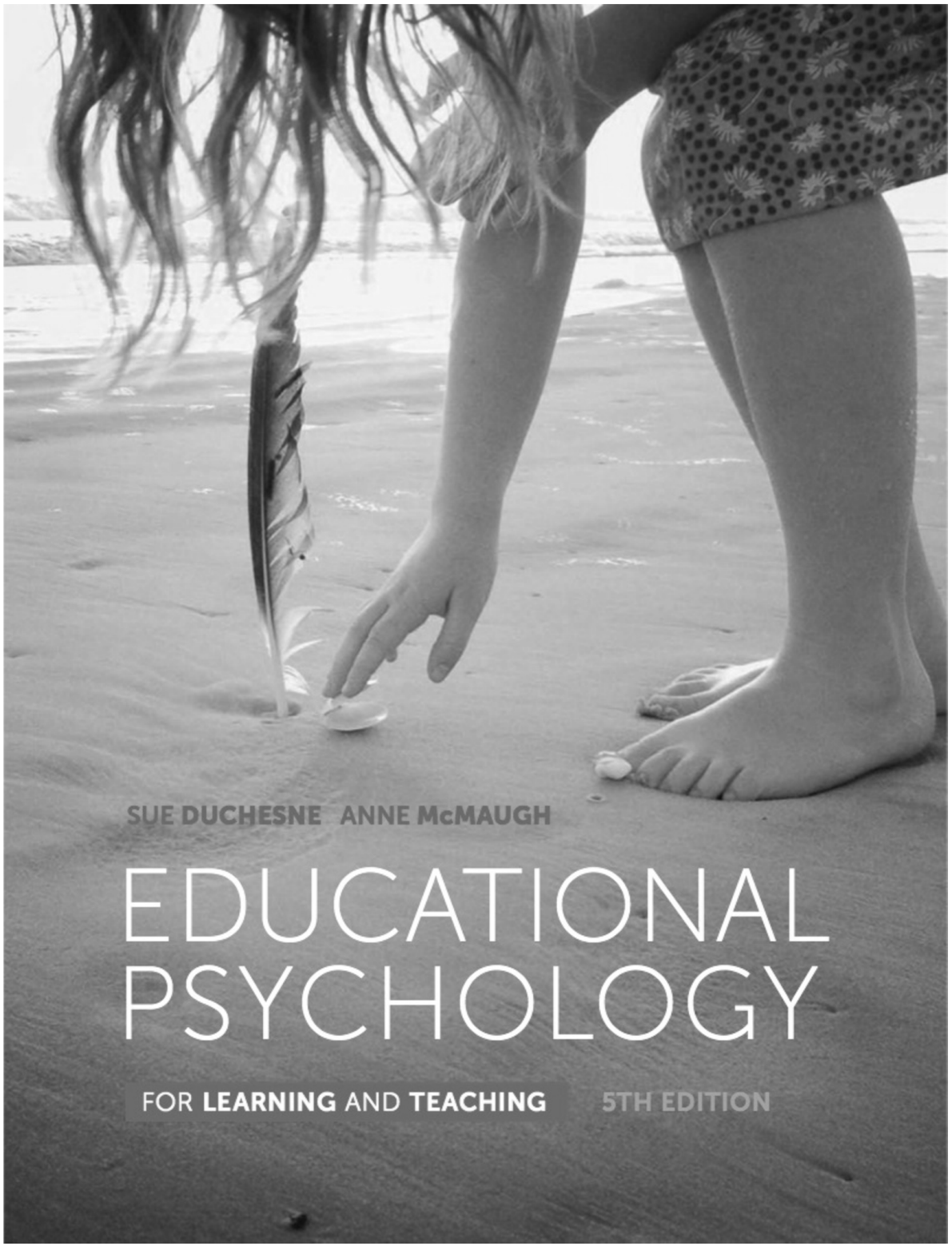

SUE DUCHESNE ANNE McMAUGH

EDUCATIONAL PSYCHOLOGY

FOR **LEARNING** AND **TEACHING** 5TH EDITION

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Guide to the text

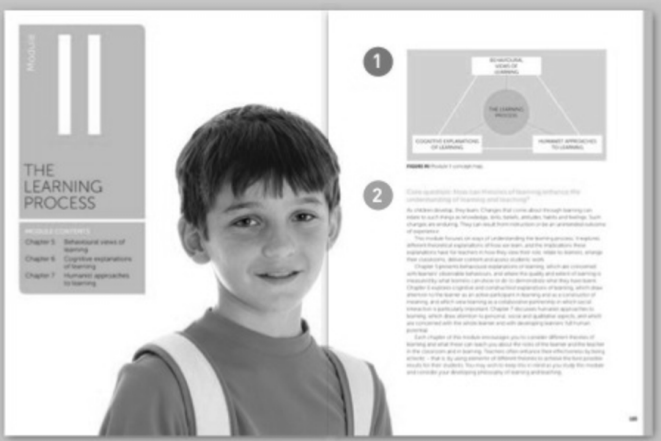
As you read this text you will find a number of features in every chapter to enhance your study of educational psychology and help you understand how to apply it in the classroom.

MODULE FEATURES

Chapters are grouped into four colour-coded modules that cover a particular set of theories or issues.

1. **Module concept maps** introduce each of the four modules to give you an overview of how the chapters in the module relate to each other.

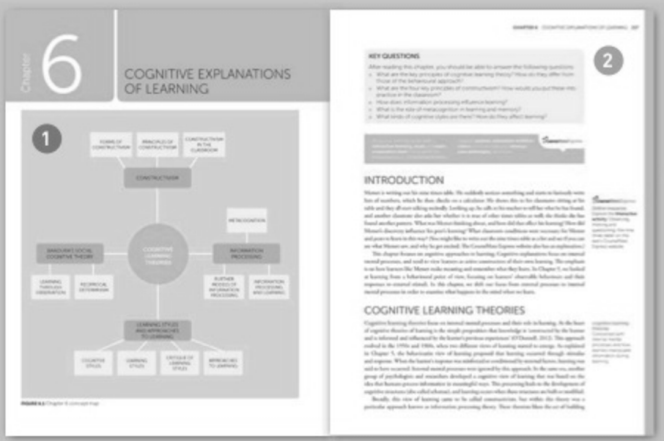
2. A **core question** at the start of each module helps you to connect your study of educational psychology to real-world issues.



Putting it together tables at the end of each module help you to see the connections between the materials and maintain a holistic view of children, of learning and of teaching.



CHAPTER OPENING FEATURES



1. **Chapter concept maps** provide a visual overview of the key concepts in each chapter and how these concepts connect to each other.

2. A list of **Key questions** gives you a broad outline of what the chapter will cover. After reading the chapter, return to this list to check your understanding of each topic.

FEATURES WITHIN CHAPTERS

THINK ABOUT

Think about... panels encourage you to reflect critically on important concepts and your beliefs about the processes of learning and teaching as you progress through each chapter.

THINK ABOUT

- What makes an effective teacher, in your experience?

RESEARCH LINKS

Research links boxes highlight specific studies and help you to understand the role of research in teaching and learning.

BOX 3.3 RESEARCH LINKS

THINKING CRITICALLY ABOUT CLASSIFICATION

To assess children's understanding of classification, Piaget used squares and circles of different sizes (large and small) and colours (red and blue). The interviewer presents the squares and circles and asks the child to sort them into groups that are alike. When the child has finished, the interviewer asks: 'Tell me why you sorted the objects into these groups. What shall we call this group? ... And this one?' They then ask: 'Can you think of

CASE STUDY

Case studies help you see how theories have been applied within Australian and New Zealand classroom settings.

BOX 1.1 CASE STUDY

ANNE'S REFLECTIVE JOURNAL

Anne was teaching a Year 8 French class. The following is from her Term 1 journal:

I want to use immersion but it is too overwhelming for some students – they just give up. There is a wide range of abilities, with some students able to translate the cartoon with ease, and others with no idea of the basics.

IMPLICATIONS FOR EDUCATORS

Implications for educators boxes give concise overviews of the implications for learning and teaching of the material you have been reading.

BOX 1.2 IMPLICATIONS FOR EDUCATORS

COGNITIVE AND LEARNING STYLES IN THE CLASSROOM

- Carefully consider the supporting evidence for any learning intervention before implementing it in the classroom – seek out critical reviews that explore the pros and cons.
- Some educators have used brain lateralisation to explain children's academic

CLASSROOM LINKS

Classroom links boxes provide real-life examples of research or applications of theory.



BOX 13.3 CLASSROOM LINKS

DEVELOPMENTAL MAP

Maps such as the one below can help teachers to pinpoint through observation and work samples where students are in their learning development, and where they will take them next. Masters (2013) explained that such maps allow progress in learning to be charted and monitored, guiding teaching to respond to students' readiness and learning needs – see Box 13.1 on page 497.

ABOUT...

Other boxes profile leading contemporary and historical psychologists and their theories.



BOX 1.2 ABOUT... JEAN PIAGET

Jean Piaget (1896–1980) was born in Neuchâtel, Switzerland to well-educated, professional parents (Brainerd, 1996). His childhood was not happy – his mother had mental health problems, and this led Piaget, like his father, to spend his time in scientific study rather than pursuing more conventional leisure activities. It also stimulated an interest in psychology. Piaget showed early promise of intellectual ability. At the age of seven he began to study mollusks, carrying out very detailed observations in the lakes around Neuchâtel. By 10 years old he had published his first scientific article, and at 14 years old he was offered a curator's position at the Geneva Museum of Natural History but was too young to take it up (Wadsworth, 2996). At the age of 16, he gained a Bachelor's degree from the University of Neuchâtel, then a PhD, and by the age of 21 had published 25 scholarly papers.

FIGURE 2.2 Piaget observed children and questioned

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Online Resources

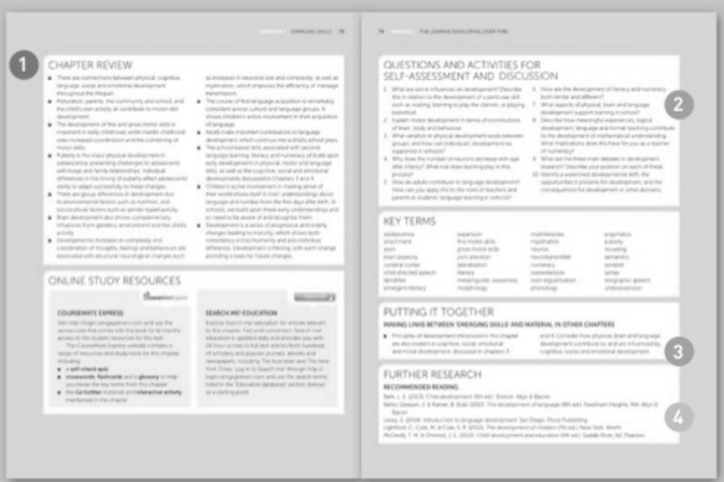
Watch a **video** on this text's CourseMate Express website showing an adolescent girl talking about why her friends go to the gym.

Throughout the book you'll find **CourseMate Express** icons that direct you to additional online materials. These include **videos, interactive activities** and materials to help you **Go further** and deepen your understanding of particular topics. The icons also suggest opportunities for you to **Develop your philosophy** of learning by using documents on this text's website.

END OF CHAPTER FEATURES

At the end of each chapter you'll find several tools to help you to review key concepts and extend your learning.

1. **Chapter review** sections summarise the key concepts and issues.
2. **Questions and activities for self-assessment and discussion** assist you to revise key topics and consolidate your learning.
3. **Putting it together** sections highlight links to key concepts across the chapters.
4. You'll find suggestions for **further research**, including recommended reading, key websites to visit and recommended database search terms to help you find more information.



Guide to the online resources

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Chapter 1

EDUCATIONAL PSYCHOLOGY FOR LEARNING AND TEACHING

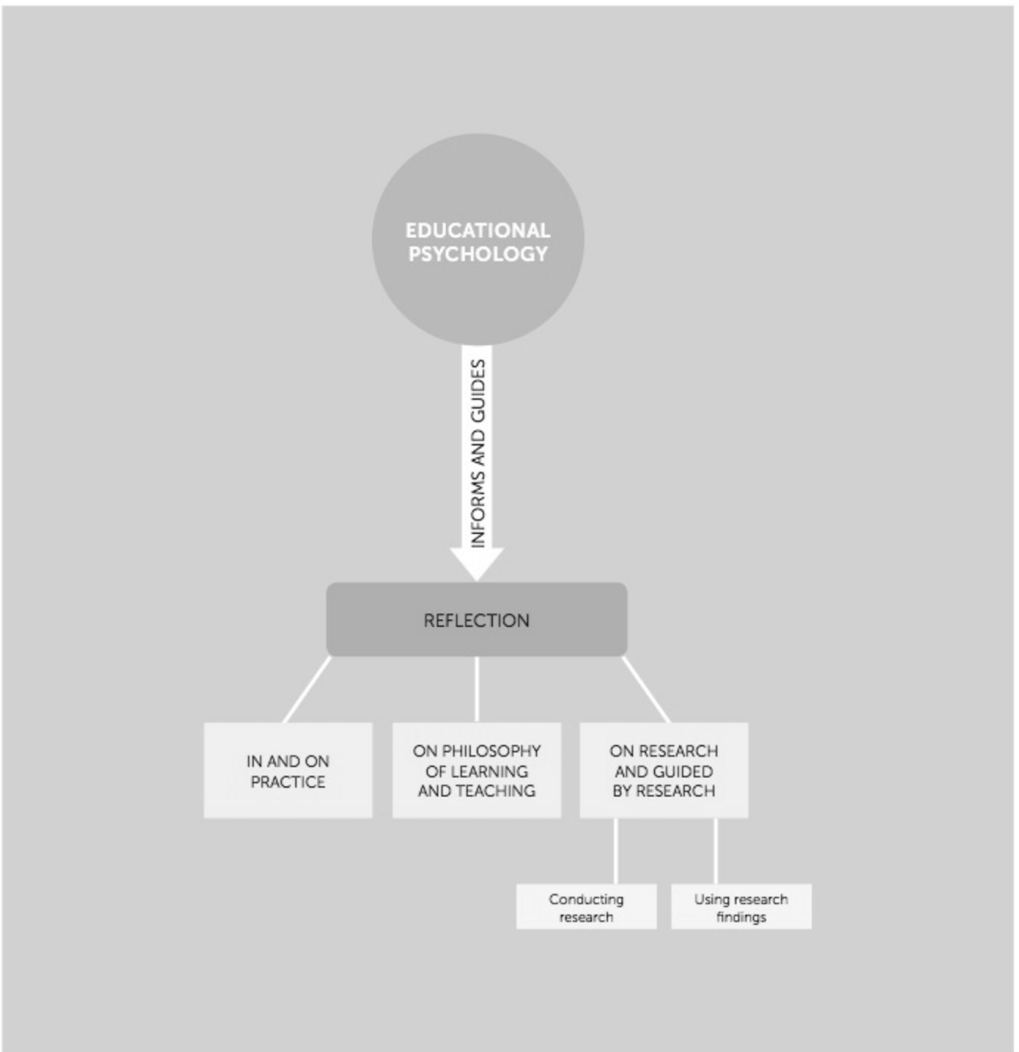

FIGURE 1.1 Chapter 1 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- What is the purpose of educational psychology?
- How can educational psychology contribute to my development as a teacher?
- What is the role of reflection in teaching, and which tools will help?
- How can I use these reflective tools in quality ways to enhance my teaching?

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INTRODUCTION

For many students using this book, the field of educational psychology – or 'ed. psych.', as you may soon call it – will represent uncharted waters. You may have chosen this area because you have always been interested in psychology, or perhaps you are studying to be a teacher and educational psychology is a compulsory subject. We hope that, whatever your reason for using this text, it will help you to develop your understanding and thinking about learning and teaching.

WHAT IS EDUCATIONAL PSYCHOLOGY?

Some students ask: 'Why not just simplify and call it *psychology*?' The reason is that **educational psychology** is a discipline in its own right, and connects the disciplines of education and psychology (Walberg & Haertel, 1992). It involves not only scientific research on the various dimensions of learning and teaching, but also the investigation of ways to apply psychological principles to educational contexts with the aim of enhancing learning and teaching quality.

educational psychology
A branch of psychology concerned with studying how people learn and the implications for teaching

One of the things students enjoy most about this subject is that, by studying theories of learning and development, they learn a lot about their own development and what influences their learning. A number of the effective teaching practices you experienced at school could be traced back to some element of educational psychology. As you read this book, you will begin to understand your own learning processes and how to improve them. You will also be challenged to think about ways in which teaching could be improved to cater for student differences and particular student needs.

WHO STUDIES EDUCATIONAL PSYCHOLOGY?

The discipline of educational psychology can be applied in many contexts. You may have taken up this book because you plan to be a teacher, and must study educational psychology as a foundation unit. Other readers may be psychology students who are interested in working with children or adolescents, whether in professional practice or as a counsellor in a school setting. Others may be preparing to be educational psychologists – qualified psychologists who specialise in applying their expertise in educational contexts, and who work in schools or other institutional settings (for example, university, government or corporate settings) where education takes place. Still others may be reading this text to better understand their own learning and the education process.

We recognise that the majority of this book's readers will be planning a teaching or related career. For this reason, our examples focus on early childhood, school-aged children and youth.

WHY STUDY ALL THOSE THEORIES?

It is true that when you first start studying educational psychology, you are introduced to many theories. Some educational psychology students have been heard to say: 'Ed. psych. is just a lot of theory … I came to uni to learn how to teach kids!' Our advice to you is to not lose heart and to remember that theories have an important purpose.

You will discover that theories form the foundation for understanding many critical issues that face learners and educators in the 21st century. Throughout this book, and particularly in the first half, we link theory to practice and encourage you to do the same. You will find that theories help us answer questions such as: What are the best ways of studying? How can I improve motivation – both mine and others'? Why do some young people give up on themselves, and what can I do about it? How can technology be used to enhance learning? Is education redundant in the information age?

Educational psychology and the theories of development and learning covered in this text will:

- help you understand your own development and factors that have contributed to it
- provide strategies to enhance the quality of your learning and motivation
- guide your understanding of how learners learn and how educators can become more effective in their teaching practice
- contribute to your personal philosophy of learning and teaching.

CHANGES IN THE EDUCATION LANDSCAPE

In the past few years, Australia has experienced major changes in policy and curriculum relating to schools and teaching, with the introduction of the Early Years Learning Framework (EYLF) in 2009, the *Australian professional standards for teachers* in 2011 and the Australian Curriculum in 2012. New Zealand also underwent changes to its assessment framework in 2011, and an expansion of Ka Hikitia, the Māori education strategy, into a second phase in 2013. You will find references to all of these documents in this edition of the text. Here, we consider how your study of educational psychology using this text might contribute to your development of knowledge towards the relevant teacher standards.

Educational psychology will contribute towards a number of elements of your professional knowledge, professional practice, and professional engagement. Table 1.1 provides an overview.

TABLE 1.1 Teaching standards and this text

CHAPTER	ELEMENTS FROM THE *AUSTRALIAN PROFESSIONAL STANDARDS FOR TEACHERS*	ELEMENTS FROM THE *GRADUATING TEACHER STANDARDS: AOTEAROA NEW ZEALAND*
	1 Know students and how they learn	**2 Know about learners and how they learn**
Module I: Chapters 2, 3 and 4	1.1 Physical, social and intellectual development and characteristics of students *Demonstrate knowledge and understanding of physical, social and intellectual development and characteristics of students and how these may affect learning*	2a Have knowledge of a range of relevant theories and research about pedagogy, human development and learning
Module II: Chapters 5, 6 and 7	1.2 Understand how students learn *Demonstrate knowledge and understanding of research into how students learn and the implications for teaching*	2a Have knowledge of a range of relevant theories and research about pedagogy, human development and learning
Module IV: Chapter 13		2b Have knowledge of a range of relevant theories, principles and purposes of assessment and evaluation
Module II: Chapter 6		2c Know how to develop metacognitive strategies of diverse learners

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CHAPTER	ELEMENTS FROM THE *AUSTRALIAN PROFESSIONAL STANDARDS FOR TEACHERS*	ELEMENTS FROM THE *GRADUATING TEACHER STANDARDS: AOTEAROA NEW ZEALAND*
		3 Understand how contextual factors influence teaching and learning
Module III: Chapter 11	1.3 Students with diverse linguistic, cultural, religious and socioeconomic backgrounds *Demonstrate knowledge of teaching strategies that are responsive to the learning strengths and needs of students from diverse linguistic, cultural, religious and socioeconomic backgrounds* 1.4 Strategies for teaching Aboriginal and Torres Strait Islander students *Demonstrate broad knowledge and understanding of the impact of culture, cultural identity and linguistic background on the education of students from Aboriginal and Torres Strait Islander backgrounds*	3a Have an understanding of the complex influences that personal. social and cultural factors may have on teachers and learners 3c Have an understanding of education within the bicultural, multicultural, social, political, economic and historical contexts of Aotearoa New Zealand
Module III: Chapters 9 and 10	1.5 Differentiate teaching to meet the specific learning needs of students across the full range of abilities *Demonstrate knowledge and understanding of strategies for differentiating teaching to meet the specific learning needs of students across the full range of abilities*	
Module III: Chapter 10	1.6 Strategies to support full participation of students with disability *Demonstrate broad knowledge and understanding of legislative requirements and teaching strategies that support participation and learning of students with disability*	
	2 Know the content and how to teach it	
Module I: Chapter 2	2.5 Literacy and numeracy strategies *Know and understand literacy and numeracy teaching strategies and their application in teaching areas*	
Module IV: Chapter 12	2.6 Information and communication technology (ICT) *Implement teaching strategies for using ICT to expand curriculum learning opportunities for students*	
	3 Plan for and implement effective teaching and learning	
Module II: Chapters 5, 6 and 7	3.2 Plan, structure and sequence learning programs *Plan lesson sequences using knowledge of student learning, content and effective teaching strategies* 3.3 Use teaching strategies *Include a range of teaching strategies*	
Module IV: Chapter 12	3.4 Select and use resources *Demonstrate knowledge of a range of resources, including ICT, that engage students in their learning*	
	4 Create and maintain supportive and safe learning environments	**4 Use professional knowledge to plan for a safe, high quality teaching and learning environment**
Module II: Chapters 5, 6 and 7		4a Use and sequence a range of learning experiences to influence and promote learner achievement
Module III: Chapters 8, 9, 10 and 11	4.1 Support student participation *Identify strategies to support inclusive student participation and engagement in classroom activities*	

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CHAPTER	ELEMENTS FROM THE *AUSTRALIAN PROFESSIONAL STANDARDS FOR TEACHERS*	ELEMENTS FROM THE *GRADUATING TEACHER STANDARDS: AOTEAROA NEW ZEALAND*
Module IV: Chapter 14	4.2 Manage classroom activities *Demonstrate the capacity to organise classroom activities and provide clear directions* 4.3 Manage challenging behaviour *Demonstrate knowledge of practical approaches to manage challenging behaviour* 4.4 Maintain student safety *Describe strategies that support students' wellbeing and safety working within school and/or system, curriculum and legislative requirements*	4f Demonstrate commitment to and strategies for promoting and nurturing the physical and emotional safety of learners
Module IV: Chapter 12	4.5 Use ICT (information and communications technology) safely, responsibly and ethically *Demonstrate an understanding of the relevant issues and the strategies available to support the safe, responsible and ethical use of ICT in learning and teaching*	
	5 Assess, provide feedback and report on student learning	**5 Use evidence to promote learning**
Module IV: Chapter 13	5.1 Assess student learning *Demonstrate an understanding of assessment strategies, including informal and formal, diagnostic, formative and summative approaches to assess student learning* 5.2 Provide feedback to students on their learning *Demonstrate an understanding of the purpose of providing timely and appropriate feedback to students about their learning* 5.3 Make consistent and comparable judgements *Demonstrate an understanding of assessment moderation and its application to support consistent and comparable judgements of student learning* 5.4 Interpret student data *Demonstrate the capacity to interpret student assessment data to evaluate student learning and modify teaching practice* 5.5 Report on student achievement *Demonstrate an understanding of a range of strategies for reporting to students and parents/carers and the purpose of keeping accurate and reliable records of student achievement*	5b Gather, analyse and use assessment information to improve learning and inform planning 5c Know how to communicate assessment information appropriately to learners, their parents/caregivers and staff
		6 Develop positive relationships with learners and the members of learning communities
Module III: Chapter 11		6a Recognise how differing values and beliefs may impact on learners and their learning 6d Promote a learning culture which engages diverse learners effectively
	6 Engage in professional learning	**7 Are committed members of the profession**
Chapter 1	6.4 Apply professional learning and improve student learning *Demonstrate an understanding of the rationale for continued professional learning and the implications for improved student learning*	7d Are able to articulate and justify an emerging personal, professional philosophy of teaching and learning

Sources: © Education Services Australia (ESA) (2015). ESA is the legal entity for the Standing Council on School Education and Early Childhood (SCSEEC). The Australian Professional Standards for Teachers were developed by the Australian Institute for Teaching and School Leadership (AITSL). This extract has been used with permission from ESA and AITSL; Copyright © 2015 by New Zealand Teachers Council. Used by permission.

REFLECTIVE TEACHING

Students sometimes enter teacher education courses with the aim of discovering 'the best way to teach'. Researchers in educational psychology have also looked at what makes an effective teacher. In one international study, Clarke, Keitel and Shimizu (2006) researched the practices of competent teachers in 16 different countries, including Australia, and found that many different approaches were used. They also discovered that effective teachers drew on a variety of teaching and learning strategies. In line with their conclusions, we argue in this book that there is no one best way to teach, but rather that effective teaching is linked to making effective choices for yourself as a teacher, and about your subject matter and for your students. These may involve choices about curriculum content, learning and teaching strategies, methods of assessment and reporting, how to motivate students, catering for individual difference and classroom management. How do teachers evaluate whether their choices were good ones? Educational psychology can help.



THINK ABOUT

- What makes an effective teacher, in your experience?

Teaching can be described as a complex problem-solving activity. As such, research on effective problem solving and effective learning is applicable to teaching. In Chapter 6 you will see that effective learners are reflective about their learning, and have knowledge of themselves, the task they are undertaking and strategies they can implement. Planning, monitoring and evaluating are metacognitive (thinking about thinking) strategies employed by effective learners. In the same way, reflective teachers draw on metacognitive knowledge of self, task and strategies as they plan, monitor and evaluate their teaching.

Reflection has been described as important to quality teaching practice for some time. Dewey (1933) described reflection as a type of problem solving, and argued that reflection involves teachers in the important work of connecting their beliefs and knowledge to current actions and situations, potentially leading to the reframing of those ideas and beliefs, and more effective action. Schön (1983, 1987) coined the term 'reflective practice', focusing on the ways in which people think about their experiences and formulate responses as they happen ('thinking on your feet', which he called 'thinking in action'), as well as afterwards ('thinking on action'). In teaching, reflective practice occurs at all stages of the teaching process (see Figure 1.2).

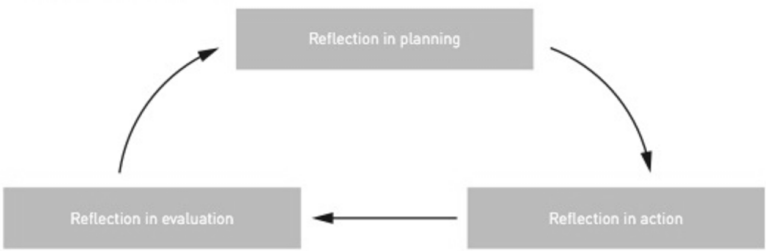

FIGURE 1.2 The cyclical nature of the reflective teaching process.

A number of researchers have developed typologies of reflection on teaching, distinguishing between several levels of reflection (for example, Lane, McMaster, Adnum & Cavanagh, 2014; Nelson & Sadler, 2013; Thorsen & DeVore, 2013). Collin, Karsenti and Komis (2013) caution that levels of reflection

should not be used to distinguish between reflection that is 'good' or 'bad', as what is most useful may depend on the circumstance. The following combines aspects from a number of the typologies to summarise the levels in broad terms:

1 At the most basic level, there is a ***description*** of what happened in the situation and its context (in Dewey's terms, this is not yet reflection); for example: 'The students were working in groups to solve an addition problem. Not all of the students participated in the groups, with some sitting back and letting others do all the talking'.
2 The next level adds some ***evaluation*** to the description; for example: 'In group work there's a range of participation. I need to make note of who does and doesn't participate, and think of how to involve them all in the learning'.
3 At a higher level, teachers ***analyse*** what happened in the situation; for example: 'I think in these group tasks some are silent but still thinking, one or two are dominating the thinking and talking, while others are being lazy and letting the rest of the group do the thinking. My setting up of group tasks will need to include strategies to ensure that all need to think, and that all can be heard'.
4 The highest level of reflection ***integrates*** the three previous tasks of description, evaluation and analysis, makes plans for proposed actions, and involves some kind of ***reframing*** of ideas, with reference to theory; for example: 'Group work helps some students to learn, while others do more learning in individual tasks. There may be a way of combining the two so that both sets of students are catered for in the one activity, but perhaps using a mix of individual, pair and group tasks would be best – both for optimum learning, and for inclusivity'.

Reflective teaching is informed teaching. Thus, reflection can draw on immediate experience, as well as theory and research in other settings, research in your own classroom (action research), discussion with colleagues, and feedback from students. The study of educational psychology is an important element that informs your reflection on your teaching.

This chapter outlines four main tools to help you become a more reflective practitioner, all of which draw on educational psychology. These are:

1 reflecting on your teaching practice
2 developing your personal philosophy of learning and teaching
3 using existing research to inform your practice
4 conducting research of your own.

REFLECTING ON YOUR TEACHING PRACTICE

critical reflection Analysing what we are thinking and learning by questioning assumptions, perspectives and values related to our thoughts or to new information

Critical reflection involves analysing your own and others' thoughts and beliefs. It involves thinking about why people – yourself and others – behave in certain ways. When you reflect critically, you analyse and question existing knowledge and assumptions.

Reflection is a constant process, linked to practice. It can be supported by a range of activities, including reflective journals and portfolios, observation, and consulting with colleagues such as mentors or critical friends.

Keeping a reflective journal and portfolio

A reflective journal is written as a record of your experience with the purpose of examining and evaluating it. Portfolios extend this idea with the collection of work samples, lesson plans, worksheets and other artefacts of your teaching, accompanied by reflective commentary on the collection. Some prompts for reflection might be research reports, other professional reading, or discussions with colleagues. Here are some questions to guide your reflection on your teaching:

1 What are my goals for this class/this lesson?
2 How does what I do reflect those goals?
3 What are students responding well to?
4 What is not working? What are students responding poorly to?
5 What is frustrating me or the students?
6 Are my goals being met? Why or why not?
7 What does research and my professional reading tell me about what is happening or what should be happening in this class?
8 What have I seen or heard about in other classes that might be helpful?
9 What other goals do I need to focus on?
10 What new strategies do I need to explore?

Box 1.1 gives an example of one teacher's reflective journal.

BOX 1.1 CASE STUDY

ANNE'S REFLECTIVE JOURNAL

Anne was teaching a Year 8 French class. The following is from her Term 1 journal:

> I want to use immersion but it is too overwhelming for some students – they just give up. There is a wide range of abilities, with some students able to translate the cartoon with ease, and others with no idea of the basics (pronouns!). It's difficult for them to do exercises with minimal vocab, and for some, little understanding of how the language works. I think group work would allow the better students to move ahead while the beginners learn the basics. Will have to work on my classroom management skills for this to work. Spoke to [another teacher] about what she does with her German class. She has set formal grammar exercises for a small group of difficult ones who were way behind the rest of the class and very disruptive. Not sure how motivating this would be, but she says they are powering through them, and like the structure, and the idea that they can do it. Success is everything. Should look up the research on using immersion in Australia. I'm sure other teachers must have encountered this. Meanwhile for next lesson: set up activities with a series of exercises, stems on board, and some direct instruction. Small groups with cards in English (advanced students) or French (beginners) to complete the stems

Je veux ... or je ne veux pas ...	Je peux ... or je ne peux pas ...
Money for the show	Visit grandma
Buy clothes/a skateboard	Play at a friend's house
Do the washing up	Go to a movie
Go to Europe for the holiday	Stay at home

ACTIVITIES

Keep a journal of your ideas about teaching at present, and compare them with those you have at the end of your training, when you start teaching full-time, and several years hence.

Using mentors, critical friends and colleagues

Mentors are expert practitioners who take on a responsibility to share their skills and experience with a novice to help them to develop professional expertise. This may involve direct transfer of teaching skills, but it may also involve many other strategies: helping novices to reflect on their practice, or pointing them in the right direction to seek help, for example. Mentor programs may be formal or informal.

mentor
An expert practitioner inducting a novice into their profession

Many universities and education departments in Australia and New Zealand make use of mentors in teacher education and beginning teacher induction programs, and mentors are also seen at other levels of professional development, such as school leadership.

As well as expertise, there are a number of characteristics you may want to consider when choosing who you will approach to request a mentor relationship, thinking about someone who communicates well with you, is reflective, whom you trust, and who has expertise and a degree of match with your philosophy of learning and teaching. You are entering into a relationship that will involve demands on their time, and need to consider that as well. Is the person likely to have the time to listen to and talk with you, to come and watch you teach, and to reflect on your concerns? Possible roles mentors can fill include:

- emotional support
- professional support, including modelling, sharing of expertise and resources
- supervision
- critical evaluation, including provision of feedback
- reflection
- team teaching and collaboration (Hall, Draper, Smith & Bullough, 2008).

Given this range of roles, you may want to consider a number of colleagues: critical friends who can give you feedback on your ideas, a more senior colleague for advice, another teacher in your department with whom you can pair up to watch and comment on each other's lessons, and a friendly person who encourages you. All of this suggests a teamwork approach to teaching. Colleagues provide an important source of assistance and input for reflection.

Observation

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Online resources
Watch a **video** of a pre-service teacher reflecting on how she used some of the reflection activities during professional experience.

It can be helpful to observe your own class with fresh eyes, as well as observing others teaching. Aids to observation may include video and audio. Of course, you must gain the consent of your students to record them in this way, and make clear to them the purpose of the recording. McFadden, Ellis, Anwar and Roehrig (2014) reviewed a number of studies showing that observing and annotating video facilitated reflection, increasing depth of thinking, particularly when the process involved interaction with others. Additionally, you may choose to focus on certain behaviours you or your students are exhibiting. In this case, an anecdotal record or checklist may be useful. An anecdotal record is a simple description of an activity or event giving information on the setting of the activity, the individuals involved, what was said or done by whom, and the length of time involved. Such information is useful for analysing what is happening in a problematic situation, and for describing and defining specific behaviours. An example of an observation is given in Figure 1.5 (see page 17).

REFLECTING ON YOUR PERSONAL PHILOSOPHY OF LEARNING AND TEACHING

Studying educational psychology provides an ideal opportunity to develop the ability to reflect critically, and in so doing to develop a personal philosophy of learning and teaching. A philosophy is like a personal mission statement: it guides your choices, behaviours, thoughts and feelings. Whether you plan to teach in classrooms, work as a school counsellor, support your own children's learning or simply be a responsible and informed member of society, your personal philosophy will be central to what you believe, how you think and behave, and how you relate to others.

All of us have experience as learners, and possibly as teachers as well. As such, we come to the learning–teaching process with implicit theories, and preferences regarding learning and teaching. It can be helpful to examine that implicit knowledge, and to become aware of its origins. As you

study units in education, and gain further experience, your philosophy may well change. We hope, for example, that studying educational psychology will give you new insights into the learner, the learning–teaching process and some of the choices available to you as a teacher. With further teaching experiences, and deepening knowledge, your philosophy of learning and teaching is likely to continue to evolve. Developing a personal philosophy helps you to be aware of your beliefs, how they are related to your knowledge and experience, and the ways in which they can have an impact upon your learning and teaching. As a teacher, your philosophy should be informed by relevant theory and research in educational psychology. It will help you to set goals, make choices and evaluate your progress.

Here are some questions that might help you to start thinking about your personal philosophy:

- What does teaching involve?
- What (and who) has an impact upon learning?
- What is the role of the teacher?
- What makes an effective teacher?
- What is the role of the learner?
- What is learning?
- What makes an effective learner?

On the CourseMate Express website, you will find 'Develop your philosophy', which provides a space for you to consider your philosophy of learning and teaching related to each module of this text.

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Online resources
Take a moment to consider your personal philosophy. You may wish to use the **Develop your philosophy** tool on this text's CourseMate Express website.

USING RESEARCH AS A REFLECTIVE TEACHER

Research in educational psychology can assist the reflective teacher in several ways. First, it can be a source of new strategies or ideas for teaching. In studying this text, you may identify some ideas and strategies of which you were previously unaware. Second, research can help teachers to evaluate a number of choices in order to select the most appropriate one for their circumstance.

Research in educational psychology can also help teachers to make sense of their experiences by comparing them with others' findings and with theory.

John Hattie (1999, 2003, 2009) has conducted a number of meta-analyses, combining the results of thousands of studies to compare the effects of various factors on student achievement. He reported that student factors account for about 50 per cent of variance in achievement, while teachers accounted for about 30 per cent, and home, peers, schools and school principals each accounted for between 5 per cent and 10 per cent of achievement variance (see Figure 1.3). Hattie (2009) argued that beyond student ability, what teachers do in classrooms makes the greatest contribution to student learning, so it's important to think about how we evaluate what we do.

Hattie's research showed that almost all teacher interventions made some difference to student learning. This is in part because of the process of reflection the teachers go through in preparing, conducting and evaluating the program. This is a strong argument for research as a tool for reflection. Hattie argued that because the average effect size was 0.4, we should look for effects above this figure to identify truly effective interventions. His results are summarised in Table 1.2. You can explore many of the influences in the chapters of this book, as indicated in the table.

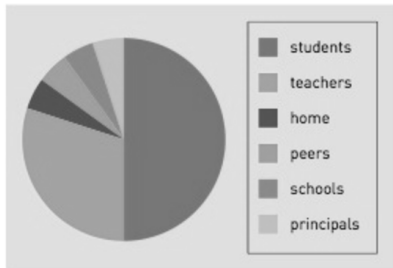

FIGURE 1.3 Percentage of achievement variance according to Hattie's research.

TABLE 1.2 What makes a difference to students' achievement? Comparison of effect sizes

BIGGEST EFFECTS	EFFECT SIZE	CHAPTER	SMALLEST OR NEGATIVE EFFECTS	EFFECT SIZE	CHAPTER
Piagetian programs	1.28	3	Programmed instruction	0.24	5
Classroom behaviour	0.80	14	Finances	0.23	11
Comprehensive interventions for learning disability	0.77	10	Class size	0.21	
Reciprocal teaching	0.74	3	Web-based learning	0.18	12
Feedback	0.73	13	Problem-based learning	0.15	6
Metacognitive strategies	0.69	6	Ability grouping	0.12	9, 10
Prior achievement	0.67	9	Gender	0.12	11
Creativity programs	0.65	9	Open versus traditional	0.01	7
Cooperative learning	0.59	6, 7	Summer vacation	−0.09	
Study skills	0.59	6	Retention	−0.16	10
Direct instruction	0.59	5	Television	−0.18	
Socioeconomic status	0.57	11	Mobility (changing schools)	−0.34	11
Quality of teaching	0.44	6, 7, 8			

Source: Adapted from Hattie, J. A. C., *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Published by Taylor & Francis Group, © 2009.

Reading and evaluating research

There is an enormous well of research in educational psychology from which to draw. Judging what is useful is an important skill for teachers to develop, as you will encounter numerous new approaches, theories and strategies in your practice. Hattie's rough guide of looking for effect sizes larger than 0.4 is one way to judge research studies showing an effect from a particular intervention. Other questions you might ask include:

- What evidence supports the theory, strategy or finding? Has it been researched? Is the research valid and reliable? Are the claims fully or only partially supported by the evidence? What other explanations of the research outcomes are there?
- Does it fit with other research in the area?
- Is it well supported by educational theory?
- What other views are there? Throughout this book, you will find presentations of different views on particular topics. By reviewing the research, you can make judgements about which view is best supported by the evidence, and perhaps identify what research still needs to be conducted.
- Where has the work been published? Is it only on the Internet? A vast amount of information on the Internet is very mixed in terms of quality and reliability. Research published in journals that have fellow academics review the articles submitted has been through a rigorous process before publication. Your university librarian can help you to locate appropriate journals for your area of interest.

CONDUCTING RESEARCH AS A REFLECTIVE TEACHER

The research process

Conducting your own research in educational psychology can give you an insight into the research process, as well as giving you direct answers to your own questions. It also helps teachers to integrate their experience with theory and previous research. The research process involves asking questions, informed

by prior research and theory, and then seeking answers to those questions through the collection and analysis of some kind of data. The conclusions drawn by the researcher about the meaning of the data are tested by reference to previous research and theory, and by presentation of the results for others to evaluate.

Figure 1.4 summarises the research process. Note that although this has been presented in a step-wise fashion, in reality, researchers may take a different path; for example, reframing a new research question after collecting interesting data, returning to design a second study linked to the first, or changing the research question if the original one proves unworkable to test.

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Online resources
Go further: See guidelines for writing a research report in Education on this text's website.

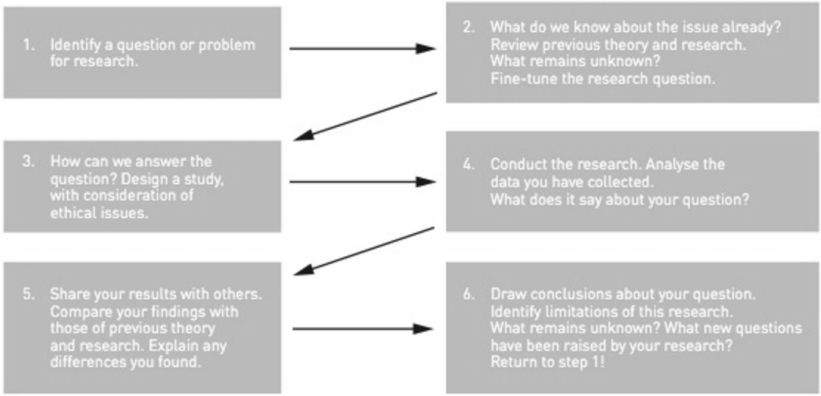

FIGURE 1.4 The research process.

CourseMateExpress
Online resources
Explore an example of a research report with the **Interactive Activity** on this text's website.

Action research

Action research is not confined to educational contexts but is undertaken by professionals across many spheres. It is defined simply as professionals investigating their own practice with the goal of improving it. It is therefore closely related to reflective teaching. The process of conducting action research involves the four steps of reflection, planning, action and reflection:

action research Professionals evaluating their own practice with the goal of improving it

1 *Reflection*. Identify the issue you are concerned about. Develop some questions concerning this issue. Learn more about the issue by reading and consulting colleagues.
2 *Planning*. Develop a strategy.
3 *Action*. Take action – implement your strategy. Share the results with your students and colleagues. Action research is a collaborative process. Evaluate the evidence about the outcomes of your strategy.
4 *Reflection*. Revise your plans based on your evaluation. This restarts the cycle. An example of action research conducted by a teacher is given in Box 1.2.

BOX 1.2 RESEARCH LINKS

ACTION RESEARCH

Carlyn Sproston (2008) conducted an action research study in her Year 8 English classroom to investigate how involving students in negotiating their learning affected their motivation.

In the first cycle, students were asked about their perceptions of their English class through questionnaires and journal entries. They saw it as 'static and boring'. In particular, they didn't like the

>>

amount of writing and inactivity in the class. They then had a class meeting at which students' views were discussed and suggestions shared about what might make it more interesting.

The action that followed this was to start a unit on children's stories, which involved students analysing these stories and then writing their own. They visited a local primary school to read their stories to the children, and showed excitement and engagement in the activity. Students' journal entries at the end of the unit showed that they had enjoyed the narrative writing, particularly because it was a 'real' task. Carlyn's own reflection on the first cycle includes:

> As I reflected on the first cycle, I re-read some of the student journal entries. It seemed to me that the majority of the students had no idea of what to write; they just wrote what I asked for. When asked for their opinions about the activities, they wrote a word or a phrase and seemed to have no idea of how to evaluate their own work. However, when I interviewed students they were able to give me some opinions about the work, and what they thought about their own learning.

This led to a second cycle of action, in which Carlyn decided to build in some strategies to help students to evaluate their own work. Students developed informative pieces to present to the class. They had choice in their topic and the mode of presentation. They were given five guiding questions to support their evaluation of their work. Once again, the action was evaluated through students' journal entries and interviews, as well as Carlyn's own reflections. The students' evaluation was much more detailed. Another finding was that some students had found having a broad choice difficult, so that while ability to choose was motivating, they needed some boundaries within which to do this.

In the third cycle – a unit on school with students' work to be presented as a speech – Carlyn referred to work by Boomer (1992) and Reid (1992) on negotiated learning. Students were given the choice of topic, task, who they worked with and the audience, with the broader topic of school as the boundary. Students' journal entries indicated a real change from the attitudes to English they had expressed at the beginning of the year. They identified 'having a choice in learning activities; being involved and having a voice in the class; positive relationships with teacher and peers; variety and activity in their classes; collaboration and teamwork; having a real or authentic audience for their work; being committed to their work and to their class community; and having fun' as important elements that resulted from the negotiation of their learning.

Carlyn's final evaluation of the process concluded that there was greater motivation and commitment to learning from her students as a result of their involvement in the decision-making process.

Source: Adapted from Sproston (2008).

ACTIVITIES

1. Identify the steps in the action research cycle in this study.
2. Read the original article that relates the study in detail.
3. How is action research different from the reflection that teachers do in the course of their work?
4. Design your own action research study for a class you are involved in (it could be a school or a university class). You will need to negotiate this with everyone involved – teachers and students.

Approaches to data collection

In learning and teaching, a number of research methods can be useful for helping teachers to reflect on their practice. These include experimental approaches, interviews and observations. Researchers are careful to choose the appropriate method to answer their research questions or to test hypotheses.

A number of books are available describing methods of educational research in depth (for example, Cohen, Manion & Morrison, 2011).

1 *Experiment.* An experiment is a particular research technique involving the manipulation of one or more variables so that you can observe the result. In the classroom, you may wish to conduct an experiment to observe the result of a particular teaching strategy. In general, this requires two groups: one that received the treatment (were taught by the strategy) and another control group that did not. Use of a control group allows the researcher to test whether any effect found was a result of the treatment or whether it would have occurred anyway.
2 *Interview.* Interviews are useful for gaining insights into the views or thinking strategies of students, parents and teachers. For example, your students' feedback on your teaching (and their learning experiences) can provide powerful information to prompt your reflection. Some guidelines for collecting data through interviews are included in Box 1.3.
3 *Observation.* Observation was discussed above as a strategy for reflective teaching. It can also be a research tool. When observing in this context, it is useful to have a systematic way of collecting the data. For example, information can be organised in the form of a checklist, with data organised in segments of time, or by student behaviour, with the observational categories listed in the left-hand column and time units or student names listed across the top. An example is given in Figure 1.5, and an activity relating to observation is available on the CourseMate Express website. Observation can also be broader, noting elements of the context, activities and participants (teacher, learners) in the situation. Anecdotal records are a useful tool with which to collect information both about the broader situation and specific events. In either case, observation will be guided by particular research questions such as 'What is contributing to the observed outcome?' or 'How is this initiative affecting students' learning?'.

The observation record sheet in Figure 1.5 has as its focus student engagement in a lesson. It could be used to research student engagement in respect to particular lesson activities, timing in a lesson, and/or relationships in learning. Having more than one observer, and comparing their records, increases the reliability of the data.



BOX 1.3 IMPLICATIONS FOR EDUCATORS

GUIDELINES FOR COLLECTING DATA THROUGH INTERVIEWS

At the start of an interview, you need to establish rapport with the interviewee. Your aim is to give them the opportunity to tell you a little more about themselves.

- **Step 1:** Commence by telling participants there are no right or wrong answers.
- **Step 2:** As a way of making participants feel comfortable, ask them to tell you or write down a list of ways in which they learned or taught that day (or the day before). This will prompt them to think about the learning activities they engage in and how they feel about them.
- **Step 3:** Ask participants to elaborate and explain why they have given their answers. Remember to always ask participants to tell you why!
- **Step 4:** Now you can introduce the topic that you want to talk about in the interview.

Ideas for eliciting information

In order to promote discussion during the interview, you might ask participants to write down their ideas and let them think about them first, before they elaborate and tell you more. You can refer to each point on this list in turn as you progress through the interview.

Some interviewers also encourage participants (of all ages) to draw pictures or some form of visual representation, and then get them to comment on these in response to questions. You may wish to experiment with this technique.

>>

It may also be helpful for you to use information from the literature to help develop your questions.

Using background reading to develop questions

Do plenty of background reading on the subject so that you are prepared to ask appropriate questions. You should tailor your reading and literature review to suit the subjects of your study if necessary. In other words, if you select an adolescent student, your literature review might look at research on adolescents.

Conducting interviews

Making sure you are well prepared is essential to conducting a successful interview. Devise a list of questions beforehand so you are familiar with them, and during the interview remember to adapt them, depending on the age of the interviewee. The set of questions does not have to be identical for each interviewee, but you should cover the same material so that you can compare and contrast answers.

Before you start the interview, take some time to get to know your interviewees (if necessary) and make sure they feel comfortable. Let them know that the purpose of the interview is to find out their views and opinions, and assure them there are no right or wrong answers. Also, make it clear that they are under no obligation to answer any question.

It is important to avoid any distractions during the interview. To this end, it is a good idea to record the interview (you will need to get ethics permission for this). Not only will this ensure you are able to focus completely on the interview, but it will be vital in preparing your transcript. Make sure your equipment is set up and ready to go so you don't need to attend to it during the interview.

Finally, try not to talk too much, and encourage the interviewees to talk. You may need to think of some prompts; for example, 'Can you tell me more about ...?', or 'Can you explain that a little more?'.

Keeping track of the interview

Some interviewers electronically record interviews, while others rely on written notes containing key points and quotes from participants. The transcript is then usually included as an appendix to the report.

In verbatim transcripts, there is no need to include 'ums' and 'aahs', but you should note any breaks or extended pauses in the interview. Body language or gestures may be noted in brackets if appropriate.

Ensure that your transcript does not contain the name/s of any schools, students or teachers. When interviewees mention names, you may include the first names only or make up pseudonyms. It is vital to maintain confidentiality throughout the report.

Quality considerations in research

If it's worth doing, it's worth doing well! In particular, researchers need to ensure that they collect information that can be trusted and that answers the questions, and that the conclusions they draw from it are reasonable, based on the information collected. The two key interrelated aspects of quality to consider in designing research are:

1 *Reliability*. This principle ensures that any findings would be found on another occasion under the same conditions. It avoids 'one off' results, and seeks to limit researcher bias. As a teacher, it is particularly important to protect against bias that might influence the results of your research. You can do this by using others to compare and confirm judgements made, and by collecting data from a range of sources or instruments.
2 *Validity*. This asks whether the research findings relate to what is claimed. For example, students' results on a reading test might be used to evaluate the effectiveness of a teaching strategy, but in

Class:	Lesson:	Date:	Time:

Record number of students engaged in each activity at time intervals of five minutes in a 50-minute block. Write the main activity of each phase of the lesson that corresponds to the time period being observed.

	Time									
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Lesson activity:										
On task – independent										
On task – with peer										
On task – with teacher										
Off task – independent										
Off task – with peer										
Off task – with teacher										

FIGURE 1.5 Observation record sheet

fact students may have encountered other teaching strategies as well as the one under investigation, or the results may simply reflect students' reading ability rather than the effect of teaching. Validity can be strengthened by using established measures of the specific topic being researched, and by using a control group and randomly assigning participants to either group.

Ethical considerations in conducting research

When conducting research with humans or animals, a number of ethical guidelines must be followed. In Australia, these have been set down by the Australian Psychological Society (APS) and other bodies such as the National Health and Medical Research Council (NHMRC). Also, universities in Australia and New Zealand have ethics committees that check that research studies fulfil the appropriate guidelines.

Some of the issues to consider include:

- *Informed consent*. Information you must give includes a description of the research, its purpose and what participation would involve. Parents' consent must be obtained when conducting research with children.
- *Anonymity and confidentiality*. You should take every step to ensure that you maintain confidentiality. This means that you should not include participants' names or other identifying characteristics in any report you make of the results. You should also keep any records of the research in a secure place, to ensure privacy.
- *Voluntary participation*. Participants must be informed that their participation is voluntary, and that they can stop the interview or withdraw from the study at any time. This includes the right

to withdraw their permission for you to use their data. Participation should be entirely voluntary. Participants must not be pressured or coerced into participating in the research.

- *Sharing of results*. Your participants should be given a copy of any report of results and have it explained to them.



THINK ABOUT

- How can you ensure that your own students' consent to participating in your research is informed and voluntary?

ABOUT THIS BOOK

This book provides an introduction to educational psychology for learning and teaching, outlining key theories and research studies relevant to early years, primary and secondary education settings. It is organised in modules, with each module covering a particular set of relevant theories or issues.

- **Module I** focuses on child development, and starts with a chapter looking at some of the underpinnings of the skills you will see students display in schools. Cognitive and social, emotional and moral development are covered in the remaining chapters.
- **Module II** has learning as its focus, and is organised around the cognitive, behavioural and humanist approaches.
- **Module III**'s focus is individual differences, with chapters looking at motivation, intelligence, special needs and sociocultural differences.
- **Module IV** looks at the application of educational psychology to a number of key aspects of teachers' work: ICT, assessment and reporting, and classroom management.

Each chapter in this book has the following features:

- Concept maps at the start of each module and chapter illustrate the connections between key concepts.
- Key questions at the start of each chapter provide a broad outline of the chapter content. After you study each chapter, you can return to the list to check your understanding of each topic.
- Case studies help you to see the application of theory in practice within Australian or New Zealand classroom settings.
- 'Think about' panels throughout the text enable you to reflect critically on the processes of learning and teaching, and on your beliefs about these processes.
- Activities at the end of many boxed items give you the opportunity to apply your new knowledge.
- Self-assessment and discussion questions and activities detailed at the end of each chapter allow you to test yourself to see if you can connect theoretical concepts and real-world contexts.
- 'Putting it together' sections at the end of each chapter offer some possible links to material in other chapters that you can explore.
- Suggestions on recommended reading, online visits and education databases provide you with tips for further reading and research. The Search me! education database is a particularly helpful resource for assignments and wider reading.
- CourseMate Express icons throughout the book indicate where there are links to further examples, videos and activities on this text's website. These icons are also used to denote opportunities for you to 'Develop your philosophy'; that is, to consider your own position on the issues of learning and teaching raised in each chapter.

CONCLUDING COMMENTS

As you study educational psychology, we hope that you will develop your skills of reflection and critical inquiry, and that it will be helpful in broadening your understanding of learning and teaching. The material we cover in this book will be most meaningful to you if you see connections between theories and issues in the real world – and, in particular, links to your own learning and teaching experiences. The book contains four modules. The first two modules introduce you to theories of development and learning, which we encourage you to think about in relation to your own development and learning processes so as to understand practical applications. The third module is about individual differences that affect learning and teaching. The final module draws on these theories as the basis for discussing issues related to the learning–teaching process.

As you start reading, prepare to learn many new terms – especially in the first half of the book. Students often become discouraged because they forget what they have read and feel overwhelmed. The key is to deal with small chunks of new information at a time. Talk with fellow students and with your lecturer or tutors about the most effective ways to learn and revise this material. Return to the questions at the start of each chapter to check your understanding. Usually, as students become more familiar with educational psychology and with discussing its application in the classroom or other contexts, they start to see connections. At the end of each module, a summary table makes links between or compares key content in each chapter. Take some time to review the relevant table as you finish a chapter, to help you connect ideas as you go, and to build your own philosophy of learning and teaching, guided by research.

CHAPTER REVIEW

- Educational psychology is the application of psychological principles to the study of learning and teaching.
- Studying educational psychology can contribute to your understanding of yourself as a learner and teacher, as well as of your students, and to your understanding of the learning and teaching processes themselves.
- Effective teaching is linked to making effective choices, and educational psychology can help to guide teachers in both making and evaluating their choices.
- Educational psychology informs and deepens reflection on teaching practice.
- Tools for critical reflection include reflective journals, portfolios, mentors and observation.
- Developing a personal philosophy of learning and teaching can guide choices; provide insights into your own behaviours, thoughts and feelings; and reveal implicit knowledge and theories you bring to your practice.
- Using existing research can inform practice, provide new ideas for teaching, evaluate choices and make sense of experiences.
- Conducting research involves asking questions, and seeking answers to those questions. Methods include experiment, interview and observation.
- Action research links reflection on teaching to research. It involves a cycle of reflection, planning and action.
- Research quality is determined by validity and reliability, as well as ethical considerations such as confidentiality, informed consent and voluntary participation.

ONLINE STUDY RESOURCES

COURSEMATE EXPRESS

Visit http://login.cengagebrain.com and use the access code that comes with this book for 12 months' access to the student resources for this text.

The CourseMate Express website contains a range of resources and study tools for this chapter, including:

- a **self-check quiz**
- **crosswords**, **flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.

SEARCH ME! EDUCATION

Explore Search me! education for articles relevant to this chapter. Fast and convenient, Search me! education is updated daily and provides you with 24-hour access to full-text articles from hundreds of scholarly and popular journals, ebooks and newspapers, including *The Australian* and *The New York Times*. Log in to Search me! through http://login.cengagebrain.com and use the search terms listed in the 'Education databases' section (page 21) as a starting point.

QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1 List some ways in which educational psychology can guide teacher reflection.
2 Identify strategies teachers can employ to reflect on their teaching, and students' learning.
3 What makes for quality research? What issues should be considered?
4 Reflect on your past experience (if any) as a participant in a research study.
   a How were you informed of the purposes of the research and your role in it?
   b How was your voluntary consent obtained?

KEY TERMS

action research | critical reflection | educational psychology | mentor

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'EDUCATIONAL PSYCHOLOGY FOR LEARNING AND TEACHING' AND MATERIAL IN OTHER CHAPTERS

- 'Research links' boxes in each chapter give examples of research studies. Consider the different approaches used.
- See Chapter 13 for more on reliability and validity.
- See Chapter 13 for more on observation and interview in relation to student assessment.
- There are opportunities throughout the book for you to reflect on and develop your philosophy of learning and teaching.

FURTHER RESEARCH

RECOMMENDED READING

Cohen, L., Manion, L. & Morrison, K. (2011). *Research methods in education* (7th ed.). Abingdon, UK: Routledge.

Larrivee, B. (2000) Transforming teaching practice: Becoming the critically reflective teacher. *Reflective Practice: International and Multidisciplinary Perspectives*, *1*(3), 293–307.

Stringer, E. T. (2014). *Action research*. Thousand Oaks, CA: Sage.

RECOMMENDED WEBSITES

Australian Institute for Teaching and School Leadership: www.aitsl.edu.au/australian-professional-standards-for-teachers
This website also has illustrations of practice in each of the various standards.

New Zealand Teachers Council: www.teacherscouncil.govt.nz/content/graduating-teacher-standards

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

- action research AND teaching
- mentoring AND teaching
- reflective practice AND teaching

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

Module

1

THE LEARNER DEVELOPING OVER TIME

MODULE CONTENTS

Chapter 2 Emerging skills
Chapter 3 Cognitive development
Chapter 4 Social, emotional and moral development





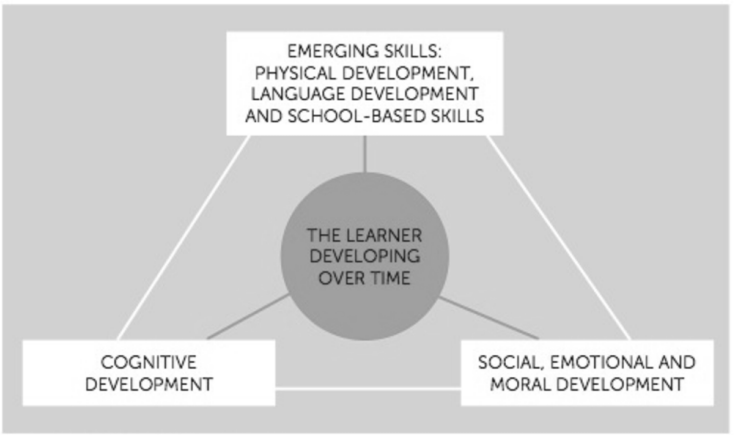

FIGURE MI Module I concept map.

Core question: How can theories of development enhance the understanding of learning and teaching?

Human development occurs in many areas: physical, cognitive, social, emotional and moral, to name a few. None of these aspects of development occurs in isolation. To understand the learner as a whole person, you need to see the interconnections between the different facets of development and the ways in which these contribute to the emergence of a complex but integrated individual.

Although genetic influences on development are significant, the role of social and cultural factors is receiving increasing attention. In this module, you will notice the use of the prefix 'socio' in words such as 'socioemotional', 'sociocultural' and 'sociomoral', to highlight social influences on development.

The three chapters in this module highlight the learner's complex and multidimensional nature. In Chapter 2 we explore the physical and linguistic dimensions of development, including brain development, and how these relate to learners who are developing the basic skills of literacy and numeracy. Chapter 3 focuses on the learner's mind and the ways in which thinking and reasoning develop over time. Chapter 4 examines what makes the learner unique – the self – and how thinking about the self and others develops as cognitive processing abilities become more complex. We also examine the relationship between cognitive, social and emotional development, the capacity for moral reasoning and the development of values and beliefs.

Recognising how developments in one dimension support and contribute to developments in other areas helps teachers consider all aspects of their students' lives in order to design appropriate learning and teaching experiences. In each chapter of this module, we encourage you to consider how teachers can adapt their teaching to cater for the varying developmental needs of students.

Chapter 2

EMERGING SKILLS

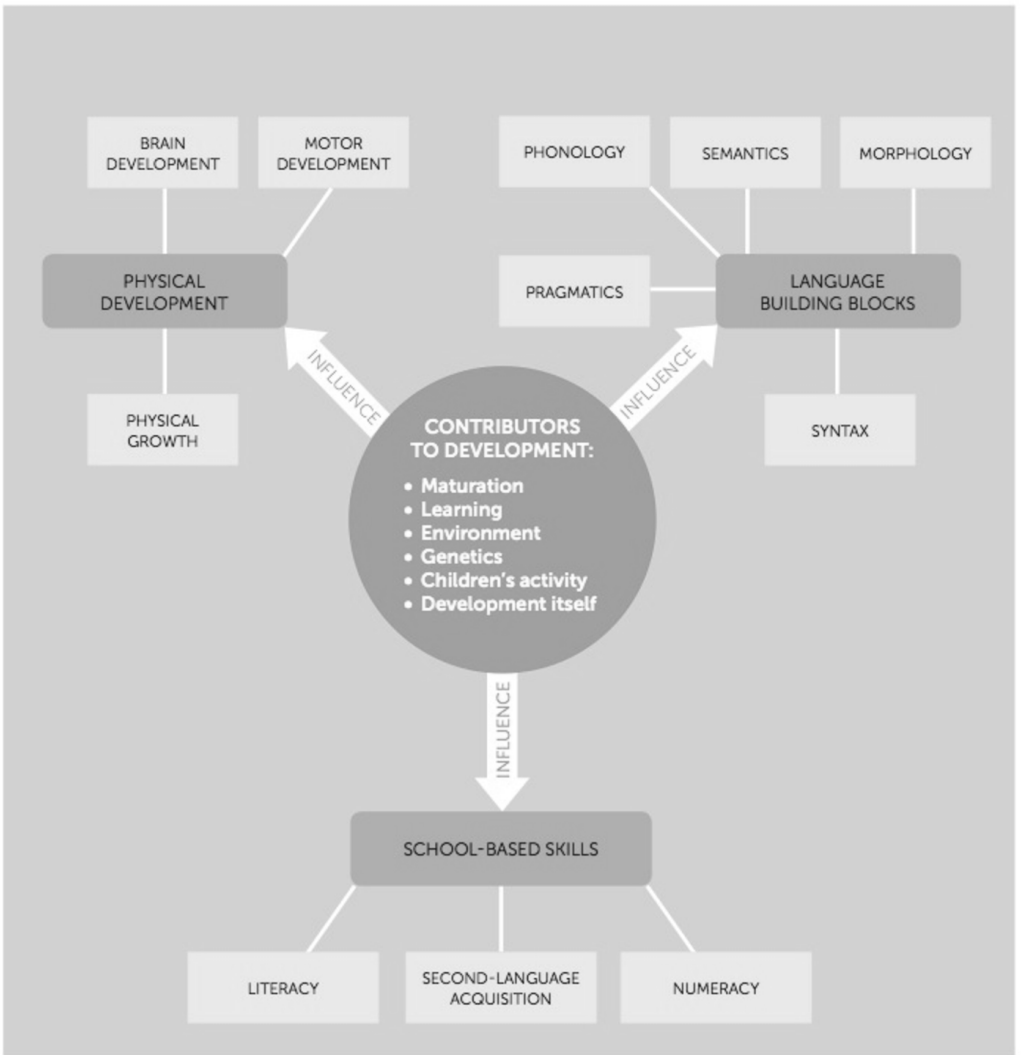

FIGURE 2.1 Chapter 2 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- What are some milestones of physical development from early childhood to adolescence?
- How are physical development, language development and school skills connected? Give examples of the relationships between them.
- How do developments in the brain over time explain the broad patterns of development seen in physical, language and school skills?
- Broadly describe the course of language acquisition. What influences it?
- How does the teaching of literacy and mathematics build on earlier developments?
- What are some key principles of development?

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INTRODUCTION

As a young child starts to crawl and to walk, these physical developments lead to others in thinking, language and social relations. As an adolescent enters puberty, this physical milestone has consequences for their emotional and social development. Those same children starting school, and young people starting high school, experience changes that influence language, cognitive, social and emotional development. Development is influenced by multiple factors, some of them environmental, and others internal to the child. Development in one domain shapes and is influenced by development in others. As we look at development in some key domains in this chapter, this and a number of other principles of development will unfold. These are summarised for you at the end of the chapter.



Source: Matthew Duchesne, © Milk and Honey Photography, 2010.

FIGURE 2.2 Each child brings skills to school with them. What influences their development?

PHYSICAL DEVELOPMENT OVER TIME

As we explore development in this chapter and throughout Module I, we look at four phases of the child's life: 'infancy' (the first two years), 'early childhood' (from three years old until seven years), 'middle childhood' (from seven years old to adolescence) and 'adolescence' (about 12 years old to adulthood). Development does not stop at adolescence, of course, but continues throughout the lifespan. This text focuses mainly on the school years: early and middle childhood, and adolescence.

PHYSICAL DEVELOPMENT IN INFANCY

Physical development sometimes seems to happen without our noticing. Yet the physical developments of childhood – changes in growth, in motor skills, and in the structure of the body and the brain – form an important basis for developments in cognition (thinking) and emotion.

Consider a newborn baby. Right now she has no control over her movements, yet within 18 months she will be walking, in another year running, and soon after jumping and throwing and kicking balls. In the first two years, children develop physically at a faster rate than at any other time in their lives. Although we do not describe infants' physical development here in any detail, it forms an important basis for children's development – not just physical, but also social, emotional and cognitive – in later years.

Physical development, cognition and emotion

An infant's shift from staying in one place to independent mobility is a change with consequences parents are rapidly aware of – suddenly the whole house seems to need to be rearranged to keep the baby safe … and to keep the household items safe from his reach! This shift in physical development also has consequences for the child themselves, with increased opportunities to explore the environment through crawling, as well as the physical work of crawling itself linked to improvements in visual perception, wariness of heights, spatial search strategies and brain development (Anderson et al., 2013).

What about infants who are unable to crawl because of disabilities? Or infants from cultures in which children are discouraged from crawling because of environmental dangers? There may be some effects on other domains of development. For example, it appears that there is a delay in spatial search for infants whose crawling is delayed (Campos et al., 2000). However, lack of crawling may only delay its development, not prevent it entirely. In addition, crawling is not invariably linked to spatial search, so it can be said that crawling is neither necessary nor sufficient for this cognitive ability to develop. This relates to another principle of development: there are more likely to be multiple pathways to development, rather than a common one for all individuals.

With walking comes another shift in development, as the child's line of sight moves forward and upward, rather than being directed largely at the floor and lower walls when crawling (Kretch, Franchak & Adolph, 2014). Language development is affected as the child interacts with their environment in new ways, prompting parents to respond by talking about their environment, building vocabulary. Walking infants are also reported by parents to be more independent, which relates to their socioemotional development (Walle & Campos, 2014).

The close relationship between physical, cognitive, social and emotional development is one that persists throughout development. As you read this chapter, try to look for more connections between the development of one skill and others. There are other connections, too, with later development building on what has gone before. In infancy, children are already developing the physical, cognitive and emotional bases for the skills they will use at school.



THINK ABOUT

- Consider other times when reaching a developmental milestone might prompt development in other domains. What does this reveal about how the domains of development are interrelated?

PHYSICAL DEVELOPMENT IN EARLY CHILDHOOD

Although the rate of physical growth slows in early and middle childhood, age brings further increases in children's size, strength and coordination. This development of children's muscle strength, plus improved balance and coordination, along with a lower centre of gravity, brain maturation and children's activity

itself, all support the development of children's motor skills (Adolph & Berger, 2010) (see Figure 2.3).

Motor-skill development in early childhood

Gross motor skills are those skills involving large muscle groups and often whole-body movements such as rolling, jumping, clapping, throwing and running. **Fine motor skills** are skills involving smaller muscle movements, usually of the hands and fingers, and include grasping and manipulating pencils or scissors. As children's development progresses and their control becomes increasingly refined, they move from requiring large pieces of paper on which to work, and large implements with which to write, to being able to write with a variety of pens and pencils between ruled lines on a page.



Source: Matthew Duchesne, © Milk and Honey Photography, 2010.

FIGURE 2.3 A shift in the centre of gravity, together with increased strength, balance, coordination and flexibility, contribute to improvements in running skill that occur with age.

Acquisition of motor skills is one of the main developmental tasks of early childhood, and for this reason most preschool and early-school programs in Australia and New Zealand attach great importance to it. Climbing over obstacle courses; rolling, throwing and catching balls; and running, jumping, hopping and skipping all help to develop gross motor skills. Likewise, using dough, clay, crayons and paint, and activities that involve crumpling, cutting or tearing paper, all contribute to fine motor-skill development (see Figure 2.4).

gross motor skills Movement skills using large muscle groups

fine motor skills Movement skills using small muscle groups



Source: Matthew Duchesne, © Milk and Honey Photography, 2010.

FIGURE 2.4 Children's activities in early childhood help to develop gross and fine motor skills. What skills are being developed here?

Motor-skill development is also controlled by neurological growth. As the speed and efficiency of information processing improves (see later in this chapter and in Chapter 3), this enables children to intentionally control and combine movements (Adolph & Berger, 2010).

Parents contribute to motor-skill development at home through undertaking everyday activities with children, such as going to the park for a swing, drawing and doing puzzles. In some communities, motor skills are developed through community or traditional activities, as well as in formal preschool contexts. In the Torres Strait region of Australia, for example, Indigenous children's motor skills are developed through involvement in community dances from the time they can walk. The dances are taught more formally at school, which refines these skills (J. Davis, personal communication, 2001). Likewise, Māori communities in New Zealand develop *te reo kori* (the language of movement) within *ngā mahi a r-ehia* – Māori recreational and leisure activities such as *poi*, *rakau* and *whai* (New Zealand Ministry of Education, 2007).

Children's spontaneous activity also contributes to their motor-skill development. The seemingly constant movement of preschoolers has a purpose in developing their gross motor skills, strength, coordination and sense of balance. Children also benefit from such activity in other ways, since (as we have seen) motor and cognitive development are related. The contribution of motor activity to cognition continues beyond the early years, influencing later academic skills such as reading and calculation. Box 2.1 describes further the relationship between physical activity and cognition.

BOX 2.1 RESEARCH LINKS

EXERCISE AND COGNITION

Best (2010) reviewed the research literature examining links between aerobic exercise and children's goal-directed cognition or executive function (see Chapter 3 for a description of the development of this aspect of cognition). He reported that single bouts of exercise and also more extended exercise programs had been shown to increase children's cognitive skills related to executive function. These skills include inhibition (the ability to selectively attend to a stimulus, ignoring others), shifting (the ability to shift between cognitive tasks) and creativity. Davis et al. (2011), working with overweight children, found that aerobic exercise also improved their achievement in mathematics, even when the children received no specific instruction in mathematics.

Best suggested several explanations for the links. Exercise is often cognitively demanding – we are using executive function, for example, when working with a team, or judging where to move to in order to intercept a ball in soccer. The cognitive skills that are developed through physical activity are then available for purely cognitive tasks. Coordination of motor movements that develops in middle childhood also involves executive function, and may be a contributor to brain development in the particular areas of the brain involved in executive function (addressed later in this chapter). Chemicals released in the brain during exercise also contribute to cognition – so exercise shows benefits for cognition in the short and long term.

The strength of the relationship between physical exercise and cognition underscores the importance of physical activity as a part of the school day. This may happen through structured lessons as well as in school break times. Parrish and colleagues (2009, 2012) have explored factors in primary school environments that influence children's physical activity levels in the playground. They found that longer break times, access to non-fixed equipment, ball play, and environmental aspects such as unshaded areas, painted targets and soft play surfaces all contributed to increases in children's physical activity.

ACTIVITIES

1 What place should physical activity have in the school curriculum? Develop a recommendation for a school to maximise children's physical activity during the school day.
2 How would you encourage students who are reluctant to be physically active at break times?

PHYSICAL DEVELOPMENT IN MIDDLE CHILDHOOD

Continued increases in size, strength, flexibility and coordination during the school years enable children to master the skills involved in sports. However, rather than learning entirely new skills – as occurs in early childhood – the task now is to refine and recombine existing skills to suit new challenges. Consider as an example the running, turning and kicking involved in playing soccer; or the running, throwing and catching required in netball. The jumping and chasing games and ball throwing and kicking done in early childhood are precursors of the advanced skills that are combined in specialised ways to play each sport. Younger children may be able to jump, hop, run, turn and throw a ball in isolation, but being able to combine these skills is a new achievement of the middle-childhood years. The ability to coordinate motor skills, such as in eye–hand and foot–hand coordination, is a significant development of middle childhood.

Motor-skill development in middle childhood

Children's playground games such as hopscotch, skipping, elastics, chasing, handball and jacks all contribute to the development of motor skills during the middle-childhood period.



Source: Cameron Spencer/Getty Images

FIGURE 2.5 Children's physical activity contributes to cognitive, social and emotional development.

Swimming, riding bikes and scooters, and similar activities enjoyed by children in their leisure hours are also important. In addition to contributing to motor-skill development, links have been made between physical activity and *social outcomes*, such as the learning of social skills and reduced isolation; *emotional outcomes*, such as reduced depression, anxiety and stress, and increases in self-esteem and confidence; and *cognitive outcomes*, such as concentration, memory and learning (Commonwealth of Australia, Department of Health and Ageing, 2005). Two reviews of research found a positive relationship between physical activity and academic achievement (Singh et al., 2012) and academic skills and behaviours such as attention, memory and on-task behaviour (Centers for Disease Control and Prevention, 2010). Links have also been found between exercise and neuroplasticity, explained later in this chapter (Hötting & Röder, 2013).

One of the concerns expressed about the amount of time children spend watching television or playing computer games is the time that these activities take away from more active pursuits. Adolph and Berger (2010) stated that sedentary activity is more likely to account for overweight and obesity rates than will overeating. A large study of Australian children revealed that 74 per cent of children met the physical-activity guidelines of at least one hour of moderate-to-vigorous physical activity each day, but only 33 per cent met the guidelines for screen time, which is to spend no more than two hours per day in viewing television, video or computer screens (AIHW, 2009). New Zealand figures are similar, with 67 per cent of children and young people meeting physical-activity guidelines, and 40 per cent meeting screen-time guidelines (Clinical Trials Research Unit, 2010). These percentages are averaged across the entire population of either Australia or New Zealand, with poorer results for older than for younger children, for those from low socioeconomic backgrounds, and for some ethnic groups. Participation rates are higher when parents regularly participate in a physical activity (Australian Sports Commission, 2012). The Australian Sports

CourseMateExpress

Online resources
Watch **videos** of children of different ages running on this text's website.

Commission (2004) reported screen time as a major competitor with physical activity for children's time. The commission also attributed the decline in physical activity to factors such as concerns for children's safety, modern street design, less play space, smaller home blocks, longer working hours of parents and a general disintegration of neighbourhood social networks, all of which restrict opportunities for free play.

CourseMateExpress
Online resources
Go further: View the Physical Activity Guidelines via the link on this text's website.

Physical education forms an important part of school curricula in Australia and New Zealand, with the New Zealand Ministry of Education (2004) setting a priority on physical activity in the *National education goals*, and the Australian Government recommending at least one hour a day of vigorous physical activity for children and young people (Commonwealth of Australia, Department of Health, 2011a, 2011b). In addition, the Australian Sports Commission in 2005 initiated an after-school program that encouraged physical activity and provided opportunities for ongoing sports participation. Entitled *Active after-school communities*, it involved over 3000 school communities across Australia, and had seen 190 000 children participate by the end of 2010 (Australian Sports Commission, 2011).

PHYSICAL DEVELOPMENT IN ADOLESCENCE

During adolescence, physical growth resumes the rapid pace of growth in infancy. The hands, feet and legs are the first to increase in size, which sometimes results in a 'coltish' look and in clumsiness. The trunk of the body lengthens last, bringing adolescents to adult body proportions (Berk, 2012). These developments are accompanied by significant muscle growth – although this is greater in boys than in girls, for whom there is a 40 per cent increase in body fat. These sex differences result in the different body shapes of adulthood, with men generally leaner and more muscular than women.

Sex differences in adolescent development

adolescence
The period between childhood and adulthood

puberty
The biological changes associated with sexual maturity

Often, the terms **adolescence** and **puberty** are used synonymously, but they are not the same thing. The period of adolescence is usually associated with the teen years (ages 13 to 19) but may be defined as the period between childhood and adulthood. Thus, in Western societies, adolescence can stretch from 11 to 21 years and is typically defined in terms of age and social circumstances. Puberty, however, is defined by physical changes, specifically the physical and biological changes associated with sexual maturity. Puberty generally occurs during adolescence but may start some years earlier than the age of 13, particularly in girls in industrial societies. Puberty tends to be completed within four years; adolescence, however, may last from six to 10 years and tends to be longer in industrial societies, where young people are often engaged in education for long periods before they are truly independent of their parents (Cote & Allahar, 1996).

In girls, puberty is signalled by rapid increases in height and weight, which trigger the onset of 'menarche', or first menstruation. This is accompanied by other physical changes that are related to reproduction, including breast development (which precedes menarche), and the enlargement of the uterus and the appearance of pubic hair (which usually follow menarche).

In boys, sexual maturity starts with changes to the testes and scrotum, followed by the appearance of pubic hair and then growth of the penis. Increases in height generally occur later in boys' developmental patterns than in those of girls, which explains why girls may be taller than boys in the early years of high school. 'Semenarche' (or first ejaculation) commonly follows the height spurt in boys, just as menarche does in girls. Other changes associated with the later stages of puberty for boys include the growth of facial and body hair, and the deepening of the voice as

the larynx lengthens. This can initially cause boys some embarrassment as the voice 'breaks', with sudden changes in pitch.

Connections among physical, cognitive and socioemotional development in adolescence

The dramatic physical changes of puberty are accompanied by social, cognitive and emotional changes. One of the most significant results of physical changes is a concern with body image. A feeling of 'not fitting' the new taller body with its bigger hands and feet may bring self-consciousness for boys, while girls may become dissatisfied with their increased weight and body fat that do not match the 'ideal' body image promoted in the media. Recent studies, however, showed that comparison with peers has a greater role than the media (Carey, Donaghue & Broderick, 2014), which may suggest social media's role in the process.

Australian and New Zealand studies of body image and dieting behaviour have shown that dieting and dissatisfaction with body image are widespread, and are greater among girls than boys. The New Zealand Ministry of Health (2012) reported on a 2007 youth survey that showed just 36 per cent of girls and 44 per cent of boys were happy or very happy about their weight, while 48 per cent of these young people were trying to lose weight and 14 per cent were trying to gain weight. There were variations across different ethnic groups, with more Māori, Pasifika and Asian youth positive about their weight compared with European young people in the study. There were gender differences, too, with more girls reporting they were trying to lose weight and more boys trying to gain weight.

In some girls, this widespread pattern develops into eating disorders such as compulsive eating disorder, anorexia and bulimia. Chapter 4 discusses eating disorders in more detail. If teachers or parents suspect a child of having an eating disorder, it is important that they consult an expert, as these illnesses are complex, difficult to treat and have potentially severe outcomes.

The timing of puberty appears to affect how adolescents cope with developmental changes, as well as with others' reactions to these changes. Adolescents who mature 'on time' fare best, with early maturing girls at greater risk for social anxiety, depression, substance use and deviant behaviour (Ge & Natsuaki, 2009), while boys can experience depression, anxiety and problematic behaviour from either early or late maturing (Negriff & Susman, 2011). A number of explanations have been given for these effects, including the possibility that with early maturation, girls may seek peers similar to themselves, exposing them to older peers and risky behaviours before they are emotionally ready to evaluate the risks (Stattin, Kerr & Skoog, 2011). Stattin, Kerr and Skoog reported that the context (such as school) can moderate this exposure to older peers. Boys can also experience effects from early or late maturing, with White, Deardorff, Liu and Gonzalez (2013) finding that early-maturing boys experienced problems with anxiety and behaviour. Cultural norms amplified the effects on the Mexican boys in their study, who fared better in communities with concentrations of people of like ethnicity. The link between physical and emotional development here is evident but complex: there is considerable scope for individual difference in outcomes depending on context, level of support and personality factors.

In this section we have looked at variation within groups of boys or girls. In the next section, we consider variations in physical development among groups. Box 2.2 summarises the developmental trends we have discussed, and links them to contributions made by brain and body development and children's behaviour. It then gives some suggestions for ways in which the teacher or parents can contribute to development at each stage.

BOX 2.2 IMPLICATIONS FOR EDUCATORS

CONTRIBUTING TO MOTOR DEVELOPMENT

	MOTOR DEVELOPMENTS	CONTRIBUTIONS OF BODY, BRAIN AND BEHAVIOUR	WHAT TEACHERS AND PARENTS CAN DO
Infancy 	Sitting independently Crawling Walking	*Body:* Changes in body proportion contribute to balance, stability and increased strength; greater muscle-to-fat ratio in legs and stronger back and hip muscles allow weight bearing. *Brain:* Increases in processing speed and efficiency allow infants to combine movements, and to control them. *Behaviour:* Exploration is both a motivation for and a consequence of greater mobility; practice contributes to strength, balance and visual-motor learning.	Encourage exploration, which motivates crawling, walking and reaching behaviour. Child-rearing routines influence motor development by providing opportunities to practise, by strengthening muscles and stability, and by facilitating visual-motor learning.
Early childhood 	Fine motor skills Gross motor skills	*Body:* Longer arms and legs and greater muscle control contribute to smoother, more coordinated movement. *Brain:* Myelination leads to improved coordination of various regions of the brain, which is necessary for motor control. *Behaviour:* Constant activity contributes to skill and muscle development.	Provide opportunities for practising fine motor skills, such as manipulating pencils and scissors, zips, laces and buttons, and for use of gross motor skills, such as climbing, running, jumping, throwing and kicking balls.
Middle childhood 	Combining skills Refinement of gross and fine motor skills	*Body:* There are increases in strength, agility and balance with continued growth in height and muscle mass. *Brain:* Development of executive function contributes to coordination of motor movements. *Behaviour:* Activity levels remain high; organised games played at school contribute to coordination and movement problem solving; common school activities such as handwriting practise fine motor skills.	Encourage physical activity, including team games. Fundamental movement skills can be explicitly taught to improve children's enjoyment of and skill in games.
Adolescence 	Increased strength and coordination of both fine and gross motor skills	*Body:* There is increased height and muscle mass, particularly in boys. *Brain:* Further development of executive function contributes to coordination and control of behaviour. *Behaviour:* Individual differences in motor skill are strengthened by young people's choices about involvement in physical activity.	Encourage physical activity.

Sources: Adapted from Adolph and Berger (2010); Kopp (2011); McDevitt and Ormrod (2010).

Image sources: 1: © Petro Feketa/Shutterstock.com., 2: © Ternych/Shutterstock.com., 3: Christopher Futcher/Getty Images., 4: Dotshock/Shutterstock

VARIATIONS IN PHYSICAL DEVELOPMENT

Individual differences in the rate of physical development and the timing of major milestones such as puberty occur between males and females, and across different social and cultural groups (see Figure 2.6). These differences attest to the combination of environmental and inherited factors involved in development.



Source: wavebreakmedia/Shutterstock

FIGURE 2.6 The timing of puberty varies from individual to individual.

Environmental influences

Adolescent girls in industrial societies tend to experience menarche earlier than those living in countries with widespread poverty. As the onset of menarche is associated with increases in body fat, nutritional factors are likely to be responsible for this difference. Girls who participate in rigorous exercise programs – such as those for athletes in training – also tend to experience menarche later than their peers (Rees, 1993). In industrial societies, and in some developing nations, the age for menarche onset has declined steadily over the past century or more, probably as a result of improvements in nutrition and general health (Tanner, 1990).

Differences in growth rates and eventual height also have been observed among people from different countries (Evelyth & Tanner, 1990). There may be genetic factors involved in these differences, but it is likely they are also related to diet and to health issues such as the prevalence of disease in particular countries. People from countries with widespread poverty tend to be smaller on average than those from industrialised nations such as Australia and New Zealand, although there is also variation within populations. Indigenous Australians living in remote communities tend to have poorer health than the Australian population in general, with higher levels of infectious disease, poor sanitation and housing, malnourishment and limited access to clean water. A study comparing the growth of Aboriginal children in the Kimberley region of Western Australia with international norms showed the influence that environmental factors can have on infant growth, and that low birth weight was significantly related to later growth (Roberts, Gracey & Spargo, 1988). The pattern is similar to that of malnourished infants in the developing countries – thriving in the first three months and then faltering in height and weight (Burns & Irvine, 2004). Follow-up studies of these Aboriginal children showed that overall growth at 10 years was appropriate for those living in urban areas, but not for those in remote areas (Mackerras et al., 2003).

Other areas of physical development are also influenced by environmental factors. Some of these are associated with a child's development in the womb; for example, pregnant mothers' consumption of alcohol and tobacco (as well as less widely available drugs) is associated with abnormal physical and brain development (Berk, 2012). Other influences may be felt later in the child's life; for example, high levels of family conflict are associated with earlier onset of menarche (Manuck et al., 2011), while Whittle et al. (2014) reported from a longitudinal study that warm and supportive parenting influenced the development of adolescent brain structures that are associated with positive emotional and behavioural outcomes. Environment is a significant force throughout the course of development.

Development of children with physical disabilities

Some physical conditions, such as cerebral palsy, spina bifida, Down syndrome and muscular dystrophy, result in a different developmental path, and the acquisition of motor skills may be challenging for some students with specific physical disabilities. Nonetheless, you should not assume that a child with a physical disability also has an intellectual disability, nor that they do not need to develop their physical

or motor skills. Supporting students with physical disabilities to participate in the classroom may involve making adjustments to the way in which you teach, the physical environment, equipment and tasks. For example, a student in a wheelchair may be able to participate in a long-jump exercise by using their arms to propel the chair forward, a parallel task to the spring another child must make using their legs. Chapter 10 deals in detail with the inclusion of children with special needs.

Sex and gender differences

You have probably heard it said that girls mature faster than boys. Physically, this tends to be true, with girls reaching some milestones several weeks ahead of their male counterparts during infancy, and the gap widening through childhood so that girls may reach the end of puberty as much as two years ahead of boys (Tanner, 1990). Boys are generally taller and heavier than girls throughout childhood, with the exception of a brief time in early puberty (around 11 years old) when girls go through the pubertal growth spurt about two years ahead of boys.

Differences such as this, which have a strong biological basis, are generally referred to as sex differences. Other differences between boys and girls have a mixture of biological and social origins. The term 'gender difference' is generally used to refer to these kinds of differences. As it is often difficult to determine whether a difference we observe has a biological or social origin, in this book, we tend to use the term 'gender difference'. Chapter 11 discusses gender differences in more detail.

Gender differences in motor-skill development are increasingly evident from early childhood through to adolescence. In early-childhood tests of motor ability, girls perform better at locomotor skills and stability such as are used in balance tasks, while boys have better manipulative skills such as are used in hitting and ball skills (Iivonen & Saakslahti, 2014). This difference persists through childhood, with boys proving more proficient at object-control skills and girls at locomotor skills in grades 4 and 5 in one Australian study. This study also found that children proficient at object control were more likely to be involved in physical activity as adolescents (Barnett et al., 2009). This finding is consistent with trends reviewed by Iivonen and Saakslahti. Later, boys tend to be better at sports that involve force and power, while girls are more skilled in fine motor tasks and activities that require agility (Malina, 1998). These differences are partly a result of boys' greater muscle mass and heart and lung capacity, but can also be attributed to the societal roles apportioned to males and females. Boys tend to be encouraged to play ball sports, while girls are steered towards dance and gymnastics. While a five-year-old boy might be given a football or basketball as a gift, a girl is more likely to receive (and to ask for) a skipping rope. In addition, boys tend to be admired by peers for sporting prowess, something that tends to be far less important to girls and that is probably related to the relative significance placed by the media and society on men's versus women's sport. Similarly, boys are more likely than girls to play computer games (see Chapter 12).

CourseMateExpress

Online resources
Go further: See resources for developing children's fundamental movement skills at 'Get skilled get active'.



BOX 2.3 CLASSROOM LINKS

PHYSICAL DEVELOPMENT IN SCHOOLS

- The connections observed between physical development and developments in cognition and emotion suggest that opportunities for a range of physical activities should form part of schooling.
- Motor-skill development is an important part of the curriculum in preschool education in Australia and New Zealand, and health and physical education is a Learning Area in the Educational Goals for Young Australians (MCEETYA, 2008) and in the New Zealand Curriculum (New Zealand Ministry of Education, 2007).
- The New Zealand Curriculum (New Zealand Ministry of Education, 2007) adopts the Māori philosophy of health and wellbeing, or *Hauora*, which recognises the interconnection of

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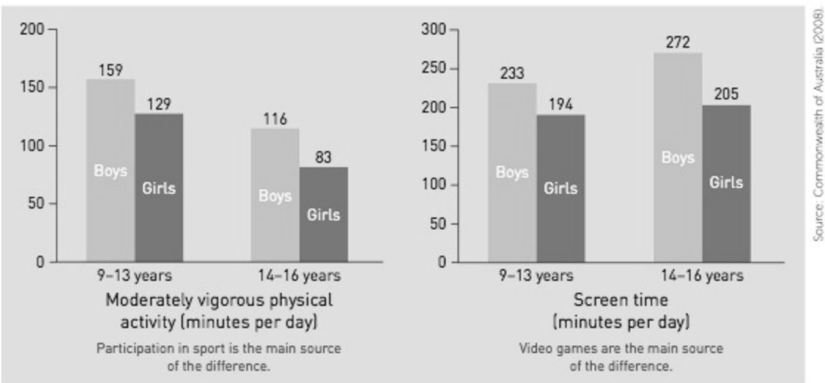
taha tinana (physical wellbeing) with *taha hinengaro* (mental and emotional wellbeing), *taha whanao* (social wellbeing) and *taha wairua* (spiritual wellbeing).
- Physical exercise can contribute to academic learning through motivation as well as cognitive skills such as attention and memory.
- Children with physical disabilities may take a different developmental path, but they still require opportunities to participate in physical activity at school. Adjustments can be made to tasks, equipment and the environment to enable them to participate alongside their peers.

Gender differences in physical activity and exercise involvement are more widespread than this, however. The 2007 Australian National Children's Nutrition and Physical Activity Survey (Australian Government, 2008) found that girls spent less time than boys in vigorous physical activity, though this mainly related to the amount of time spent playing sport (see Figure 2.7). Given the links between physical activity and learning discussed earlier, as well as the demonstrated relationship between physical exercise and the risk of disease, these differences are of widespread concern, and schools have sought to address students' physical activity levels. Iivonen and Saakslahti (2014) and Barnett et al. (2009) – cited above – argued that developing girls' object-control skills in early and middle childhood is an important part of the solution.

CourseMateExpress
Online resources
Watch a **video** of an adolescent girl talking about why her friends go to the gym.



Source: Commonwealth of Australia (2008)

FIGURE 2.7 Comparing boys' and girls' physical activity and screen time.

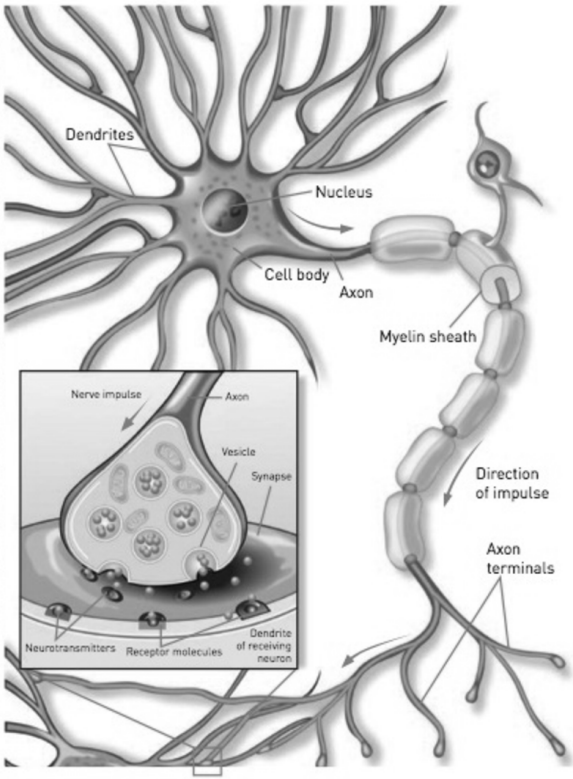
BRAIN DEVELOPMENT

One dimension of physical development that is particularly important in the learning and teaching processes is brain development. The brain directs the course of overall development and responds to environmental stimuli to promote its own growth. In this section we consider how the brain's physical structures develop, and how this development is related to visible changes in thinking and behaviour.

THE BRAIN'S PHYSICAL STRUCTURES

The development of the brain begins in the earliest stages of foetal life, soon after conception. **Neurons** or nerve cells develop and are responsible for storing and transmitting messages throughout the brain system. In the growing embryo, a process of neuron proliferation produces millions of neurons so that

neuron
A nerve cell



Source: *Brain facts: A primer on the brain and nervous system*, © 2008 Society for Neuroscience, www.sfn.org/brainfacts, p. 7

FIGURE 2.8 The neuron receives messages through its dendrites and passes messages along its axons and across the synapse to other cells.

at birth the baby's brain has most of the neurons it will need to grow and develop. It is estimated that the newborn baby has between 100 and 200 billion neurons.

Neurons transmit information to other neurons via a long arm-like projection known as an **axon**. When a neuron cell is activated or 'fired', information travels as an electrical impulse along the axon, and then crosses a gap called the **synapse** by means of a chemical **neurotransmitter**. The synapse thus forms a junction between neurons. The branch-like **dendrites** of the neighbouring neuron receive the message (see Figure 2.8).

Over the course of development, neurons develop in size and complexity, growing axon branches and dendrites that connect to other cells. This enables networks of cells to be connected as more synapses are formed. Many neurons are connected with thousands of other neurons, and organised in networks that interact with other networks. In addition, a process of **myelination** occurs, in which the axon is insulated in a fatty sheath that improves the speed of transmission by up to 100 times. This special insulating material enables information to be transmitted more efficiently across the neural networks.

The developing brain actually produces many more neurons and synapses than are eventually used or needed. Some neurons die off naturally, and unused or unnecessary synapses are pruned. By adulthood, the adult brain contains only about half the number of neurons generated during the developmental phase. It is believed that these natural processes enable the communication between the remaining cells to become faster and more efficient, and also allow room for new connections to develop.

axon
The long 'arm' of a neuron that carries messages to other cells by means of electrical impulses

synapse
The gap between the axon and dendrites of two neurons

neurotransmitter
A chemical substance that carries messages across the synapse between neurons

The process of the brain changing and adapting itself is known as **brain plasticity** and is a relatively new concept in neuroscience. It was once thought that the brain had little capacity for change and that 'hard wiring' occurred relatively early in life. Although there do appear to be 'optimal' periods of brain development, in early childhood for example, this does not mean that the brain loses its capacity for change throughout the lifespan.

There are several forms of brain plasticity that enable the brain to develop and recover certain functions. Developmental processes such as synapse pruning are one form of brain plasticity. The very nature of learning itself can also be considered as a form of plasticity when our neural networks alter to accommodate new information or skills. Changes in the body, such as a change in eyesight or a traumatic injury to the brain, may lead to another form of brain plasticity (Vanderbilt Kennedy Center, 2012). Examples of brain plasticity have been observed in adults who have experienced a major neurological

injury such as a stroke. Activation of the motor cortex after a stroke leads to remapping in the brain and some recovery of function in a paralysed limb, for example, or in the recovery of speech (Johansson, 2011; Schaechter, 2004).

dendrites
Branch-like protrusions from a neuron that receive messages from other cells

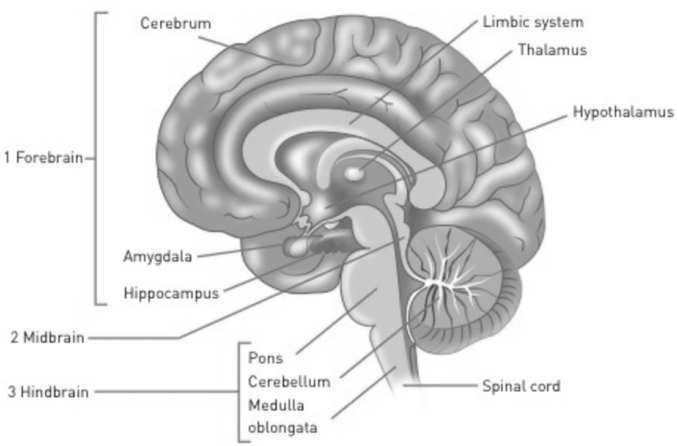
myelination
The process by which axons are insulated with a sheath of fatty cells, which improves the speed and efficiency of message transmission

brain plasticity
The capacity of the brain to change and develop new neural connections throughout the lifespan

INTERNAL STRUCTURES OF THE BRAIN

The brain is made up of both internal and external structures. It is generally the 'grey matter' of the external structures that we are most familiar with in images of the brain; however, the internal structures of the brain are just as important.

The internal structures of the brain are complex systems that control and activate some of the most basic functions of human life (see Figure 2.9). The hindbrain section, also known as the brain stem, contains structures such as the pons and the medulla, which control and regulate our breathing and heart rate; it also contains the cerebellum, which helps us control our movements as well as thinking processes that require careful timing and coordination. The centre of the brain also acts as a relay station to other parts of the brain. In the midbrain area are very small structures that take in sensory information (sight, hearing, smell, taste, touch) and relay this information to other parts of the brain. Higher in the central part of the brain is an area known as the limbic system, which is critical in the regulation and control of automatic drives and responses in the body, as well as emotional responses and memory. In this system, the hypothalamus helps relay information coming from the autonomic nervous system of the body, which helps regulate automatic and unconscious processes such as our sleep patterns, hunger, the activation of the pituitary gland and stress responses such as our classic 'flight or fight' response to stress. The hippocampus is believed to be very important in the memory of recent events we have experienced by helping us organise the 'what', 'where' and 'when' of these episodic memories (Society for Neuroscience, 2008). The amygdala is associated with emotional memories and learning, and is particularly associated with our fear responses. Many of these internal structures are linked and connected to the outer regions of the brain.



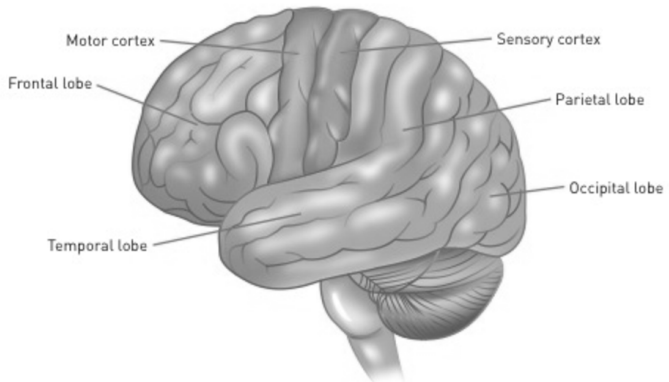
Source: *Brain facts: A primer on the brain and nervous system*. © 2008 Society for Neuroscience. www.sfn.org/brainfacts, p. 5

FIGURE 2.9 The internal brain structures.

The cerebral cortex

cerebral cortex
The outer layer of the brain, which is responsible for human intelligence

The **cerebral cortex** is the largest and last area of the brain to complete development and is considered the most important contributor to children's cognitive functioning (see Figure 2.10). The cerebral cortex is made up of two hemispheres that are linked by an internal brain structure known as the corpus callosum. In this way the inner structures of the brain can communicate with the outer structures of the cerebral cortex.



Source: *Brain facts: A primer on the brain and nervous system*; © 2008 Society for Neuroscience; www.sfn.org/brainfacts, p. 5

FIGURE 2.10 The cerebral cortex. Particular functions are localised in specific areas of the cortex; most skills involve the coordination of messages from a number of areas.

lateralisation
The specialisation of functions in the two hemispheres of the cerebral cortex

Different regions or lobes of the cerebral cortex are associated with specific bodily functions and abilities; for example, the motor cortex is associated with physical movement, and the visual cortex is associated with vision. One of the most important specialisations of the brain is known as **lateralisation**, in which the two hemispheres of the brain specialise in different functions. For example, the right side of the brain controls the left side of the body and the left side of the brain controls the right side of the body. The right hemisphere also processes visual–spatial information, non-speech-related sounds such as music, and recognition of faces and facial expressions. The left region of the brain is associated with the processing of spoken language and some logical thought processes. However, the lateralisation of the brain is strongly supported by *connectedness* between the parts of the brain. Not all processes function independently in one side or other of the brain; emotion, for example, is processed by the whole brain. The internal structures of the brain are critical for relaying emotional signals to the outer regions of the brain where, broadly speaking, the right side processes negative emotions and the left side positive emotions. Language is also processed in both hemispheres of the brain. It was once thought that all language abilities resided in the left brain, but it is now understood that recognition of spoken words and sounds occurs in both sides of the brain, and it is speech production that is strongly controlled in the left part of the brain. Damage in one of two critical areas in the left part of the brain, known as Broca's area and Wernicke's area, can produce specific deficits in speech output (Society for Neuroscience, 2008).

The degree to which our brains are specialised in these ways varies between individuals; for example, lateralisation is believed to be influenced by genetics or family similarities – it may be less strong in females than males, while left-handed people may also have less lateralisation than right-handed people.

Studies of the brains of mathematicians show use of centres from both sides of the brain when solving problems and doing simple arithmetic (Dehaene, Molko, Cohen & Wilson, 2004). In fact, most activities involve coordination of messages from both sides of the brain (see Box 2.4).



BOX 2.4 IMPLICATIONS FOR EDUCATORS

THINKING CRITICALLY ABOUT BRAIN RESEARCH AND THE CLASSROOM

Research into brain development has been prolific over the past two decades, but work investigating the application of this new understanding of how the brain works to classrooms is still in its infancy. Yet teachers around the world report that they are being bombarded by requests to join 'brain-based learning' workshops or attend seminars on 'brain-based teaching'. Although we are learning more about the structure of the brain, how this relates to its function in learning and teaching is still being examined and is very difficult to research. A number of research centres worldwide have taken up the challenge to investigate the applications of brain research to education.

Goswami (2004) reviewed links between neuroscience and education, and suggested some likely areas for useful application, such as in understanding reading acquisition and dyslexia, or in training children with autism to understand emotion. However, caution should be used when reading recommendations for teachers that are billed as being 'brain-based' (Fischer, 2004). Sometimes this label is used to describe educational applications that are based on educational psychology generally (for example, Caine & Caine, 1991), but others have claimed direct applications of neurological research to learning and teaching strategies that are not supported by research evidence. These are sometimes called 'neuromyths' (OECD, 2007). Here are some examples:

- Some educators have used brain lateralisation to explain children's academic strengths and weaknesses, describing students as being 'left-brained' or 'right-brained' (for example, McCarthy & McCarthy, 2005). Others have used this as a basis for programs that seek to tap into the skills of one or other side of the brain (for example, Edwards, 1981). Bruer (1999) warned against such simplistic applications of brain-lateralisation research, pointing out that most skills involve the coordination of messages from both sides of the brain. Healthy brains rely on the two hemispheres working together for most tasks.
- There are sometimes suggestions that males and females learn differently, based on differences in the structure of male and female brains. Fine (2010, 2013) drew on neuroscience research to show that there are in fact few reliable differences between male and female brains (differences within each group are larger than differences between them), and that those differences that do exist are not relevant to learning or education. Chapter 11 discusses gender differences in more detail.
- Because of the idea of 'critical periods' of brain growth and the concept of synapse proliferation, some programs targeted at teachers have suggested special teaching interventions that promote 'neuroplasticity'. In fact, any teaching intervention or life experience that leads to a change in behaviour and knowledge will be 'remapped' in the brain – neuroplasticity occurs naturally, without the need for costly programs.
- Knowledge of the importance of early experience to brain development has sometimes been taken up with 'enrichment' programs that claim to accelerate cognitive development by providing experiences early. Nagel (2013) spelled out a number of dangers in this approach, including the importance of the in-built developmental timetable of the brain, which supports learning at particular periods when the brain is 'ready' for them; this built-in timetable also ensures that cognitive and emotional development occur in tandem, and support one another.

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CourseMateExpress

Online resources
Go further: Visit centres for research into the brain and learning via the link on this text's website.

- There may be sensitive periods during which the development of certain abilities is optimised, but these do not prevent learning from occurring later. For example, London taxi drivers who are particularly good at navigating around the city have been found to have enlarged hippocampi (the area responsible for spatial memory), suggesting they have developed synapses in this area in response to their task (Maguire et al., 2000, as cited in Goswami, 2004).

ACTIVITIES

What 'neuromyths' have you heard of in the classroom? Use the accompanying CourseMate Express link to make some online visits to centres for research in the application of neurological research to learning and teaching, and discover some of the evidence-based findings.

How are these processes reflected in the developments observed in children? As we discussed earlier in this chapter, one of the patterns of development is an increase in skill complexity and coordination that relates, in part, to the increase in networks of nerve pathways. In this section we will continue to explore developmental changes that occur in infancy, early childhood, middle childhood and adolescence. We also look at important factors that may influence brain development.

BRAIN DEVELOPMENT IN INFANCY

The infant brain experiences rapid growth and neuron proliferation. All experiences, especially sensory experiences, are important in the growth and development of the infant brain. As mentioned previously, in the first year of a child's life, the brain produces many more synapses than it will need; thus, the infant brain is readied for experience. Synapses that are not used – that is, do not receive stimulation – are pruned, while those that are used through environmental stimulation are strengthened.

One of the most well-known concepts in the development of the infant brain is the notion of an 'optimal period' or 'critical period' of development. From late in pregnancy to two years of age, brain development occurs at a great pace, and high-quality nutrients and an adequate 'energy supply' are important for the developing brain. However, it is the quality of the life experiences of the infant that are believed to be the foundation stones of a healthy future brain. As such, this critical period of development requires careful attention to factors that influence brain development and growth.

attachment
The strong emotional bond established between infant and caregiver

In this period of life, the warmth and security of relationships with primary care givers, known as the **attachment** relationship, is believed to be critical for the development of the social and emotional processing centres of the brain (Schore, 2001). Brain-imaging studies support the idea that brain development in infancy is greatly dependent on positive experiences and interactions with others, particularly primary caregivers. Brain imaging has been used to study the responses of mothers and infants when looking at each other's smiling faces. The brain images show that important social information-processing areas of the brain are activated when a very young infant sees an image of its mother's smile; similarly, the same region of the mother's brain is activated when she sees a smiling image of her child. In this way, critical neural networks are developed in the child's brain, and the attachment relationship between parent and child is strengthened.

The infant brain readily absorbs sensory information but is also active in sorting and understanding this information. This is especially clear in the area of understanding language. The newborn brain not only appears to recognise the native language but shows different brain activation in response to the familiar native language compared with an unfamiliar language (May, Byers-Heinlein, Gervain &

Werker, 2011). The infant brain shows discrimination of features of language such as melodic rhythm and stress, and babies as young as four months of age appear to show language-specific neural representations of word forms (Friederici, Friedrich & Christophe, 2007).

The quality of early life experiences is critical to healthy brain development in infancy and early childhood. As explained in the following sections, there is a significant difference between the brain development of an infant raised in a normal, caring environment and that of a child who has early experiences of abuse or neglect.

BRAIN DEVELOPMENT IN EARLY CHILDHOOD

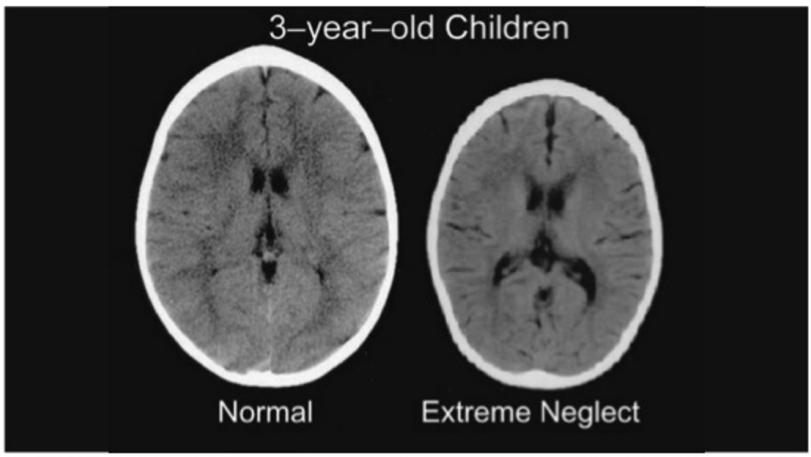
The period of early childhood sees rapid growth and development in areas of the brain that allow the child greater self-control. In particular, a growth spurt in the frontal region of the brain corresponds to the development of executive function skills, such as the ability to follow rules and directions and control impulses. (See more on executive function in Chapter 3.) For example, by three years of age most children can complete tasks that require them to follow two rules simultaneously, and by five years of age children can shift their attention from one rule to another to accommodate different situations. Young children can inhibit and control some impulses, allowing them to complete more complex tasks and follow instructions from caregivers, but they still need a lot of practice, positive experience and support from adults to reinforce these new skills in the brain (CDC, 2011).

This frontal area of the brain, the prefrontal cortex, also develops connections to other parts of the inner brain, including those structures that help us control our response to threat or stress (our 'flight or fight' systems). As such, the growth of executive functioning abilities requires a range of early-childhood experiences that allow executive skills to be tested within a caring and regulated environment.

A number of studies have shown that very dysfunctional (unregulated) and stressful early-life environments lead to a type of toxic stress that actually inhibits executive functioning. As an adult you might recognise such an effect when you have experienced the feeling of not being able to 'think straight' or remember critical actions when you have been faced with extreme stress or anxiety. In such situations the body releases chemicals, such as cortisol (also known as hydrocortisone), in response to the stress; these chemicals activate inner regions of the brain that send us into 'fight or flight' mode, inhibiting clear functioning of the prefrontal cortex. In the developing brain of the child, repeated and prolonged exposure to the chemicals released under stress seems to impair the neuronal 'architecture', leading to less-well-developed executive functioning systems. As an adult, you have the capacity to calm yourself or use your executive function to think of a response, but the young child's brain is still developing this ability (CDC, 2011, p. 7).

The brains of children who have suffered extreme neglect or abuse (physical, emotional or sexual) in early childhood appear to show stunted or reduced growth patterns (see Figure 2.11). The cerebral cortex and limbic areas of the brain appear to be significantly reduced in size (Perry & Pollard, 1997), and subsequent developmental problems in diverse areas of functioning have been noted (Kreppner et al., 2007).

Studies of Romanian orphans have shown that pervasive developmental problems persist for children whose neglect extends beyond the first six months of life. Due to brain plasticity, children whose circumstances improve within the first six months of life show greater brain recovery. The prolonged nature of neglect beyond six months of age seems to be related to psychological deprivation rather than nutritional deprivation. However, these studies have also shown the clear capacity of the human brain to improve and adapt beyond the early childhood years, enabling some improvement in cognitive function to occur into the middle childhood years for children with the greatest level of cognitive impairment at age six (Kreppner et al., 2007).



Source: Perry, B. D. (2002). Childhood experience and the expression of genetic potential: What childhood neglect tells us about nature and nurture. *Brain and Mind 3*, 79–100. www.childtrauma.org.

FIGURE 2.11 These images illustrate the negative impact of neglect on the developing brain. The CT scans are from three year olds – one healthy, on the left, with an FOC (head circumference) in the 50th percentile, and on the right is a child who experienced total global neglect (including sensory deprivation). These images are from a series of 122 severely neglected children of many ages. In general the brains of the neglected children were significantly smaller and demonstrated various forms of abnormal development (e.g., cortical under-development and enlarged ventricles).

BRAIN DEVELOPMENT IN MIDDLE CHILDHOOD

The heavy focus in research and the media on the importance of brain development in early life has led to some concern that we may be neglecting or overlooking the fact that the brain continues to grow and develop throughout childhood and into adulthood (Cashmore, 2001). By the end of early childhood, the brain has reached 90 per cent of its adult size, and thus the main type of change seen in middle childhood relates to continued growth of the cerebral cortex, further synapse pruning, and myelination of more extended connections across regions of the brain.

In the middle years of childhood, executive function skills continue to improve as networks, and interconnections between parts of the brain grow stronger. These connections, visible as the 'white matter' in neuroimaging studies, show thicker neural connections starting to grow across and between different areas of the brain, hence connecting multiple areas of functioning together. The learning experience of middle childhood is about reinforcing and building upon these new connections. This is clearly visible in the classroom as children become much better at rule-based understanding, thinking about diverse topics and verbally expressing their ideas with greater confidence and clarity.

Although the amount of energy consumed by the brain seems to decline in middle childhood, indicating a slowing down of synapse proliferation, certain areas of the brain show continued energy consumption and activity. In particular, certain structures in the limbic system continue to grow, and these systems aid in the integration of emotional and bodily signals so that bodily awareness of pain or recognition of threats to the body is enhanced (Campbell, 2011). These areas of the limbic system are also implicated in the distress a child feels when experiencing social exclusion in middle childhood. This connection has been established in studies using a virtual game of 'Cyberball' along with brain imaging. During the game, other players deliberately bypass the child participant by throwing the ball to other players, leading to a feeling in the child of mild distress and rejection that can be measured in images of the brain. These studies have shown that the neural experience of the distress of rejection is very

similar to that of physical pain and sensation (Crowley, Wu, Molfese & Mayes, 2010). This provides vital evidence that an increase in bullying and social ostracism in the middle childhood years (for more detail, see Chapter 4) corresponds with the emerging capacity of the brain to understand and respond to this 'pain'.

Middle childhood is also the period in which many developmental differences in functioning between children are observed. Conditions such as attention deficit hyperactivity disorder (ADHD) and other learning problems associated with a lack of focus or ability to 'sit still' are observed by teachers. Some studies have linked the presence of ADHD with delays in the development of certain regions of the central cortex. Although the mechanisms of brain development or difference in ADHD are much debated, some researchers have found that slower maturation of the prefrontal cortex during middle childhood may explain some of the notable differences in executive functioning for children with this condition (Shaw et al., 2007), particularly impulse control, and maintenance and shifting of attention.

Brain development in middle childhood is the expression and refinement of many of the processes started in early childhood. Neural networks are faster and the regions of the cerebral cortex continue to grow, culminating in the final stages of growth in adolescence.

BRAIN DEVELOPMENT IN ADOLESCENCE

The adolescent brain enters a new 'critical period' of development during which two processes appear to underpin the emergence of the adult brain. First, as the grey matter of the cerebral cortex completes development, a process of synapse pruning begins, resulting in an adult brain that is actually *less* dense in grey matter than the childhood brain. This process of pruning is believed to make communication between different regions of the cerebral cortex extremely efficient. A second process also speeds up communication between different areas of the brain. An increase in myelination results in stronger and longer neural connections (or white matter) that extend to different parts of the brain.

One of the most interesting findings of the past decade relates to the final stages of growth of the cerebral cortex, and particularly to the finding that the prefrontal cortex is the final area of the brain to complete growth some time in the third decade of life, possibly as late as 25 years of age (Hickie & Whitwell, 2009). It is also known that male brains complete this final stage of development slightly later than female brains, probably due to the slightly later onset of puberty in males.

The continuing maturation of the adolescent brain has been linked to the slow and gradual emergence of frontal-lobe control of behaviour, and has been used as an explanation for impulsive and risky behaviour during adolescence (Romer, 2010). If you reflect upon the importance of the prefrontal cortex for executive functioning, as discussed in earlier sections, you will understand that the slow development of this part of the brain means that even adolescents still have limitations in their thinking and reasoning skills. Could the slow development of the prefrontal cortex make the adolescent particularly prone to impulsive or risky behaviours?

A number of researchers have adopted a 'brain-maturation' explanation of adolescent risk-taking behaviour. This explanation proposes that the 'risky' adolescent brain may be caused by different rates of development of two key areas of the brain. First, activation of certain areas of the brain known as the 'reward' circuits occurs relatively early in the adolescent brain. These circuits may encourage the adolescent towards novel and sensation-seeking activities. These activities may be of the kind that provide instant reward or gratification to the individual (for example, driving very fast or sexual activities). Second, the prefrontal cortex of the adolescent brain develops more slowly and is not yet mature enough to help the adolescent handle these risky situations (Romer, 2010). A more mature and adult-like prefrontal cortex is what enables us to step back and carefully assess a situation, engage in forward thinking, and plan or prepare for likely outcomes. Adolescents who engage in sensation-seeking or rewarding behaviours may often say to adults 'Oh, I didn't think of that!' when confronted with the



Source: © Angie Knost/Alamy

FIGURE 2.12 Some researchers attribute risk-taking behaviour in adolescence to the pattern of brain maturation. What other factors could contribute?

outcome of their behaviour. The brain-maturation perspective suggests that the adolescent is not just making an excuse but has a real problem in connecting sensational activities to risky outcomes.

However, it seems that the developing adolescent brain, or weakness in executive functioning, does not provide all of the explanation for difficult adolescent behaviour (Romer, 2010). For example, it is clear to teachers, parents and researchers that not all adolescents take risky pathways at this time of life. There may be other factors that explain why a relatively small group of adolescents engage in extremely problematic behaviours such as binge drinking or physically aggressive behaviours. In the previous sections we discussed the role of early-life experiences in shaping and setting up the foundations of a healthy future brain. Early-life exposure to toxic stress has been linked to several negative outcomes in adolescence, including suicide, drug use and development of addictions. Longitudinal studies show that for a small number of individuals, a pathway of impulsive or aggressive behaviours starts early in life and continues into adolescence or adulthood (for example, Campbell, Shaw & Gilliom, 2000; Nagin & Tremblay, 1999). This seems to suggest that the origins of some adolescent behaviours may be from much earlier in life, and may be associated with impulsive traits in certain individuals or the role of early-life experiences in shaping the future brain (Romer, 2010).

What should we conclude about the developing adolescent brain and its effect on behaviour? Certainly, there is wide agreement that adolescence is indeed a 'risky' time for some young people, but whether or not this is entirely due to a lack of cognitive sophistication is still uncertain. Romer (2010) suggests that some natural chemical processes in the brain that lead to sensation seeking are not necessarily associated with deficits in executive functioning or poor reasoning skills. Rather, the adolescent may simply need experience to help them cope with this new need for novel and sensational learning experiences. As with other stages of brain development we have studied, the role of experience and nurturing guidance is just as likely to be critical for the healthy maturation of the adolescent brain as it was for the early-childhood brain. Learning to take risks in 'safe' and regulated environments may be one such solution, and graduated licensing schemes are an example of experiential learning that has significantly reduced adolescent crash rates and injuries (Romer, 2010).

The continuing plasticity and growth of the brain into young adulthood also raises significant concerns about protecting the brain from harmful substances for as long as possible. Alcohol use during this final period of brain development is believed to affect parts of the brain that are still developing. Studies of the cognitive function of teenage drinkers show deficiencies in executive functions such as memory, attention, future planning and abstract reasoning (Hickie & Whitwell, 2009). Memory deficits in teenage drinkers are likely to be associated with a shrunken or underdeveloped hippocampus; the hippocampus is very important in the formation of memories. Executive functioning skills may be generally impaired because the prefrontal cortex region is also shrunken and reduced in size. Impulsive or risky patterns of longer-term behaviour may be established because of damage to these regions of the growing brain (Hickie & Whitwell, 2009). Further damage to the brain is likely to result when adolescents injure themselves as a result of drinking or other impulsive behaviours. Due to the 'critical period' of brain development, the adolescent brain is especially vulnerable to injuries that tend to result in much more severe damage to brain architecture and a lesser chance of a full recovery than might have occurred earlier in life (Hickie & Whitwell, 2009).

Despite these serious concerns about risky or impulsive behaviours during adolescence, it is important to remember that the adolescent brain is indeed developing and making significant advances that are very important for learning in the classroom and life in general. Executive function skills in shifting and maintaining attention improve. Memory skills improve, and the adolescent has a greater capacity to hold something in mind while they do another task or try to solve another part of the problem; for example, the adolescent who is learning to drive learns to be flexible in shifting attention from the primary task of driving to observing road signs. Social reasoning and perceiving emotional signals and cues also improves, leading to the deepening and greater intensity of adolescent friendships and other relationships (see more on social development in Chapter 4). It is also important to remember that many adolescents achieve incredible feats of deep intellectual thought (such as students who accelerate into university at young ages) and great displays of empathy and community awareness (such as adolescents who volunteer in their communities and abroad), and some show incredible self-control even while undertaking extremely risky pastimes.



THINK ABOUT

- What changes in behaviour would you see in the classroom from early childhood to adolescence as a result of brain development?
- What activities or supports could you offer as a teacher during each of the stages?

LANGUAGE DEVELOPMENT

Language expresses our intentions and desires, allows us to frame and express our thoughts, helps us to achieve our goals, and is fundamental to our relations with others. It is central to our cognition and social interaction, but its development is also influenced by cognitive, social and emotional development. Unlike physical development, language development does not occur without social interaction or the child's interaction with the environment. Language develops in context, and with a particular set of purposes.

LANGUAGE BUILDING BLOCKS

In describing the process of language acquisition, linguists have divided language into a series of five 'systems'.

Phonology refers to the sound systems of a language. The **semantics** of a language are the relationships between words and their meanings; for example, you know what the words 'cat' and 'dog' refer to because of your semantic knowledge. **Morphology** describes the way in which words are made up according to tense, gender, number and so on; for example, the difference between the forms write, writes, wrote and writing are aspects of morphology. **Syntax** refers to the grammatical systems that combine words into phrases and sentences. **Pragmatics** is concerned with the appropriate use of language in social settings; for example, 'Give me some cake now' is syntactically correct, but it is an impolite way to phrase a request in English. Knowing how to achieve your aims using language and how to express yourself appropriately are part of your pragmatic knowledge of language. Linguists tend to describe the five systems as separate, but of course they interact and work together to form the larger language system. As children learn language, they don't build it up system by system. Rather, as Tomasello (2006) argued, children acquire 'speech forms' or chunks of speech that have a particular purpose, and extract elements such as words from these larger chunks.

Children develop the key features of language in the first three to four years of life. Knowing the early processes of language development can help us understand later developments in literacy and second-language learning.

phonology
The sound system of language

semantics
The system of meanings associated with language

morphology
The combination of units of meaning in words; for example, listen + ed = past tense of 'listen'

syntax
The grammatical system that orders the construction of sentences

pragmatics
Rules for the appropriate use of language in social contexts

LANGUAGE DEVELOPMENT DURING INFANCY

In the first days after birth there are signs that language is developing. Infants' early cries use sound to communicate emotion, and infants discriminate between speech and other sounds, and between their mother's and others' voices (Sachs, 2001). They also learn the rules of taking turns in conversations in these first months, with 'visual conversations' observable in exchanges of eye contact between mothers and their babies. These early 'conversations' affect the rate of language development – a clue that social interaction is an important influence in language acquisition – and are complemented by verbal turn-taking conversations at about three months. Games such as peekaboo also contribute.

The sounds made by infants progress from cooing (mainly vowels) at about two months, to babbling (strings of consonants and vowels such as 'dadadada') about two months later. By about seven months, the babbling starts to sound more like language, and by the end of the first year, when the first words appear, they have the intonation and other sound patterns of the child's native tongue.

Gestures are the other pre-linguistic element that emerges at about the end of the first year, accompanying the emergence of language and significantly contributing to language development. A number of studies have linked young children's use of gestures to growth of vocabulary and the shift to two-word utterances (for example, Blake, Vitale, Osborne & Olshansky, 2005; Özcaliskan & Goldin-Meadow, 2005).

The use of gesture reflects the fact that children comprehend language long before they produce it, and this priority of comprehension over production continues throughout the course of language acquisition. The production of language forms appears closely linked to developments in cognition.

The first words tend to be limited in number, simple in pronunciation, and refer to familiar, concrete objects or important people – 'mum', 'dog', 'juice'. These words are used like phrases. In English, first words tend to be nouns, with verbs appearing later as they are more difficult to make sense of. The first verbs tend to refer to simple, frequent actions. Other languages show a different order of acquisition (Levey, 2014). Tomasello (2006) identified the typical purposes of 'holophrases' (words used like phrases) across many languages. Just as in infants' pre-linguistic gestures or utterances, they are generally statements or requests, asking for or describing a person or thing; more of something ('more', 'again'); movement of objects ('up', 'in', 'open'); actions of people ('eat', 'kick'); and comments on the locations of objects and people ('here', 'outside'). Added to these are simple questions ('What's that?') and social formulae ('thank you', 'bye bye').

telegraphic speech Communication using two-word sentences, leaving out smaller words

Towards the end of the second year, the child's vocabulary increases rapidly to about 50 words, and words start to be combined to produce **telegraphic speech** of two words – usually to ask for more ('more milk'), to say no ('no bath') or to notice the presence or absence of something ('all gone'). With time, the range of meanings expressed broadens, although children in the two-word stage are still constrained to talking about the here and now. Aspects such as tense, gender and number appear as the length of children's utterances grows.

There are links in this early development to cognitive and emotional development. The spurt in vocabulary that occurs at the end of the second year has been associated with a number of changes in the nature of children's thought (Bloom, 1998). We have already noted that children first learn words referring to people or objects that are important to them. Infants' early words are also usually related to their actions: they first learn



Source: Westend61/Getty Images

FIGURE 2.13 Infants' gestures contribute to their language development and extend their communicative competence at this early stage of development.

the names of objects that move ('car', 'ball') and words relating to actions themselves ('up', 'gone', 'more'). With the development of object permanence (see Chapter 3) terms such as 'all gone' appear, and with early understanding of causality terms such as 'oh dear' and 'uh oh' are heard. One explanation of the link between cognition and this aspect of language is that children's vocabulary is acquired around the particular cognitive problems they are solving (Gopnick & Meltzoff, 1997). Tomasello (2011) argues that children use their cognitive and social-cognitive abilities to acquire language. Language also contributes to cognitive development; words help with concept formation (Lupyan & Thompson-Schill, 2012) and cognitive flexibility (McWhinney, 2010).

LANGUAGE DEVELOPMENT DURING EARLY CHILDHOOD

Between two and three years of age, children start to speak in three-word sentences, and with the word order of their native language (in English, subject–verb–object) (Maratsos, 1998). Grammar also develops, with categories such as nouns, pronouns and verbs appearing in sentences as adults would use them. Thus, preschoolers' speech begins to more closely resemble that of adults.

The kinds of errors children make as they acquire language reveal the process of problem solving in which they are engaged. Very young children 'underextend' and 'overextend' meanings of words as they work to define the limits of a category; that is, they may use the word 'dog' to refer to all animals (an example of **overextension**) or to refer only to their own dog (an example of **underextension**). They may also develop their own expressions for words they do not know by combining words. For example, Jake, who is four years and seven months old, said:

overextension
Inappropriate use of a word for a class of things rather than for one particular thing

underextension
Inappropriate use of a word for one thing rather than for a class of things

> You can't touch his head because there's a hole and you might hurt his thinking thing.

while Eloise, who is two years and four months old, said:

> Don't fall me down [drop me].

Over-regularisation of grammatical forms occurs at the preschool stage as children recognise a particular rule and attempt to apply it. Initially, they tend to ignore irregular forms and apply the rule universally; for example:

over-regularisation
Application of a grammatical rule, ignoring its exceptions

> I goed to the zoo with Nana and we seed a baby giraffe.

and

> He did it well-ly, Mummy.

It is a measure of children's understanding of the language system that such over-regularisations are limited to the appropriate part of speech (verbs, in 'I goed … we seed') and tense (the past, in this case). Some of these kinds of errors are also made by learners in the process of acquiring a second language, and by children learning to spell.

The emergence of grammar has been linked to children's ability to find patterns and form categories (Tomasello, 2005, 2011). As children begin to form more complex sentences by joining phrases together, another sequence is evident that appears to parallel cognitive development. The first joining word is 'and', followed by 'then' or 'when' and 'because' or 'so'. Children learn in a similar way about concepts: first that things can be grouped together ('and'), then that they can be sequenced ('then'), and finally that relationships may be causal ('because') (Bloom, 1998). Bloom reminds us that the same sequence is seen in children's storytelling and understanding of stories.

CourseMateExpress
Online resources
Explore an example of children's storytelling with the **Interactive Activity** on this text's website.

The pragmatics of children's language also develop throughout the periods of infancy and early childhood, as children's use of language moves from simple expressions of emotion to a realisation that language can be used to direct and control others. Children as young as two years old adjust what they

say to take account of the listener (Dunn & Kendrick, 1982), although they do this imperfectly until their awareness of others' points of view (perspective-taking ability) improves.

LANGUAGE DEVELOPMENT DURING MIDDLE CHILDHOOD

Although most of children's language development is complete by the time they enter school, there are some further developments in middle childhood. There is a greater use and understanding of abstract words and constructions through middle childhood and adolescence, and children's use of correct grammar improves as a result (McDevitt & Ormrod, 2013). Children's vocabulary increases from 50 words at 18 months old, to about 10 000 words in the first year of school, to 20 000 words by Year 3, and to 40 000 words as the child enters adolescence (Anglin, 1993). Reading contributes to this increase in vocabulary, as do direct instruction and increased opportunities to converse with adults about a range of topics, as happens at school. A more complex grammar develops in order to deal with the increasing number of words used, and there is a close relationship between vocabulary size and grammatical complexity (Bates & Goodman, 1999).

metalinguistic awareness
Awareness of and understandings about language

These changes are accompanied by a greater awareness of language itself, which we refer to as **metalinguistic awareness**. Children's awareness progresses from appropriate use of phonology, morphology, syntax, semantics and pragmatics to specific knowledge of the rules being followed and the ability to express these rules. Such awareness is particularly important as children learn literacy skills. It may be that the school context itself focuses children's attention on the nature of language (Gombert, 1992). Bloom (1998) suggested that children's language develops around and in response to the meanings and intentions of the child's activity. In the early years, the first words tend to refer to the important people, events and objects in the child's world. Then, as the child's context changes from home to school, the activities on which the child focuses attention also change. Quite a bit of time is spent in classrooms talking with children about what language does and how it works. The meanings talked about are often to do with language itself, which helps children to develop their cognitive understanding of language.

Children's language play reveals a developing metalinguistic awareness. Early play with language tends to focus on phonological (sound-related) features. For example, this is from Harry (four years old):

> Hello Jacob Wacob.
>
> Jacob wacob cacob macob.

This kind of play with the sounds of language contributes to later developments in reading. It can be supported with nursery rhymes and stories that make use of repetition and rhyme (Bryant, Bradley, McClean & Crossland, 1989).

As children become more aware of other features of language, they move from being concerned with purely phonological features to an interest in playing with semantics and syntax. For example, Jack (aged six) said of his baby brother:

> Harry will be good at basketball when he grows up, because he dribbles a lot.

Jacob (aged five) said this when he learnt his cousin's name:

> I'm not going to call him Henry. I'm going to call him Chickenry.

This shift is displayed through an interest in riddles when children are about six to eight years old. Once again, there is a link between the ability to understand riddles and reading ability (Ely & McCabe,

1994). The metalinguistic skills involved in interpreting riddles are the same as those involved in making sense of a text.

In late middle childhood and adolescence, with increasing awareness of the rules for language use, children can become pedantic about what is said and how (and delight in picking up their teachers or parents on errors!); for example:

> 'Can you take the garbage out?'
>
> 'Yes I can … Oh, do you want me to? I thought you were just asking if I was strong enough. Ha, ha!'

LANGUAGE DEVELOPMENT DURING ADOLESCENCE

Adolescents have greater opportunities to acquire specific language forms and practices through participation in contexts outside home and school (for example, in workplaces or interest groups), and may shape their language to fit a variety of contexts (Smith Gabig, 2014). In addition, they spend considerable time in school navigating the academic language used in classrooms, with its particular rules.

By the final year of schooling, adolescents may have a vocabulary of up to 50 000 words (Stahl & Nagy, 2006). Increases in vocabulary during adolescence include the wider use of a variety of forms such as connectives ('although', 'however', 'nonetheless') and more complex words using prefixes and suffixes (for example, 'hope' may be expanded through the use of 'hopefulness', 'hopeless' or 'unhopeful'). There are also further developments in syntax, with mastery of complex forms such as passive ('It was taken by him' rather than 'He took it') and nested clauses ("The man who was riding the elephant's camera'), and use of more cohesive devices such as pronouns and conjunctions (Smith Gabig, 2014). Wider reading and exposure to subject-specific texts contribute both to vocabulary and to syntax development. Correct use of subtle distinctions in word use – as in the use of 'can' and 'want' in the garbage example given above – are probably learnt through formal instruction (Smith Gabig, 2014).

Development of abstract thinking in adolescence is reflected in language. The ability to compare what is said with the underlying reality allows adolescents to go beyond the literal. This ability shows itself in increased use and understanding of figurative speech, sarcasm and multiple meanings (McDevitt & Ormrod, 2013). Such developments are also related to further increases in metalinguistic awareness, with some students enjoying debating, arguing for the sake of arguing, and using language to think through ideas.

Nippold (2009) argued that more complex thinking, as well as the need to give information through exposition, prompts the use of more complex language in middle childhood and adolescence to communicate the new ideas and information students are thinking about. This parallels the link described earlier between younger children's language development and their cognition.

ADULTS' ROLE IN LANGUAGE ACQUISITION

Joint attention

When parents and children both focus on an object or activity in **joint attention** sessions, language learning is more rapid when parents do not interrupt or change the focus but instead talk about the object of the child's attention (Carpenter, Nagell & Tomasello, 1998). In these interactions, adults are supporting children's language development by labelling their environment for them. Tomasello (2005) suggested that children's ability to follow and direct attention underpins language development, as the purpose of language lies in responding to and manipulating others' thinking.

joint attention When carer and child together attend to a stimulus, such as when reading books or playing peekaboo games

Rogoff (1990) showed that children play an important, active role in such situations, directing much of their interaction with adults and initiating conversations or joint attention sessions. By being in charge, children can direct the focus to an issue of concern to them, keeping learning at an appropriate level. Implicit in this is the assumption that children attend to their environment selectively, learning from the experiences they are interested in and can make sense of.



THINK ABOUT

- How might we let individual children control the focus and pace of their learning in the school context?

Child-directed speech

child-directed speech
A type of speech directed to young children and characterised by high pitch, short and well-spaced sentences, simple vocabulary and exaggerated intonation

Adults worldwide adjust their language when talking to children, producing a special register of speech termed 'motherese' or **child-directed speech**. This type of speech tends to be higher in pitch than other speech, simple in grammar and vocabulary, and characterised by exaggerated expression and enunciation of words. It appears to help children separate the flow of speech into words, and to attend to the key words in a communication (Snow, 1995). Even children adjust their speech in this way when talking to babies. Infants show a preference for child-directed speech compared with other adult talk (Cooper & Aslin, 1994), and its use in the first year is positively related to infants' language comprehension at 18 months (Murray, Johnson & Peters, 1990).

The content of child-directed speech is also important in children's language development. Cameron-Faulkner, Lieven and Tomasello (2003) found that there was a limited number of phrases with which mothers in their study initiated utterances to their two- and three-year-old children. In fact, there were 17 phrases that initiated 45 per cent of utterances. They included units such as 'what', 'that', 'it' and 'you'. The children used the same initiating phrases in their own speech. The researchers concluded that the often-repeated phrases help the children to reduce the variety of the great number of utterances they hear (5000–7000 per day) and seek to comprehend and to use themselves.

Adults' speech and gestures directed to infants help them to make connections between words and their meanings (Zammit & Schafer, 2011). Children influence the words they hear as mothers interact with them around objects they show an interest in. Mothers also tailor their language to children's ability level (Ucelli & Pan, 2013).

Expansion and recasting

expansion
Parents' tendency to respond to young children's utterances by restating them in a more elaborate form

recasting
Parents' tendency to respond to children's utterances by restating them in the correct grammatical form

As well as simplifying what they say, parents may amplify what the child says, repeating the child's statement with an **expansion**, and **recasting** errors in grammar. For example, the child's phrase 'Daddy work' may be responded to with 'Yes, Daddy's gone to work in his car, hasn't he?', expanding the information by adding 'in his car', and recasting the phrase into correct grammar: 'Daddy's gone to work'. Children repeat adults' recasts, but the contribution that expansions and recasts make to children's language acquisition is a matter of debate (Nicholas, Lightbown & Spada, 2001).

Language input

As we have seen, direct instruction at school and the language of school contribute to growth in children's vocabulary, use of correct forms, and their metalinguistic awareness. It has been estimated that children are exposed to an average of 3000 new words in every school year (Smith Gabig, 2014). This contributes not just to vocabulary but also to knowledge of morphology – how words are put together – that in its turn contributes to further language skills.

It is also clear that the amount of language in the home affects the rate at which children acquire vocabulary. This is one explanation for differences in language detected between people of various social classes. In a landmark study, Hart and Risley (1995) found significant differences in the amount of language directed at children in different socioeconomic groups. Particularly affected were children of families in situations of poverty: these children had a third of the interaction and experience with language of children in families from higher socioeconomic strata. The acquisition rate also links to later achievements. In the same study, Hart and Risley found a positive correlation between children's language experience before three years of age, and verbal intelligence scores at ages nine to 10. Socioeconomic status is not the only factor at work here. Pan, Rowe, Singer and Snow (2005) found variation within low-income families, with observed variation in the growth of young children's vocabularies positively linked to maternal language and literacy skills, and negatively linked to maternal depression. In Chapter 11 we explore the contribution of socioeconomic factors to individual differences in more depth, including the variability observed within and among different social and ethnic groups.

Later studies have suggested that children also learn from overheard speech, particularly when they are being talked about, or when others are talking about something they are interested in (Floor & Akhtar, 2006). A recent study found that in naturalistic settings, overheard speech from multiple others in the household (such as siblings, aunts, uncles or grandparents) did not contribute to children's vocabulary, although the researchers pointed out that it is likely that overheard speech contributes to other aspects of language, and/or that in other cultures it may play a greater role (Shneidman, Arroyo, Levine & Goldin-Meadow, 2013).

Bryant (2013) identified a number of strategies parents use to 'socialise' language in their children, contributing to their communicative competence. These include prompts, modelling, reinforcement, evaluation and other forms of input. Activities engaged in at home that prompt language also play a role. Rodriguez et al. (2009) found that three-year-old children's vocabulary was predicted by a combination of the frequency of their participation in literacy activities, the quality of the mother's engagement, and the availability of age-appropriate learning materials in the home.



THINK ABOUT

- How could you contribute to children's language development at school?

THE ROLE OF PEERS AND THE CHILD THEMSELVES IN LANGUAGE ACQUISITION

Language play

Throughout this chapter, we've seen a number of ways in which children's activity contributes to their development. Play is a particular kind of activity that is especially important to language learning. Children's play with language contributes to their metalinguistic awareness, as they play with sounds or with meanings.

In fantasy play, children negotiate meaning with one another, and must experiment and revise what they say in order to clearly communicate their ideas for the imaginary situation (Smith Gabig, 2014). Vygotsky (1977) described play as a supportive context for the development of children's thinking; for more on Vygotsky's view of the role of play in cognitive development, see page 108. It also clearly supports their language development.

Peer interaction

The importance of friendship and peer relations to children makes this a motivating context in which language is shaped to achieve acceptance and maintain friendships. In peer interactions, children develop and practise language skills in coordinating play, resolving conflict, and negotiating with and persuading



Source: Gladskikh Tatiana/Shutterstock

FIGURE 2.14 Children's interaction with peers during play contributes to their language development, with new requirements for using particular forms, opportunities to practise, and motivation for communicating effectively.

others (Smith Gabig, 2014). The role of peers in second-language acquisition (discussed later in this chapter) is also important (Philp, Adams & Ishawita, 2013). For example, children acquire and practise new language forms in the context of interactions with peers, and may adopt the language forms of their peers to appear more like them (Philp & Duchesne, 2008). Language both contributes to and is influenced by the social development of the child. We explore social development in greater detail in Chapter 4.

INDIVIDUAL DIFFERENCES IN PATHWAYS TO DEVELOPMENT

As we have seen, children's communication skills are developed through interactions with multiple others: parents, siblings, teachers, peers and others, each of these working differently to provide different kinds of interaction, feedback and input, depending on who is being conversed with, and in what context. Opportunities for language learning vary for different children, and for different families (Goldfield, Snow & Willenberg, 2013). The child's own interest and motivation play a role as well, influencing what they attend to (Bryant, 2013), with the result that there are individual differences in pathways to language development as well as in the language that develops.

In the section that follows, we discuss how children's prior experiences in language and other areas contribute to their understanding and to their learning in school. Being aware of the interests and activities for which children use language, including playing with language itself, can help us as teachers to make learning relevant for students.



BOX 2.5 IMPLICATIONS FOR EDUCATORS

LANGUAGE DEVELOPMENT AND THE CLASSROOM

Some of the principles drawn from how children learn language suggest initiatives teachers can implement in classrooms to contribute to language development:

- Interaction contributes to language development: give students opportunities to interact with a wide range of partners on a range of topics.
- Develop vocabulary through talking with students and encouraging reading about a variety of topics.
- Allow children to direct the focus of interaction.
- Explicitly teach students how to use irregular forms. They may not hear them used consistently in everyday speech.
- Build students' awareness of language by talking about how language works, and by drawing attention to specific language features in relation to content areas.
- Contribute to metalinguistic awareness with the use of riddles, rhymes, jokes and metaphors in middle childhood – but ensure that all students understand them. Remember that there are individual differences in the rate of development.
- Similarly, explore proverbs and multiple meanings in adolescence, allowing students both to find layers of meaning in texts and to construct their own.

You will see more examples of ways in which language contributes to learning in the section on the school-based skills of literacy and numeracy below.

SCHOOL-BASED SKILLS

Children do not arrive at school without knowledge or skills. Physical and language skills developed in infancy and early childhood form an important basis for the skills that are the focus of schooling. In this section, we discuss three sets of skills that are central to the work of schools: second-language learning – for many children an essential skill necessary to access education – and the skills of literacy and numeracy. In each case, children's knowledge develops from very early in life and is built upon by formal teaching in schools. Each of these skills, too, is needed for learning across the curriculum throughout schooling and, indeed, life.

SECOND-LANGUAGE ACQUISITION

We described the process of first-language acquisition earlier, but for many children in Australia and New Zealand, English is not their first but their second (or maybe even third or fourth) language. Some children grow up with several languages. Others must acquire a second language when their families migrate to a new country, or when they start school if their families do not speak Standard Australian English. The term 'learners of EAL/D' (English as an additional language or dialect) has replaced the older ESL (English as a second language) term, recognising the range of language backgrounds these learners of English may have. For these children, acquiring a second language is an essential skill for success at school. Snow and Kang (2006) have drawn several conclusions from research on children's learning of a second language, in this context:

- Acquiring a second language in childhood can be intimidating and difficult, lead to temporary emotional problems, and take several years.
- The first language is at some risk of loss or decline under the influence of the second language.
- A child's continued development of the first language is more likely if the parents are bilingual and/or highly educated in the first language.
- Higher status languages and languages associated with schooling and literacy are in general less subject to attrition than lower status languages.
- First language literacy skills can be a support to second-language acquisition.
- Learning to read a second language is easier if one is already literate in a first language.
- Literacy skills contribute to higher levels of oral proficiency in both a first and a second language.
- Older children typically learn a second language faster than younger children, perhaps because of their better developed literacy skills.
- Transfer of literacy skills can support second language literacy but may not occur automatically across even closely related languages.

Source: Snow and Kang (2006), pp. 78–9.



BOX 2.6 CLASSROOM LINKS

STAGES OF SECOND-LANGUAGE ACQUISITION IN THE CLASSROOM

What will you see in the classroom? There will be considerable variation in learners' progress in English as an additional language or dialect, depending on their age, experience and context, but five broad stages of development have been identified. Goldstein (2014) summarised the features of these stages of second-language acquisition.

Stage 1: Preproduction

As in first-language acquisition, learners' receptive language advances further than their expressive language in the early stages of language learning. There may be a silent period of up to six months during this stage, and/or a period when students converse with peers but not with adults in the new language. This should be seen as a natural aspect of the early stage of second-language acquisition. Students respond to simple commands and can understand up to 500 words.

Stage 2: Early production

The focus on receptive language continues. Approximately 3–6 months after being introduced to the new language, students understand yes/no and what/when/why questions, and generally use one- to three-word phrases and formulaic expressions such as 'How-are-you?'. They understand and use up to 1000 words.

Stage 3: Speech emergence

Six months to two years after being introduced to the language, learners' comprehension improves, and their vocabulary expands to allow them to talk in simple sentences. Some grammatical errors are shown in their speech and writing as they start to use more complex grammar. Vocabulary increases to about 3000 words.

Stage 4: Intermediate fluency

Approximately three years on, comprehension improves still further, and learners show competent skills in face-to-face conversations. They can express their thoughts and opinions using complex constructions, and show few grammatical errors. Vocabulary continues to increase, to approximately 6000 words.

Stage 5: Advanced language proficiency

Five to seven years after being introduced to the language, students' grammar and vocabulary are similar to those of a native speaker. They can use the specialised vocabulary of particular subject areas and can participate in classroom activities at their grade level.

ACTIVITIES

1 Identify the supports that learners would need in the mainstream classroom at each of the stages. See also Box 2.7 for further ideas relating to particular age groups.
2 One of the first things students learn is to ask to go to the toilet. Consider other practical needs, and particular language that students may need to participate in your subject area.

Comparing first- and second-language acquisition

There are some similarities between the ways in which first- and second-language learners use language, which seem to be related to the nature of the language-learning process. There are also important differences arising from the contexts in which people learn first and second languages. The focus in this discussion is on learning EAL/D, something that confronts non-English-speaking migrants in Australia and New Zealand and some Indigenous children in Australia. Foreign-language learning (for example, speakers of Standard Australian or New Zealand English who learn French or Vietnamese in classrooms in Australia or New Zealand) is a different although related process.

Similarities between first- and second-language acquisition include an early dependence on routine phrases such as those in telegraphic speech. Young children may use phrases such as 'all gone' for all situations where an absence of something is indicated, later recognising that these phrases can be combined with other language units to make phrases such as 'all gone milk', or separated to make phrases such as 'Mummy gone'. Second-language learners at early stages similarly depend on remembered language chunks – formulaic phrases that have not been separated into their component parts, and that cannot therefore be applied flexibly or adapted and expanded upon. Such use of formulaic phrases is an important support in the learning of a second language. Some common examples are the questions 'Where is it post office?', 'How are you your father?' and 'Who is she this man?'. The constraint at this early stage may be one of memory, since when confronted with a large, unfamiliar system, people commonly start with a small sample of language and build from there. The overgeneralisation of grammatical rules is another feature of both first- and second-language acquisition. The problem-solving nature of the language-development task is evident here.

There are some important differences between learning a first and a second language, however (remembering that we are not discussing bilingualism at this point, but the learning of a second language at school). In particular, while the learning of a first language can be assumed for the majority of children, such assumptions cannot be made about the learning of a second language. Children learning a second language bring with them understandings about language and the way it operates that can both assist and hinder them in their learning of the new language. Nicholas and Lightbown (2008) point out that learning a second language is a different process that has implications for teachers in their support of second-language learners alongside native-language learners in the classroom (see Box 2.7). They also caution that the age of the child makes a difference: under seven years of age, there appears to be a different process than for children over seven, due in part to the rapid development of understandings about language that are occurring at this earlier stage, apparently without instruction, and in part to the importance of literacy from the age of seven onwards.



BOX 2.7 IMPLICATIONS FOR EDUCATORS

Nicholas and Lightbown (2008) pointed out that the process of learning a second language differs for children of different ages. Following are some suggestions from the literature for supporting second-language learners in early childhood, middle childhood and adolescence.

EARLY CHILDHOOD

- Young children (under seven) draw on features of their first language, such as word order, to help them to meet the challenges of producing second language.
- There may be extended periods (months, or even a year such as in one case) of silence during which students understand but do not produce the second language. This may be strategic, with children focusing on learning from input before they attempt to produce it.
- Children may 'code-switch' – use a mixture of first and second language – and need to learn when this is appropriate, and when they might not be understood.
- Language play is an important feature of young children's use of first language (see page 48), and through it, second-language learners can learn and explore the features of the new language. For example, teachers can use language play to explore difficult features such as pronunciation through tongue twisters and rhymes. Children can also attain an identity as a peer in the classroom through language play and mimicry (Philp & Duchesne, 2008). Lightbown and Spada (2008) point out that it is important, however, for children to move on to adult forms.
- For young children, the focus should be on language associated with activities, actions and simple thinking operations, with language presented and used in context.

>>

MIDDLE CHILDHOOD

- Children need not only to learn the second language, but to learn through it as well, so that they can develop skills in using the language for academic purposes.
- Second language can be taught in the context of, and through, all curriculum areas, not just in English classes.

ADOLESCENCE

- Older children may learn from decontextualised language, and from language associated with more complex thinking.
- Students apply their knowledge of their first language and may rely on translating to a greater degree than younger learners. They need also to develop knowledge of the second language and how it works, so that they can draw on this knowledge independently of the first.
- Identity can be particularly important for students in adolescence, and language is part of identity. Consider how to support second-language learners to construct identities as full members of the class group.
- Opportunities to interact informally with native speakers are important both to provide input and to allow the practice of output. Encouraging positive relationships between native and non-native peers in the classroom can thus be valuable.

Sources: Nicholas and Lightbown (2008); Ellis (2005); Gibbons (2002); Muñoz (2007).

Why is it that learning our first language sometimes seems effortless and automatic, while learning a second language can be a long and difficult process? The contextual features of second-language acquisition make it a more difficult task than learning a first language. In first-language acquisition, children tend to be supported by their parents, with intense one-to-one interaction focused on the child's level and the activities the child is engaged in. Second-language acquisition rarely occurs with this level of intense support. In addition, as we have seen, the child's emotional, social and cognitive development is progressing in tandem with language development, supporting and being supported by it. When second-language acquisition happens later, this match does not occur, and the child has often quite complex thoughts, ideas and emotions to express in the new language. There are emotional and motivational differences, too. As we saw earlier, first-language acquisition is an intrinsically motivating task for the child due to caregivers being involved in the process. There are many rewards for success – and even for failure – when parents respond to the child's requests and attend closely to clarify meaning. Second-language learning can be frustrating and anxiety-producing, particularly for a newly arrived non-English speaker in an Australian or New Zealand school. When second-language acquisition occurs in the school context, there is also the double demand of learning about other curriculum areas through the second language (Nicholas & Lightbown, 2008).



THINK ABOUT

- How might the school context be shaped to support second-language acquisition?

Bilingualism and learning English as an additional language or dialect in schools

A review of bilingual education programs worldwide found that schools that are organised to support children's first language result in cognitive, social and educational advantages for their bilingual students. Programs that teach English at the expense of the first language, by contrast, produce negative cognitive,

social and educational outcomes for these students. For bilingual students, the most effective programs are bilingual, particularly if these aim to maintain and build up the first language. Less effective are integrated EAL/D programs, then EAL/D withdrawal programs, with English-only programs the least effective (May, Hill & Tiakiwai, 2004). This may be because strength of the first language supports the learning of a second, with considerable knowledge about language and the way it works already in place (Lightbown & Spada, 2013). Children for whom English is a second language tend to learn English and other subjects more effectively when their first-language skills are strong (Cummins, 1979; Thomas & Collier, 1999). The majority of programs in Australian and New Zealand schools involve EAL/D withdrawal or integrated EAL/D, although there are some schools with bilingual programs supporting Aboriginal languages and *te reo* Māori, as described in Chapter 11.

EAL/D learners may be of any age, with differing levels of cognitive development and skill in their first language. In addition, they may differ in their experience of English prior to starting school. Thus, effective evaluation and teaching programs are marked by flexibility. Rather than being guided by a specific developmental path, teachers focus on students' needs.

EAL/D programs in Australian schools are currently of two types: intensive English programs for newly arrived migrants, and support programs in mainstream schools. The latter may be within classes, where specialist and general classroom teachers support the development of English while studying the curriculum; or in withdrawal situations where English may be the sole focus (Scarino, Vale, McKay & Clark, 1988). For migrants in New Zealand, there are intensive English classes, with some immersion in mainstream English classrooms, to ready these students for mainstream classes once the intensive class ends (New Zealand Ministry of Education, 1994).

Immersion and bilingual programs in *te reo* Māori are also run in New Zealand schools, at levels ranging from whole-school immersion to bilingual units within schools. These were introduced in the 1980s following concerns that the language was diminishing in use (May, Hill & Tiakiwai, 2006). In a review of these programs, May, Hill and Tiakiwai urged that students need to be taught a language (such as English or *te reo* Māori), and to be taught in that language, so that they develop *academic* English or *te reo* Māori.

LITERACY DEVELOPMENT

Traditionally, **literacy** has been conceptualised in terms of the written language skills of reading and writing, but as our society becomes more technological, the written word is used in increasingly wider contexts. More recent approaches to literacy have also recognised the close relationship that reading and writing have with listening, speaking and viewing.

literacy
Engaging with various kinds of texts, and using and modifying language for use in a variety of contexts

The Australian Curriculum identifies literacy as a general capability underpinning learning. It states, 'Literacy involves students in listening to, reading, viewing, speaking, writing and creating oral, print, visual and digital texts, and using and modifying language for different purposes in a range of contexts' (ACARA, 2012b). The New Zealand literacy and numeracy strategy is even broader than this. It defines literacy as 'the ability to use and understand those language forms required by society and valued by individuals and communities' (New Zealand Ministry of Education, 2002). How does this add to our understanding of literacy?

Have you ever noticed how your use of English changes depending on where you are and who you are with? You may be more casual with your family, and more formal when you need to give a presentation to a group; teenagers often speak in particular ways with their peer group (Gee, Allen & Clinton, 2001). Similarly, your handwriting, grammar and even spelling probably differ when writing lecture notes, and when writing a letter to a friend, an essay, an email message or a text message. We use different forms of English in different contexts, and we need to adapt our language to the use we are making of it. Similarly, along with a variety of texts, there is a wide range of ways in which we interact

with texts. The way you read a website is different from the way you read a book, which is different again from how you read a shopping list, or watch a television program. **Multiliteracies** is the term that has been used to refer to this variety in types of language we need to master to be literate in our society (Cope & Kalantzis, 2000; Zammit & Downes, 2002).

multiliteracies
The variety of types of language we need to master to be literate in our society



THINK ABOUT

- How can we broaden the range of literacies taught in the classroom?

Learning to be literate

Reading and writing print are two key literacy skills. We have seen a number of features and practices in language development that later contribute to literacy development. Although children commonly learn to read and write once they are at school, many precursors of these skills are developed in the preschool years.

Emergent literacy

emergent literacy
Understandings about and attitudes towards reading and writing, which are the precursors of acquiring those skills

Early awareness of literacy has been termed **emergent literacy** (Clay, 1991). This includes understandings about conventions of print, such as the left–right, top–bottom ordering of print on a page in English, and the knowledge that letters represent sounds and are combined to form words separated by spaces. It also includes attitudes about the purposes and value of reading and writing.

Activities such as looking at books, reading environmental print such as street signs or the title of a favourite television show, and simple rhymes and songs all contribute to reading, as does writing. Similarly, writing is developed through reading and activities such as drawing and telling stories, as well as adult-supported writing such as writing a letter, a birthday 'wish list' or a story dictated by the child. A child's home environment is an important contributor to emergent literacy, in terms of both direct and indirect literacy support from parents. For instance, a relationship has been demonstrated between children's reading ability and such features of the home environment as length of family meal times (Anderson, Wilson & Fielding, 1988), number of books in the home, library membership and the amount that parents (and particularly fathers) read (Share et al., 1983), as well as more direct activities such as parents or other family members reading books with the child (Raikes et al., 2006). This is by no means an exhaustive list. There are many different literacy practices in families, including direct activities to teach literacy and all the informal ways in which reading and writing occur. Literacy also builds on language development, so language activities such as talking and listening are themselves important preliteracy activities. Diehl (2014) explained that good oral language supports literacy, while literacy activities themselves contribute to oral language development. This reciprocal relationship continues throughout development, as we will see. Indeed, neurological research has linked the development of children's oral skills though storytelling and conversation with later academic and literacy achievements (Sousa, 2005). Clearly, there is a wide range of activities that contribute to literacy development, some of which are direct, and some indirect. Snow and Kang (2006) observed that children use emerging literacy skills alongside and in similar ways to other developing skills: in play, to communicate, as part of everyday routines, and as problems to solve.

Teachers need to recognise the literacy skills and experiences that students bring from home, which may differ from those of the school, and to work with these. The closer the match between the literacy practices of home and school, the better chance there is of good literacy outcomes at school (Comber et al., 2005). There can be a mismatch between home and school literacy practices. Some projects aim to add to the home literacy experiences of children to improve the match (for example, Bochner & Freeman, 2002). Others have suggested that teachers should acknowledge the knowledge and skills their students do have, so that students can make use of what they know to develop their literacy (Comber et al., 2005). McNaughton (2002) has identified rich literacy resources in families in low

socioeconomic areas in New Zealand, which he suggested could be harnessed for their literacy learning in schools. Families would benefit from a combination of these approaches, both providing a bridge from family to school practices, and building up and broadening home literacy.

Literacy development throughout the school years

We sometimes think of literacy as something learnt in the early years of schooling, and those years are certainly important, but literacy learning also continues beyond Year 2. Consider the literacy skills students need for researching topics in upper primary school, or for preparing essays during secondary school, or the further learning you have done about how to read and write academic texts since starting university. The purpose of reading and writing changes, as well as the types of texts. Chall (1996) described a shift in reading development from 'learning to read' in the early years to 'reading to learn' in the later years of schooling. These skills need to be taught as carefully and explicitly as those in the early years. They also rest on those early literacy and language skills – another example of development building on what has gone before. For this reason, some students in upper primary and secondary schools may need to consolidate basic skills in reading ('learn to read') before they can effectively 'read to learn'.

Learning to read and write

There are many possible paths to literacy (Clay, 1998). Different children learn to read and write by different means (see Box 2.8). Here, we describe the development of skills used in reading and writing, focusing particularly on the aspect of literacy that is described as 'code breaking' (Freebody & Luke, 1999) or 'decoding'. Some other skills are described under the heading 'Teaching literacy in schools'.

Reading and writing are complex skills that involve the coordination of a number of individual skills. For expert readers, reading tends to be automatic, but for children the process is demanding and a little like solving a puzzle in code. Readers must simultaneously recognise the pattern of marks on the page as letters, decode individual letters as sounds, group strings of letters together to form new sounds, and check the word formed against their vocabulary – and that is just to read one word! As readers continue the process with subsequent words in a sentence, they must keep each word in their working memory so as to combine it with the other words in a meaningful way, and attend to punctuation to obtain clues about intonation and stress. It is little wonder that comprehension is often set aside as children tackle the complexities of decoding. The information-processing approach (see Chapter 3) describes reading as an information-processing problem that makes demands on working memory. The individual skills must become automatic in order for working memory to operate efficiently, or reading performance will be affected (Perfetti, Yang & Schmalhofer, 2008).

Once reading becomes more automatic, attention is increasingly focused on a variety of purposes, so that rather than 'learning to read', children start to 'read to learn' at around nine years old (Chall, 1996). In primary school, children progress from reading aloud to silent reading, and show increases in 'sight vocabulary' (the number of words they can recognise automatically) that affect fluency. The purpose of reading expands from reading simple stories to reading to obtain new information. At school, students don't just read, but also use reading as a tool for study. Going into adolescence, there are further increases in fluency and in the ability to read complex, unfamiliar and abstract texts. The range of materials and viewpoints further expands. This builds on learners' ability to go beyond the literal meaning and consider multiple viewpoints, and to draw inferences from a text with the development of abstract reasoning (see Chapter 3). By the end of school, many students define the purpose of reading for themselves, and are able to integrate their own viewpoint with that of the writer. Decoding skill is automatic and efficient, allowing for these broader functions of reading (Ely, 2005). Similarly, in writing, children progress from focusing on form to using writing as a tool. For example, Jacob enjoyed playing 'cafes' with his family, taking down each person's order on a notepad. To begin with, when Jacob was four years old, the orders

CourseMateExpress

Online resources
Go Further: See samples of Jacob's writing on this text's CourseMate Express website.

BOX 2.8 CASE STUDY

BEGINNING TO READ

Case study A

Anna loves to read, picking up books whenever she can. Her mother reports that Anna used to 'read' to the family dog, telling stories from her picture books, from about three years old. Anna's teacher reports that she is moving quickly through the school readers, picking up new words by sight and making sense of what she reads even when the words are difficult for her to sound out. Anna writes long sentences in her 'journal' (a scrapbook students spend time writing and/or drawing in each day), and many words are written with standard spelling, though she hasn't 'learnt' them formally.

Case study B

Fred participates in all the literacy activities in his kindergarten class. At home, his mother was reading *The Lion, the Witch and the Wardrobe* to the children in the evenings. At an exciting point in the adventure, the readings were interrupted for a few nights. To her surprise, Fred picked up the book and finished it himself. He was able to read well beyond his years before anybody had noticed, seemingly learning to read overnight.

Case study C

Josie also likes to look at books, but she enjoys them best when they are being read to her. Her teacher reports that she didn't understand the connection between the letters on the page and the words read out loud until it was clearly explained to her. The phonics program in her class is helping Josie to make this connection, and to be able to sound out words herself. Josie is also learning to read a bank of words by sight, to help her reading to become more automatic. Josie's journal entries are usually pictures, but she is starting to write sentences as well, inventing spelling by joining sounds together that she hears in the words. Occasionally, she copies words from word banks around the room.

Case study D

David is mystified by some of the reading activities at school. He doesn't yet hear individual sounds in words, so is not ready for the school's phonics program. A teacher aide works with David to develop his phonemic awareness. In his journal, he writes in scribbles, copying the children around him by making marks on the page, though he doesn't yet connect those marks to the specific shapes of letters.

ACTIVITIES

1 How does the reading development of these four children differ?
2 What would you do, if you were the teacher, to support each child's reading development?

were a series of scribbles on the page. Later, Jacob progressed to writing strings of letters and numbers. By the time he was six years old, his letters approximated the sounds they are meant to make, and others could read what he had written.

With further formal instruction at school, children's spelling and punctuation become more standard. There is a wide age range in children's development of these skills: in the same kindergarten class there may be one child still writing in unrecognisable scribbles, while another is writing elaborate stories.

In parallel with developments in their reading, children in middle childhood start to use writing as a learning tool to help make sense of information or events (Daiute & Griffin, 1993). Instruction becomes focused on writing for different purposes (genres) as children become more proficient and their understanding of other perspectives improves.

In adolescence, writing shows more complex syntax, better planning and editing, and an increasing depth of topic. The earlier focus on the mechanics of the writing process is replaced in these older learners by the ability to phrase things in their own words and to adapt their writing for a variety of purposes and audiences (McDevitt & Ormrod, 2013).

Teaching literacy in schools

Teachers make an important contribution to students' literacy throughout the school years (Comber et al., 2005).

There are many developmental pathways to literacy, and there is no 'best' way to teach literacy. Different aspects of literacy development require different inputs, with phonemic awareness and letter knowledge vital for decoding, while vocabulary and grammar skills contribute to reading comprehension (Adams, 2011). Reading practice contributes to the automatic, high-speed retrieval that is vital for reading skill, and exposure to print is fundamental to reading development (Snowling & Gobel, 2011). Indeed, the best way to ensure that all students have the skills they need across a range of contexts is to combine a number of approaches. You may have heard of approaches to literacy teaching such as the phonics, whole language, genre, functional or critical literacy approaches. Combining a number of such approaches in a balanced program appears to create the best outcome for the greatest number of students (Deakin University, 2005). Box 2.9 gives an example of such a combined approach.



BOX 2.9 CLASSROOM LINKS

Center (2005) recommended a balanced approach to the teaching of reading, balancing the systematic teaching of phonics with teaching children to make meaning from texts. These skills need to be combined so that children have the skills both to decode the text and to make meaning from the sounds and words they decode. In the first year, she suggests that teachers:

- read a variety of texts daily with the children to develop listening comprehension, vocabulary, knowledge and enjoyment of the reading process
- read texts interactively, including predicting, discussing and retelling the story
- use Big Books (large-format texts) to develop print awareness
- explain to children how learning individual sounds will help them to read all the books they encounter
- introduce each sound over the year, helping children to identify them in words, and to write them
- give children 'decodable texts' (that is, readers with simple text using the sounds the children can recognise)
- have other books available for children to read and have read to them
- develop phonemic awareness through activities such as thinking of words starting with a sound, blending sounds together to form words, and pulling words apart orally to separate phonemes
- encourage children to write in response to literature and to put in practice their phonological knowledge and skills
- teach spelling systematically to support children's reading and writing skills
- start to teach syntactic awareness
- include plenty of oral language activities, particularly for students of language backgrounds other than English.

Source: Adapted from Center, Y. (2005) *'Beginning Reading', a balanced approach to literacy instruction during the first three years of school*. Sydney: Allen and Unwin.

ACTIVITIES

Interview a teacher about their approach to teaching reading, and think about the skills that are being developed.

CourseMateExpress

Online resources

Go further: Explore the value of teaching skills and context in reading.

Luke and Freebody (1999) developed a model of the resources that literate people draw on to make meaning from and in texts. The resources are interdependent, so although there are four families of resources, each of these is necessary for literacy, but is not sufficient on its own. The resources reflect the four practices of literate people as code breakers, participants, users of texts and analysts of texts.

- *Code breakers* combine knowledge of graphophonic cues, spelling and grammar with other cues to meaning, such as pictures and context, to decode or create a text. A number of studies have shown the importance of explicit, systematic teaching of phonics to reading fluency and comprehension (de Lemos, 2002). Diehl (2014) listed phonemic awareness, phonics, reading fluency, vocabulary and text comprehension as supportive of literacy skills in the primary school years.
- *Participants* apply their knowledge of culture and society to make meanings in texts. Research has shown that the teaching of skills needs to occur in meaningful contexts, as reading is a purposeful activity (Comber et al., 2005).
- *Users of texts* are able to recognise and use different genres of text for different purposes. The functional approach (Gibbons, 2014) teaches about what texts do, and how different text types are structured and defined. Students' attempts to write for particular purposes are supported by modelling and guided practice.
- *Analysts of texts* read between the lines to judge the point of view of the writer, and to write for particular purposes themselves. Critical literacy is particularly important in the later years of schooling, as students select between a number of resources, judge the appropriateness and validity of what they read, and write for particular audiences. This skill is highlighted when searching for information on the Internet, for example.

Teachers can contribute a range of practices within each resource family to each student's repertoire. As different students will use different practices in different contexts, having a range of practices available within each resource family is important. In a classroom reading lesson, you might see students learning to associate letters with their sounds and to blend sounds, predicting what will come next, taking part in a shared reading activity in which they talk about a book and what it is about, sequencing text, reading alone, reading aloud to someone else, rewriting a story to put it into a different context, exploring the structure of a fairytale, writing a response to a story they have read, using the computer to find out what others have thought of the story, and talking together about the story and what they liked or disliked about it. In another classroom, students might be looking at a different kind of text on a website, reading pictures and icons to navigate through the site, judging the truthfulness and relevance of what they've read, linking to other sites, talking together about what they want to find out and where and how they might find it, and discussing why different sites give conflicting 'facts' and how to determine which is correct.



Source: Compassionate Eye Foundation/Chris Ryan/Getty Images

FIGURE 2.15 Literacy activities may involve a range of reading, writing, speaking, listening and viewing activities. All these contribute to literacy.

NUMERACY DEVELOPMENT

numeracy
The ability to use mathematics effectively and with confidence in a range of contexts

Numeracy is often used as a partner term to literacy. The New Zealand Ministry of Education (2009a) uses the following definition: 'To be numerate is to have the ability and inclination to use mathematics effectively – at home, at work and in the community'. The Australian Curriculum (ACARA, 2012b) states that 'numeracy involves students in recognising and understanding the role of mathematics in the world and having the dispositions and capacities to use mathematical knowledge and skills purposefully'.

It involves mathematics, but goes beyond the mathematics classroom to be involved in all curriculum areas. Numeracy is identified as a general capability addressed across the Australian Curriculum. It is conceived as having six elements: estimating and calculating with whole numbers; recognising and using patterns and relationships; using fractions, decimals, percentages, ratios and rates; using spatial reasoning; interpreting statistical information; and using measurement (ACARA, 2012b).

Just as literacy is thought to be intrinsic to everyday functioning in our society, numeracy is also recognised as a key skill for learning and life. In 2008, the Australian Government set goals for literacy and numeracy that included: 'All young Australians become successful learners: have the essential skills in literacy and numeracy … as a foundation for success in all learning areas' (MCEETYA, 2008). New Zealand's *National education goals* similarly state: 'Priority should be given to the development of high levels of competence (knowledge and skills) in literacy and numeracy' (New Zealand Ministry of Education, 2004).

Bryant and Nuñes (2011) identify three main contributors to children's mathematical knowledge and understanding: their development of logical thinking (see Chapter 3 for more on this), meaningful experiences with quantity and number, and teaching of conventional systems such as counting. We will see examples of each of these contributors as we look at the development of numeracy throughout childhood and adolescence.

Emergent numeracy

As with language, awareness of mathematical principles seems to be biologically determined. Research with infants shows that they are aware of quantity from the first days after birth, recognising changes in numbers of small sets of objects (Antell & Keating, 1983). By the time they are two years old, children also show expectations that adding something will increase an amount, and that taking something away will decrease it (Sophian & Adams, 1987).

These early understandings are built upon by the developing child's experiences in the physical and social world. Look around you: almost unconsciously, you may notice that the level of tea in your cup is lower than it was earlier, that there is less text on this page than on the last, that the hands on the clock have moved from four towards five. We operate in and are surrounded by a world of quantities, measurements and spaces. Children's daily experiences habituate them to think about mathematical constructs. Stacking blocks and fitting cups inside one another help understandings about seriation to develop; playdough and sand and water play all help to develop understandings about quantity, and helping pour and mix in real or pretend cooking, or comparing the size of dessert portions to ensure the ice-cream is divided 'fairly', contribute to understandings about measurement. In addition, activities and the games parents play with young children help them to learn the number names, as well as ideas about quantity, size and shape. Rhymes such as 'one, two, buckle my shoe' are examples, as is the common game of walking or jumping up and down steps, counting as you go (see Figure 2.16). As children get older, these everyday activities change, but can still contribute: games with dice and cards help children to 'subitise' numbers – immediately recognise the number of items in a group – while setting the table for dinner develops an understanding of one-to-one correspondence. Still later, working out probability while playing a card game or watching a television game show, estimating costs for a mobile phone, comparing prices for items bought in the supermarket, and translating recipes from imperial to metric



Source: © Corbis/Claudia Rehm/Westend61

FIGURE 2.16 Children's informal activities and games help them to learn about numbers.

measurement, or adjusting quantities in a recipe for a larger or smaller number of people, continue to draw on and develop mathematical understandings.

Learning to be numerate

The role of language

Numeracy also builds on children's language development. LeFevre et al. (2010) showed that foundation skills in language (phonological awareness) predicted early mathematics performance, while Austin, Blevins-Knabe and Lokteff (2013) found a relationship between the language skills of letter awareness, letter sounds and name writing, and scores in early mathematics ability. Ginsburg, Klein and Starkey (1998) pointed out that students without a vocabulary for mathematics have the most difficulty in understanding numeracy. Developing a vocabulary to describe numbers, shapes and measurements, and to explain how a mathematical problem might be solved, forms an important part of early numeracy activities in preschool and school. Children start with informal ways of describing mathematics, gradually developing more formal and specialised mathematical language as they move through primary and secondary school. Language is central to developing an understanding of mathematics (Anthony & Walshaw, 2007). Children are encouraged to talk about their strategies to explain how they arrived at an answer, and to describe their observations in mathematics classrooms (Bobis, Mulligan & Lowrie, 2013). This can involve oral and written language, as well as pictures and symbols. It helps children to make sense of their ideas and to learn to communicate their understandings, as well as to develop the important belief that mathematics is something that is not just transmitted (taught) by a teacher, but can be discovered, constructed and elaborated by each person. It can also help teachers to assess students' understandings. In Figure 2.17, a child describes his strategies in solving two maths problems, which enables the teacher to see his thought process and to guide him.

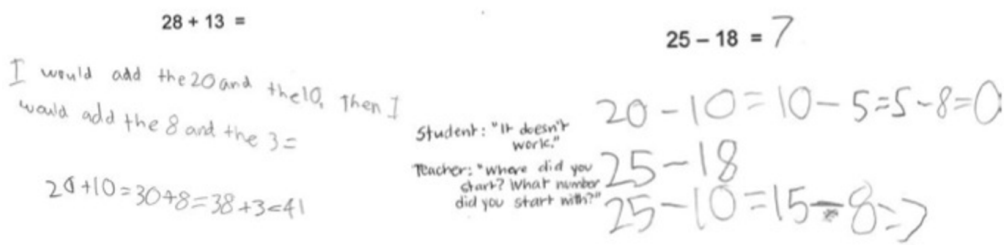


FIGURE 2.17 Children's explanations of strategies in number help them develop their thinking, and allow teachers to guide the process.

The child's role

As in language acquisition, children are active in developing mathematical understandings and strategies for operating in their world. These strategies increase in complexity and effectiveness with age (Baroody, 1987). For example, by about four years of age, children use a counting strategy to combine groups of objects: 'one, two … three, four (2 + 2)' (Ginsburg, Klein & Starkey, 1998). Such strategies for addition and subtraction appear spontaneously before the child starts school. These strategies are later extended by combining counting and the use of memorised number facts ('one and one is two … three, four, five (1 + 1 + 3)'), then by more sophisticated strategies such as recombining or restructuring numbers to simplify a problem ('nine and one are 10 and six are 16 (9 + 7)'). Children are able to apply strategies first with concrete objects they can see, then with invisible objects ('doing it in your head'). You may see why this is so in the description of Piaget's theory in Chapter 3. There is evidence that these strategies

are constructed by the child, as well as being taught formally in school (de Corte & Verschaffel, 2006). Just as children's errors in language show their developing understanding, the errors children (and adults) make in number are testimony to their own role in constructing their strategies and knowledge about mathematics (see Figure 2.18 for an example). Helping students to become aware of their strategies, by asking them to explain and justify how they solved a problem, along with sharing and comparing strategies with other students, contributes to their abilities to evaluate and improve their learning. Table 2.1 gives a developmental framework for numeracy that identifies how strategies change with development. Such knowledge can help teachers to identify the counting strategies students are currently employing, and to help students to develop more advanced strategies.

Numeracy involves more than just number sense: the development of children's understanding of space, shapes and measurement has also been described, and has connections to art, science, engineering and making sense of the visual world around us (Bobis, Mulligan & Lowrie, 2009).

Numeracy in the classroom

Children's exposure at school to more formal systems, with written rules and procedures, parallels learning to read and write, and the formal systems of language. The informal mathematics developed before school provides children with an important base on which to build new understandings. As with reading and writing, the challenge for teachers is to help children connect their informal understandings with new ways of thinking about and representing mathematics. One way in which teachers do this is with the use of concrete materials.

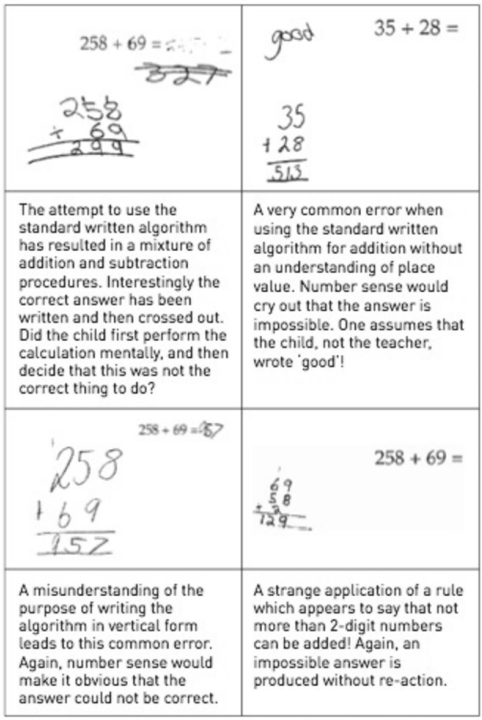


FIGURE 2.18 Common student errors when using algorithms without understanding.

Source: McIntosh, A., *Developing Computation*. Hobart: Department of Education Tasmania, 2005. © Commonwealth of Australia reproduced by permission.

Children are faced at school with the task of learning formal systems for representing numbers: for example, that twenty-four is written as '24' and not as it is said ('20-4'). Children also learn formal ways of carrying out operations with number, such as in algorithms for addition and subtraction, or the procedure for long division or for multiplying numbers with more than two digits. Recent approaches to the teaching of numeracy in Australia and New Zealand focus on building connections between students' understandings and formal ways of doing things. They do this by developing students' understanding of mathematics using concrete materials such as fingers, blocks and counters, then encouraging the students to develop mental operations ('doing it in your head') and exploring strategies for operating with numbers, before using formal written approaches such as algorithms (for example, see McIntosh, 2005; New Zealand Ministry of Education, 2005). McIntosh points out that common student errors with algorithms result from their use of them as a formula, without understanding (see Figure 2.18). He suggests that when students develop their own written strategies for addition and subtraction, the connections with meaning are less likely to be lost. Sharing strategies for solving problems helps students to articulate their thinking, as well as recognise other ways of approaching a task.

Parents and others sometimes express a concern about when number facts will be learnt under this approach. There is still a place for the learning of number facts (addition and multiplication tables), but

TABLE 2.1 The number framework

Stage 0: Emergent	The student is unable to consistently count a given number of objects because they lack knowledge of counting sequences and/or one-to-one correspondence.
Stage 1: One-to-one counting	The student is able to count a set of objects or form sets of objects, but cannot solve problems that involve joining or separating sets.
Stage 2: Counting from one on materials	The student is able to count a set of objects or form sets of objects to solve simple addition and subtraction problems. The student solves problems by counting all the objects.
Stage 3: Counting from one by imaging	The student is able to visualise sets of objects to solve simple addition and subtraction problems. The student solves problems by counting all the objects.
Stage 4: Advanced counting	The student uses counting on or counting back to solve simple addition or subtraction tasks.
Stage 5: Early additive part-whole	The student uses a limited range of mental strategies to estimate answers and solve addition or subtraction problems. These strategies involve deriving the answer from known basic facts (for example, doubles, fives, making 10).
Stage 6: Advanced additive/early multiplicative part-whole	The student can estimate answers and solve addition and subtraction tasks involving whole numbers mentally by choosing appropriately from a broad range of advanced mental strategies (for example, place value partitioning, rounding and compensating, or reversibility). The student uses a combination of known facts and a limited range of mental strategies to derive answers to multiplication and division problems (for example, doubling, rounding or reversibility).
Stage 7: Advanced multiplicative part-whole	The student is able to choose appropriately from a broad range of mental strategies to estimate answers and solve multiplication and division problems. These strategies involve partitioning one or more of the factors (for example, place value partitioning, rounding and compensating, or reversibility).
Stage 8: Advanced proportional part-whole	The student can estimate answers and solve problems involving the multiplication and division of fractions and decimals using mental strategies. These strategies involve recognising the effect of number size on the answer and converting decimals to fractions where appropriate. These students have strongly developed number sense and algebraic thinking.

Source: 'The Number Framework'. Copyright © 2005 by New Zealand Ministry of Education. Used by permission.

this follows work with numbers so that those facts are meaningful rather than simply a rhyme learnt by rote. Just as with reading, being able to retrieve the facts automatically frees up short-term memory for processing other aspects of a problem. As you can see in Table 2.1, it also allows students to recombine those facts to solve more complex problems.

Numeracy across the curriculum, throughout schooling

Just as with literacy, numeracy is a skill that is used throughout life and, like literacy, numeracy concepts should be addressed across all curriculum areas and at all levels of schooling. Stephens (2000) argued that the abilities described in the definition of numeracy above are addressed differently at different levels of schooling. Development of number concepts and counting or arithmetic skills are emphasised in the early years, and in the middle primary years this is broadened to competence in working with number and applying numeracy in other curriculum areas. In secondary schools, Stephens points to the need for students to make links between what is learnt in the classroom and its practical application in other social, personal, education and work contexts. There is a parallel here to the work in literacy, with

a number of interrelated sets of skills being required for functional numeracy to occur. The research project *Numeracy across the curriculum* looked at students' numeracy skills applied in other curriculum areas during primary school (DEST, 2007). Figure 2.19 gives examples of tasks or problems from other curriculum areas in which students need to be numerate – to apply their knowledge of mathematics. The researchers found that students didn't always recognise how their mathematics needed to be applied to solve the problem, had difficulty applying what they knew, and lacked confidence in using mathematics to make sense of the problem. They suggest that teachers can help students to apply their mathematical knowledge and skills by:

1 capturing the numeracy in the moment
2 considering the numeracy demands of tasks and the range of students' strategies for approaching them
3 allowing students to work it out for themselves, individually or with others
4 giving time for students to engage with the numeracy demands, ask questions and fully understand the lesson
5 using open-ended questioning to support students' development of understanding and to encourage discussion
6 supporting students' enthusiasm to explore a concept, rather than teaching the skill first, then doing the activity
7 listening purposefully, and questioning to monitor students' numeracy knowledge and skills
8 debriefing, with open questions encouraging reflection on how mathematics was used and how it helped them to learn, understand and solve the problems.

Science
Length of a hammerhead shark:
A nature video stated a shark's length as 19 feet. Nineteen feet of tape was placed on the floor to assist in visualising the shark. A comparison of the imperial measurement of feet to the metric metre was used.

Technology & Enterprise
Jelly-making:
Students had to divide jelly into four equal portions. They then costed the ingredients and worked out how much profit the canteen made on jelly sales.

LOTE
Making flags:
Students worked in groups to make the flag of a particular country. Measuring, approximating and halving skills were involved.

Health & Phys Ed
Obesity in children:
A newspaper article reported that 24% of children are overweight. The class discussed the statistic and related it to the number of students in the class.

English
Creating a story map:
While watching a popular and exciting film, students noted that the events built up to a climax. Later, after discussing the film, they illustrated the building excitement on a line graph.

Society & Environment
Mapping:
The students were asked to locate Meekatharra in their atlases and then describe its position. They responded by saying it was near another location rather than using latitude and longitude. This generated discussion on reading latitude and longitude on a map for accurately locating a site. Scale was also used to determine distance.

Art
Making an envelope for a 3D card:
The students made a net of an envelope that would fit the 'minibeast' card they had made. Measurement and accuracy were expected.

School Life
Lunchtime cricket:
A roster was drawn up by a group of students for the use of the classroom cricket bat. Names were drawn from a hat so there was fair and equal access to the bat for all students.

Source: © Commonwealth of Australia (2005). Reproduced and communicated with permission of the Australian Government Department of Education, Employment and Workplace Relations, 2012.

FIGURE 2.19 Students' mathematics knowledge is called upon in many different curriculum areas.



BOX 2.10 CLASSROOM LINKS

EFFECTIVE PEDAGOGY IN MATHEMATICS

Anthony and Walshaw (2009) identified from research the following principles for effective mathematics teaching. They emphasised that the principles are interrelated, working together to engage learners in mathematics learning. They sit within wider family, school, community and education system practices.

1 *An ethic of care:* With a focus on mathematical goals, effective teachers encourage model sharing and evaluation of ideas, which allows students to develop confidence in themselves as learners and mathematicians, and to take personal responsibility for their learning.
2 *Arranging for learning:* Students are given opportunities to work independently, as well as in pairs or small groups and as a whole class, as they make sense of mathematical ideas. Each of these modes offers different benefits for learning.
3 *Building on students' thinking:* Effective teachers start with students' current knowledge, interests and abilities and use them as a platform to develop further understanding. Real tasks can help to expose students' thinking, and to extend it. Misconceptions are viewed as steps on the way to full understanding, and are used to develop further opportunities for learning. Starting with students' current level of understanding enables effective teachers to adjust teaching to provide an appropriate level of challenge for each student.
4 *Worthwhile mathematical tasks:* Tasks are selected that require students to use mathematical concepts and to think in mathematical ways. The same task may provide opportunities for practice, while also presenting a challenge and provoking thought.
5 *Making connections:* Making meaningful links between different mathematical ideas contributes to conceptual knowledge. Being able to represent concepts in multiple ways similarly helps with flexible thinking and conceptual development. Effective teachers also help students to connect mathematics to their life experiences, and new knowledge to existing knowledge.
6 *Assessment for learning:* Effective teachers use a variety of strategies to assess students' understanding. They make use of this information to guide instruction, give feedback that informs students about how they can improve, and encourage students to evaluate their own work. (See Chapter 13 for more on assessment for learning.)
7 *Mathematical communication:* Effective teachers encourage students to explain their strategies and justify solutions. They model and explicitly teach students how to do this, and set up situations in which students take opposing viewpoints and defend their ideas to help them to develop the appropriate communication skills.
8 *Mathematical language:* Mathematical terms are taught explicitly and modelled, with links made to home language and to everyday concepts.
9 *Tools and representations:* A range of tools and representations link to mathematics: some examples are the number system, graphs and charts, number lines, formulae, concrete materials, student-made pictorials and ICT tools (see Chapter 12). Careful selection of tools supports students' visualisation, mathematical reasoning and conceptual understanding.
10 *Teacher knowledge:* Teachers' knowledge of mathematics helps them to judge students' level of understanding and where to take them next, what they need to teach and how to teach it, and to connect concepts and ideas in multiple, complex ways. They can anticipate likely misconceptions and respond to them in ways that move students' understanding forwards.

Source: Adapted from Anthony and Walshaw (2009).

ACTIVITIES

1 Think back to your own learning of mathematics, or to a mathematics classroom you are familiar with. How were these principles evident (or absent)?
2 Describe what a classroom that operates on these principles would look, sound and feel like.
3 Compare these principles with the principles of effective pedagogy in mathematics given in the above box.

Box 2.11 looks at the classroom implications of skills development. Vygotsky's work, described in Chapter 3, may help you think about how to assess children's abilities and how to take account of these in your own teaching. Chapter 13, which deals with assessment, contains further strategies that might be helpful.

CourseMateExpress
Online resources
Go further: See a case study of these principles (outlined in Box 2.10) put into action to improve mathematics achievement for diverse learners.



BOX 2.11 IMPLICATIONS FOR EDUCATORS

DEVELOPING CHILDREN'S SKILLS FOR SCHOOL

- Supporting EAL/D learners is important to their success, not only in English, but also across the curriculum.
- Encouraging children to think and talk about new concepts in their native language can help them acquire the concepts and learn to express those concepts in English.
- Involving parents in the classroom and encouraging them to talk to children in their own language can help facilitate the process of acquiring and expressing concepts in English.
- Students bring important skills and knowledge to their learning, as well as attitudes about particular subjects or skills and about learning itself.
- Recognising students' past experiences is important for accurately matching teaching to students' abilities and experiences.
- Current approaches to teaching language, literacy and numeracy take account of what the student already knows, in order to build new knowledge. (Examples of this in numeracy are the Mathematics K-10 Continuum of key ideas developed in NSW (NSW Department of Education and Communities, 2014), and the Numeracy Project in New Zealand (Ministry of Education, 2005), which aim to help teachers match teaching to students' number strategies.)
- Language is vital to the development of competence in second language, literacy and numeracy.
- There are connections between literacy, numeracy and other curriculum areas, which mean that these skills should be directly addressed in teaching, irrespective of the curriculum area.
- Literacy, numeracy and second-language competency are required, and continue to develop, throughout schooling.

PRINCIPLES OF DEVELOPMENT

In this chapter, we have examined the acquisition of a number of different skills in the domains of physical development, language, literacy and numeracy. Despite the range of domains and skills, some principles of development can be deduced that also apply across the cognitive and socioemotional domains discussed in Chapters 3 and 4. The principles are as follows:

- *Development involves a series of progressive and orderly changes leading to maturity.* Development involves change of a particular type, and is generally orderly (we learn to crawl first, then to walk, then to run). It is also directional: the changes, at least in childhood, tend to lead towards more complex, effective ('mature') behaviour. This trend towards complexity and more organisation is seen in all aspects of development, and reflects brain development.
- *Development is continuous but uneven.* One of the enduring debates in theories of development is about whether we describe it as continuous or discontinuous (see Box 2.12). Different areas of the body and brain develop at different times, as do different functions. In addition, there are watershed events in human development that create opportunities for significant shifts across multiple domains. These include independent locomotion (crawling and walking), language

acquisition, and puberty. Arguably, there are also cultural watershed events that similarly create opportunities for developmental shifts across domains. Starting school is an example in Western cultures.

- *Development is a lifelong process.* Although we develop at different rates in different areas, we can be said to be developing throughout the lifespan. Commonly, children's development is described as occurring in a number of stages: infancy (0–2 years), early childhood (3–7 years), middle childhood (8–11 years) and adolescence (12–20 years). You will recognise the age ranges associated with these stages in the descriptions of Piaget's theory in Chapter 3, and in Erikson's theory in Chapter 4. A number of researchers have noted the shifts that occur in children at about two to three years old, seven to eight years old and 11–12 years old – not only in cognitive development, but also in the social and personal areas. Growth spurts have also been observed in the brain at these ages. The shifts can be attributed to changes in both maturation and environment. Although there are physiological changes that occur in all cultures, the precise age at which the shifts occur varies due to environmental factors such as diet or cultural practices.
- *Development can vary from one individual to another.* The most obvious developmental variations occur between males and females, with girls tending to lead boys in physical development. Other group variations can be observed among different ethnic groups. There are many other sources of variability too. The chapters in Module III of this book examine a number of these sources in detail. In general, while genes play a role, the variability in development can be explained by looking at the forces affecting that development.
- *Multiple pathways of development.* These variations may be in timing, but they may also be in the pathways of development: the particular pattern of factors that contribute to development may vary as a result of contextual and individual factors. We have seen this in motor, language and literacy development.



Source: Laszlo Haiasi/Shutterstock

FIGURE 2.20 There are multiple pathways of development, linked to individual differences in context and activity.



BOX 2.12 IMPLICATIONS FOR EDUCATORS

THINKING CRITICALLY ABOUT DEVELOPMENT

There are some enduring debates that distinguish theoretical approaches to development. As you consider the material in this chapter, and in the other chapters in this module, your own position on these issues of development may affect your personal philosophy as a teacher.

1. Is development continuous or discontinuous? Does it progress as an abrupt series of changes, like ascending a staircase, or in small increments, like going up an escalator? Continuous theories propose that children's behaviour and skills are less complex versions of what adults can do. With development, they gain more knowledge and practice, which contributes to gradual improvements in these skills and abilities. Discontinuous theories hold that there are qualitative differences between the ways in which children and adults think about and operate in the world. With development, children's thinking and behaviour undergoes radical, relatively sudden changes from one stage to the next.
2. Are the course and processes of development general or specific? Can we describe the same set of developmental processes for all people and for all domains, or do we need a separate picture of development for different skills, and for different contexts (perhaps for different

>>

people, or for people at different times in their lives)? Some theories seek to distil the basic processes of development that occur across all people, while others investigate the effects of different contexts on development. Some emphasise general processes across domains, while others propose that each area of development has its own process, particular to it.

3 Is development mainly influenced by innate or environment factors? This is the nature–nurture debate. Theorists who represent the 'nature' end of the continuum emphasise innate, hereditary influences, while those representing the 'nurture' position emphasise environmental influences. This question continues to divide theorists, although disagreements tend to be about the relative influence of the two sets of factors, rather than taking an extreme position that denies the influence of either set. There is evidence of both sets of influences in all aspects of development, irrespective of domain.

ACTIVITIES

1 Consider an example of development from your own experience or the experience of someone you know. Would you describe it as continuous or discontinuous? Compare others' experiences. Are your processes of development similar? Are they similar across domains (whether describing developments in physical growth and skills, language, thinking or emotion)? List what has influenced your development. What do you conclude?
2 Gather evidence in support of each of these approaches from aspects of development described in this chapter. What does the evidence suggest?
3 Go to the personal philosophy section of the student companion website and fill in your views. Return to these issues as you continue to study theories of development.
4 Think about how your position on each of these issues might influence your teaching practice.

CourseMateExpress

Online resources
Take a moment to consider your philosophy of learning and teaching. You may wish to use the **Develop your philosophy** tool on the textbook's CourseMate Express website.

WHAT CONTRIBUTES TO DEVELOPMENT?

This question of what contributes to development has been a major source of controversy for developmental psychologists. Theorists argue about the roles of maturation, learning, environment and culture (see Box 2.11). Yet, while the controversy continues about each aspect's relative contribution, few would argue for an extreme position that relied on or entirely excluded any one of these forces. The following points review some examples of each kind of influence from the domains discussed in this chapter:

- *Development results from both maturation and learning.* This position represents the nature–nurture debate discussed in Chapter 9. As we have seen, both innate and environmental forces combine to influence development across the physical and language domains. Other chapters in this module similarly illustrate the influence of a mixture of innate and environmental forces in development.
- *Development occurs in context and is influenced by environment.* There are environmental influences on language development in the social interaction children hear and are involved in. In terms of physical development, family and community activities and the formal activities of school contribute to children's motor skills.
- *Children are active in development.* Far from being something that simply 'happens' to children, development grows out of children's activity. For example, crawling produces changes in brain structure that support physical, perceptual and cognitive changes. Children actively try to make sense of language and of mathematics. These attempts may result in errors, but they are testimony to the important role children play in their own development in all domains.
- *Development is cumulative.* One change provides a basis for further change. In this chapter we have seen a number of examples of the close interaction between different dimensions of development. As one area develops, it changes the kinds of activities children engage in and their

relationships with those around them, providing new opportunities for development in other areas. One example is adolescents' capacity for abstract thinking, which changes the way in which they deal with their emotions. This in turn affects their friendships and influences their thoughts and behaviours.

Box 2.13 looks at a number of the implications for educators of considering the developmental principles.



BOX 2.13 IMPLICATIONS FOR EDUCATORS

CONSIDERING DEVELOPMENT IN THE CLASSROOM

- Because development is orderly and progressive, teaching must be tailored to children's developmental levels (that is, there is no point teaching calculus to preschoolers, or basketball to babies). This involves teachers being aware of the course of development across a number of domains. This chapter and others in Module I should help you develop such knowledge.
- Stages in development coincide with stages of schooling, in that middle childhood roughly coincides with the primary years, and adolescence with secondary schooling. Recognising developmental shifts that occur with age, some States and Territories in Australia further break these broad groupings into stages of two years each. The aim is that teachers plan learning and teaching strategies to match each student's developmental stage, and that students develop skills appropriate to their developmental level.
- Developmental variations are important for teachers to consider. One explanation of gender differences in literacy outcomes is the relatively slower development of language in boys. It has been suggested that boys should receive a different kind of literacy instruction to cater for this developmental difference (Rowe & Rowe, 2002). Chapter 11 explores this and other gender issues in greater depth.
- Because development occurs in context, what happens around children influences their development. It is important for teachers to consider not just what is taught, but how it is taught. Other environments children are involved in also influence their development through the experiences and knowledge provided. Teachers therefore need to know about children's home environments in order to effectively consider children's needs. Chapter 11 explores this issue in relation to culture and poverty.
- That children are active in development suggests that students should be mentally and physically active in their learning, too. For example, learners can be encouraged to make sense of how new and old experiences and knowledge fit together.
- Students make sense of their experiences. We can encourage this process in schooling by asking students to develop their own approaches to tasks before introducing them to standard methods.
- Development is cumulative, so it is important when teaching skills to build up from what students can do first, and towards the final goal. Identifying a number of steps or component skills in a complex task can help in this process. Task analysis, described in Chapter 5, is one approach to this strategy. Designing tasks that draw on skills from a number of areas can help students consolidate earlier achievements, as well as integrate, coordinate and apply their skills.

CONCLUDING COMMENTS

Development is influenced by genetics, environment and the activity of individuals themselves. Effective teaching therefore recognises each of the possible influences on a student's development. This chapter has explored these influences on physical and language development, and on the development of some school-based skills. In Chapter 3, we look at some theories of cognitive development.

CHAPTER REVIEW

- There are connections between physical, cognitive, language, social and emotional development throughout the lifespan.
- Maturation, parents, the community and school, and the child's own activity all contribute to motor-skill development.
- The development of fine and gross motor skills is important in early childhood, while middle childhood sees increased coordination and the combining of motor skills.
- Puberty is the major physical development in adolescence, presenting challenges to adolescents' self-image and family relationships. Individual differences in the timing of puberty affect adolescents' ability to adapt successfully to these changes.
- There are group differences in development due to environmental factors such as nutrition, and sociocultural factors such as gender-typed activity.
- Brain development also shows complementary influences from genetics, environment and the child's activity.
- Developmental increases in complexity and coordination of thoughts, feelings and behaviours are associated with structural neurological changes such as increases in neuronal size and complexity, as well as myelination, which improves the efficiency of message transmission.
- The course of first-language acquisition is remarkably consistent across cultural and language groups. It shows children's active involvement in their acquisition of language.
- Adults make important contributions to language development, which continue into a child's school years.
- The school-based skills associated with second-language learning, literacy and numeracy all build upon early developments in physical, motor and language skills, as well as the cognitive, social and emotional developments discussed in Chapters 3 and 4.
- Children's active involvement in making sense of their world shows itself in their understandings about language and number from the first days after birth. In schools, we build upon these early understandings and so need to be aware of and recognise them.
- Development is a series of progressive and orderly changes leading to maturity, which shows both consistency across humanity and also individual difference. Development is lifelong, with each change providing a basis for future changes.

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- a **self-check quiz**
- **crosswords**, **flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.



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QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1 What are some influences on development? Describe this in relation to the development of a particular skill such as reading, learning to play the clarinet, or playing basketball.
2 Explain motor development in terms of contributions of brain, body and behaviour.
3 What variation in physical development exists between groups, and how can individuals' development be supported in schools?
4 Why does the number of neurons decrease with age after infancy? What role does learning play in this process?
5 How do adults contribute to language development? How can you apply this to the roles of teachers and parents in students' language learning in schools?
6 How are the development of literacy and numeracy both similar and different?
7 What aspects of physical, brain and language development support learning in school?
8 Describe how meaningful experiences, logical development, language and formal teaching contribute to the development of mathematical understanding. What implications does this have for you as a teacher of numeracy?
9 What are the three main debates in development research? Describe your position on each of these.
10 Identify a watershed developmental shift, the opportunities it presents for development, and the consequences for development in other domains.

KEY TERMS

adolescence
attachment
axon
brain plasticity
cerebral cortex
child-directed speech
dendrites
emergent literacy
expansion
fine motor skills
gross motor skills
joint attention
lateralisation
literacy
metalinguistic awareness
morphology
multiliteracies
myelination
neuron
neurotransmitter
numeracy
overextension
over-regularisation
phonology
pragmatics
puberty
recasting
semantics
synapse
syntax
telegraphic speech
underextension

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'EMERGING SKILLS' AND MATERIAL IN OTHER CHAPTERS

- Principles of development introduced in this chapter are also evident in cognitive, social, emotional and moral development, discussed in chapters 3 and 4. Consider how physical, brain and language development contribute to, and are influenced by, cognitive, social and emotional development.

FURTHER RESEARCH

RECOMMENDED READING

Berk, L. E. (2013). *Child development* (9th ed.). Boston: Allyn & Bacon.
Berko Gleason, J. & Ratner, B. (Eds) (2013). *The development of language* (8th ed.). Needham Heights, MA: Allyn & Bacon.
Levey, S. (2014). *Introduction to language development*. San Diego: Plural Publishing.
Lightfoot, C., Cole, M. & Cole, S. R. (2012). *The development of children* (7th ed.). New York: Worth.
McDevitt, T. M. & Ormrod, J. E. (2013). *Child development and education* (5th ed.). Saddle River, NJ: Pearson.

RECOMMENDED WEBSITES

Visit the website of your local department of education to look at their approach to teaching physical education, EAL/D, literacy and numeracy:
Australia: http://education.gov.au
New Zealand: http://www.education.govt.nz
Australian Capital Territory: www.det.act.gov.au
New South Wales: www.schools.nsw.edu.au
Northern Territory: www.education.nt.gov.au
Queensland: http://education.qld.gov.au
South Australia: www.decd.sa.gov.au
Tasmania: www.education.tas.gov.au
Victoria: www.education.vic.gov.au
Western Australia: www.education.wa.edu.au

Centres of neurological research relating to education:
Centre for Educational Neuroscience (UK): www.educationalneuroscience.org.uk
Science of Learning Centre (AUS): http://qbi.uq.edu.au/science-of-learning-centre

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

- brain development
- EAL/D
- language development
- literacy
- motor skills
- numeracy
- physical development
- second-language acquisition.

Adding terms such as 'early childhood', 'middle childhood' and 'adolescence' will limit the results to the age group you are interested in.

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

Chapter 3

COGNITIVE DEVELOPMENT

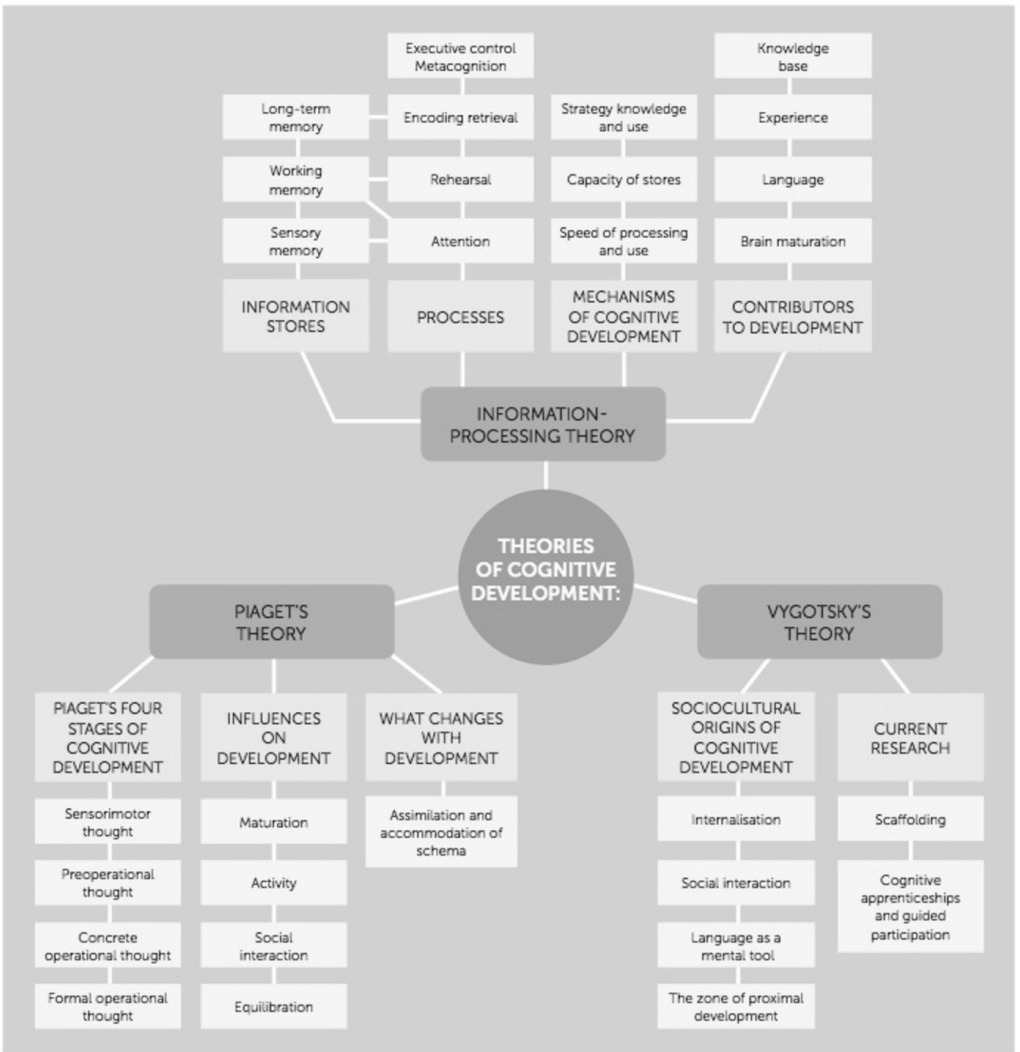

FIGURE 3.1 Chapter 3 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- What are the four factors that, according to Piaget, contribute to the development of thinking from infancy to adulthood?
- What are the key developmental milestones in Piaget's sensorimotor, preoperational, concrete-operations and formal-operations stages of cognitive development?
- What are some issues educators need to consider when working with those in the sensorimotor, preoperational, concrete-operations and formal-operations stages?
- What roles do social and cultural influences play in Vygotsky's ideas about children's cognitive development?
- What changes in children's processing of information with development, and how can these developments explain changes in reasoning such as Piaget and Vygotsky observed?
- What mechanisms influence cognitive development according to information-processing theories?

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INTRODUCTION

A family is watching the sunset. Someone wonders aloud about why the sun and sky become red at sunset. Karen, aged three, says it's because that's where the sun goes to bed: 'I want red walls on my bedroom like the sun has'. James, 10, says 'the sun hasn't gone to bed, it's gone around the other side of the world'. Sophie, 15, has studied this in Science at school: 'Actually, the sun hasn't moved. The earth's the one that rotates so that the sun shines on the other side'. 'What about the red sky?' asks Mum. 'Where does that come from?' Karen says, 'Maybe the sky's bleeding'. 'The sky can't bleed', scoffs James. 'It's something to do with the light. It's red at sunrise too.' Sophie can't remember learning about this at school, but suggests 'Maybe it's like a rainbow. The light's refracting off the clouds and the red and orange are the colours you see'.



Source: Ken Welsh/Alamy

FIGURE 3.2 What happens to the sun at night? Why does the sky turn red at sunset?' How would children of different ages think about these questions?

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Online resources
Watch a **video** showing children of different ages reasoning about what happens to the sun at night.

Cognitive development is concerned with our ability to think, to reason, and to understand and remember the world around us. It involves mental processes that are associated with taking in, organising and making sense of information – processes that include perceiving, attending to, understanding and recalling information. These mental functions are part of what is referred to as **cognition**. In this chapter, we look in some detail at the work of two of the most important and influential theorists in this area: Jean Piaget and Lev Semanovich Vygotsky. We then consider some more recent work in information processing that offers a different perspective on some of the observations Piaget and Vygotsky made about children's cognitive development.

cognition
The mental processes involved in perceiving, attending to, understanding and recalling information

PIAGET'S THEORY OF COGNITIVE DEVELOPMENT

A nine-month-old infant sits in a highchair. She drops her cup and observes it fall. Her mother picks it up and replaces it. The infant drops it again, and her sister picks it up for her. She will continue to drop the cup as many times as there is someone there to retrieve it. Her four-year-old sister is playing with playdough, cutting it into many pieces with a wooden popstick. As she works, she talks: 'Cut cut cut. Dinner!' Ten-year-old Kyle is working on his homework. He is developing his own system for classifying organisms, and hesitates over whether to put flying insects with birds that fly, or with things with six legs. 'And where do I put emus?' he thinks. 'Are they land animals, because they don't fly, or birds, because they have feathers and lay eggs?' Stephanie, 17, is also doing homework. As part of a debate for History on whether the Allied occupation of Japan at the end of the Second World War was a positive thing, she is thinking about what Japan and the rest of the world might be like if this had not happened.

What are the factors that influence cognitive development, and how do the changes we observe come about? The theorist Jean Piaget (see Box 3.1) sought to identify universal processes of cognitive development. Working from observing his own children, he focused not just on what children know, but also on how they represent and interact with the world, and how they organise that knowledge. He saw children as little scientists, acting on the world, reflecting on their experiences and testing hypotheses. The nine-month-old infant described above is not just dropping a cup; she is observing and learning about gravity, cause and effect (when I drop something it is picked up), and her relationships with others (I can influence their behaviour by dropping my cup). Kyle is reflecting on his experiences and knowledge of the physical world to organise and reorganise his thinking. Stephanie is using her knowledge of the world to hypothesise about an imaginary event.

BOX 3.1 ABOUT JEAN PIAGET

Jean Piaget (1896–1980) was born in Neuchâtel, Switzerland to well-educated, professional parents (Brainerd, 1996). His childhood was not happy – his mother had mental health problems, and this led Piaget, like his father, to spend his time in scientific study rather than pursuing more conventional leisure activities. It also stimulated an interest in psychology.

Piaget showed early promise of intellectual ability. At the age of seven he began to study molluscs, carrying out very detailed observations in the lakes around Neuchâtel. By 10 years old he had published his first scientific article, and at 14 years old he was offered a curator's position at the Geneva Museum of Natural History but was too young to take it up (Wadsworth, 1996). At the age of 18, he gained a Bachelor's degree from the University of Neuchâtel, then a PhD, and by the age of 21 had published 25 scholarly papers.

As well as his study of science, Piaget was also interested in philosophy and in the origins and nature of human knowledge. His dual involvement in the biological sciences and philosophy was highly influential in his later work on children's intellectual development.

Piaget's interest in how people acquire knowledge led him in 1919 to study psychology at the Sorbonne in Paris. While there, he worked in the laboratory of Alfred Binet, who was interested in measuring intelligence (see Chapter 9). Piaget assisted in standardising a French version of a reasoning test. His task was to identify norms for the average French child and compare them with those for an English child. This was a rather dull, mechanical task, and Piaget's interest was captured by the wrong answers that children gave to items on the test. Using interview techniques he had learned at the Sorbonne, Piaget asked the children to explain their answers, and found their explanations of errors were much

Source: © Corbis/Farrell Grehan



FIGURE 3.3 Piaget observed children and questioned them about the way they solved problems. His work changed the way we think about cognitive development.

>>

more interesting than explanations of correct answers. During these interviews, Piaget noted that six-year-olds, eight-year-olds and 13-year-olds made different types of errors. He also noticed that children of roughly the same age not only got the same items wrong, but also made the same kinds of errors. He became convinced that children think in ways that are qualitatively different from the ways in which adults think.

Piaget held chairs of psychology, sociology and related areas at universities in Switzerland between 1925 and 1964, and he was director of the International Centre for Genetic Epistemology in Geneva from 1955 until 1980. He continued to publish scholarly works until just before his death in 1980 at the age of 84. His enormous productivity over a 60-year period is one of the reasons his ideas have been so influential.

Piaget was interested in what changes as children's thinking develops, and in what influences these changes. He described a broad picture of cognitive development, as well as the processes of change.

Piaget was one of the first theorists to attempt to comprehensively describe the process of cognitive development in children. Aspects of his work have been disputed over the years, but his ideas remain influential. For example, the principle that children are active in development, described at the end of the last chapter, originated with Piaget. Subsequent theories of cognitive development have had to address many of the issues Piaget initially raised. In particular, his method of questioning children about how they make sense of their experiences – probing to understand their errors and then following up with further questions – is one of his most significant contributions.

In reviewing some of the main questions that interested Piaget, and in looking at the implications of his ideas for educators, it is important to be aware that Piaget's language can be confusing. The meaning of some of the words he used is different from that in common usage, such as his use of 'conservation', 'assimilation', 'accommodation' and 'egocentrism' (defined later in this chapter). This can be attributed in part to Piaget's background as a biologist, and to his use of biological terms to explain cognitive development.

WHAT INFLUENCES DEVELOPMENT?

As discussed in Chapter 2, the changes that occur in development have both biological and environmental origins. Changes in cognitive skills such as perceiving, understanding, remembering, problem solving and reasoning are influenced by the child's experiences, both with objects and events in the physical world and through social interaction with peers, family, teachers and others. They are also influenced by their genetic or biological make-up, which determines the mental structures that shape and constrain thinking at different stages. These factors interact with one another. Piaget suggested that there are four main factors that work together to influence the development of children's thinking over the years from early childhood to adulthood.

The first factor ('maturation') is innate or biological in origin. Considerable research into the development of the brain supports Piaget's notion that the brain's maturation provides children with the means to reason in more advanced ways (Fischer, 2008), and of the interaction between this maturation and children's activity and experience. We saw some of this interaction in Chapter 2 (see page 36), when children's activity leads to strengthening of neural networks, and the pruning of inefficient pathways.

The second factor ('activity') and the third factor (**social interaction**, sometimes called **social transmission**) are associated with the physical and social world in which children develop. According to Piaget's perspective, children actively exploring their world are acting as 'miniature scientists', learning by experimenting through physical and mental activity. A number of theorists, following Piaget, have taken up this notion of children as little scientists (Gopnic & Meltzoff, 1997; Wellman & Gelman, 1998). Rather than passively receiving knowledge passed on from parents or teachers, the child actively

social interaction (social transmission) The interactions with others (parents, peers, teachers and so on) that contribute to children's learning experiences

constructs knowledge. Piaget described himself as a constructivist, and was in fact one of the fathers of **constructivism**, with its emphasis on students constructing understanding through direct experience (see Chapter 6 for more on this approach to learning). The constant processes of exploration, testing hypotheses, adapting schemas and reorganisation of knowledge are central to this process of construction.

constructivism
An explanation of learning that views it as a self-regulated process that builds on learners' existing knowledge, and in which learners are active participants

Social interaction is particularly important when children are interacting with their peers; that is, those who think in similar ways and who have had similar experiences, but who have a slightly different perspective that challenges children's thinking and stimulates cognitive development. The resulting **sociocognitive conflict** (that is, the conflict within the child as they try to fit together others' views that differ from their own) is one of the key processes in development. Two aspects of peer relations facilitate this process. First, peers are more willing to challenge one another's ideas than they are the views of an adult. Second, children are particularly motivated to resolve the differences as they form part of their relationships – whether it is a matter of being right, of maintaining a friendship, or of keeping the interaction going (Philp & Duchesne, 2008).

sociocognitive conflict
Conflict within the child's thinking resulting from social interaction

The fourth factor (**equilibration**) is concerned with the way in which children respond to conflicts and inconsistencies between what they already know and what they experience in daily life. The concept of equilibration – according to Piaget, probably the most important influence driving cognitive development – can be traced to Piaget's background as a scientist. Just as organisms adapt to the physical environment, Piaget argued that humans make mental **adaptations** in order to ensure that new experiences fit with what they know.

equilibration
Achieving cognitive balance between what is familiar and known, and what is new or unfamiliar, through the processes of assimilation and accommodation

Just as our physical body has to be in balance for us to function properly, Piaget claimed we also need to have cognitive or mental balance. When we encounter objects or events that are unfamiliar, our cognitive balance is upset. We become confused and uncertain about how to think or act. Equilibration is the process of seeking to restore the balance between what is familiar and known – the child's existing cognitive system – and new information or the external world (Siegler, 1998). Balance is regained through the processes of assimilation and accommodation. Piaget used the biological terms 'assimilation' and 'accommodation' to identify the two processes involved in adaptation. **Assimilation** refers to the adjustment of an existing schema to fit a new experience. In **accommodation**, new information is used to establish a new model or schema. Some examples are given below.

adaptation
The process of adjusting to new situations and experiences through the modification of existing schemas (assimilation) or the creation of new schemas (accommodation)

assimilation
Adjusting an existing mental model or schema to fit a new experience

accommodation
Using fresh information to form a new mental model or schema

An infant is in his cot, reaching and grasping for what is in reach, and bringing it to his mouth to explore it. He reaches through the bars of the cot for a bright rattle on the table close by. He tries a few times to pull it towards him, but the bars of the cot are in the way, and he gets frustrated. Then he happens to turn his arm, and the rattle is able to pass through the bars of the cot. When he then reaches for a cloth book and a bear, the infant uses the schemes he already knows, making minor changes to allow for the position, size and shape of the objects. This is assimilation. When this scheme does not work, he experiences **disequilibrium**, or cognitive discomfort. His new scheme of turning his arm represents accommodation. In time, he will practise the new scheme and it will become part of assimilation. The two operate in tandem.

disequilibrium
Cognitive imbalance resulting from inconsistency between what is known and expected, and something strange and unexpected

This does not just happen with infants. Piaget argued that it is a constant process in thinking. Children (and adults) are constantly using experience to build on their knowledge of the world, and reorganising that knowledge. Experience leads to changes in thinking as we fit new knowledge (assimilate it) into existing schemas, and add new schemas to allow for (accommodate) the new knowledge. Think about the following scenarios.

Three-year-old Gina uses the word 'bird' to refer to something flying in the air. It is one of the words most children learn fairly early. One day Gina sees a dragonfly and hesitates because it is different from other things she has seen flying in the air. It looks like a leaf. It also looks like a bird flying through the air. However, although the dragonfly is different in a number of ways from a bird, it is closer to

'bird' than to any of Gina's other schemas for flying things. So the dragonfly is fitted into the 'bird' schema, which gradually becomes more effective for detecting 'birdness' (WJF, personal communication, October 2001). The account of Gina looking at a dragonfly and deciding it is a 'bird' is an example of seeing something new and adjusting an existing schema to include it. It is an example of assimilation.

Aaron's word for anything that has four legs and walks around is 'dog'. One day he sees a horse. Although a horse has four legs, it is quite different from a dog. The horse does not quite fit Aaron's existing schema for 'dog', and he feels confused. Rather than just saying 'dog', he asks 'Dog?' with rising intonation, looking at his father. Recognising Aaron's uncertainty, his father says, 'No, not dog, horse'. For the child, accepting this new information involves creating a new schema for 'horse'. This is an example of accommodation: new information is used to establish a new model or schema. Aaron now has two schemas for four-legged animals: if the animal is not too big, it is 'dog'; if it is very big, it is 'horse'. This works well until Aaron goes to the zoo and encounters another four-legged animal such as an elephant or a giraffe, neither of which fits easily into the 'dog' or 'horse' schemas. Perhaps Aaron's father will help his son create more 'four-legged animal' schemas during their next visit to the zoo.



Source: microgen/iStockphoto

FIGURE 3.4 Children's experiences expose them to new information that can challenge their existing understandings of the world. How did Piaget explain this as contributing to cognitive development?

The process of adaptation, involving either assimilation or accommodation, occurs regularly in daily life, and with great frequency in the lives of young children. Another mental process – 'organisation' – is also underway, although we are not conscious of it happening. As new ideas and information are identified and processed mentally, we organise this material in terms of existing schemas, or create new schemas. This organisational process is essential so that we can store and later retrieve information.

Changes in organisation of thinking with development

Piaget argued that across the age range, *how* we think remains basically the same. We all eat, sleep and breathe in the same way at every age. So, too, the act of thinking remains the same for everyone, across all age groups. What changes, particularly during childhood and adolescence, is the way in which we *organise* our thoughts into what Piaget called 'schemas' (or schemes).

Above, in the example with Aaron, we introduced the idea of a **schema**. A schema is an abstract concept or mental image – a cluster of ideas about a particular object or experience – that is used to organise existing knowledge and make sense of new experiences. The idea of a schema as an organised collection of thoughts or ideas associated with a particular topic or experience is a useful device for thinking about how children accumulate information about specific aspects of their experience. It can be helpful in understanding their behaviour and in guiding our responses to them.

schema
A mental image or cluster of related ideas used to organise existing knowledge and to make sense of new experiences

How do children modify the schemas they have developed? Under what circumstances does such modification occur? As we saw above, the need for modification arises when children experience disequilibrium; that is, when an inconsistency arises between what is known and expected, and something strange, unexpected and new. This is where the process of adaptation takes place. The mental processes of adaptation and organisation described here continue throughout the lifespan, but they are most obvious in childhood because change occurs most rapidly during this period. This is why examples of these processes are largely taken from the childhood years, although these phenomena are also common in adults.



THINK ABOUT

- Think of your first few weeks of university. Did you have to develop new schemas in order to adapt to your new context?
- Can you identify examples of adaptation, assimilation and accommodation in your thinking in the past six months?

There is one proviso – particularly relevant to education – that needs to be made when thinking about the organisational process involved in assimilation and accommodation. When we attend to new material (such as an unfamiliar insect or a mathematics formula) and the process of adaptation is about to be triggered, the concepts of **readiness** and **closeness of the match** become relevant. In teaching anything to a child, the new material must be close enough to what is already known by the child in order for a link to be made between old and new. If such a link is made, the process of either assimilation or accommodation can begin. The term 'readiness' is used to describe a child who has the prior knowledge or experiences needed to make a link between the known and the unknown. The phrase 'closeness of the match' (sometimes called 'goodness of fit') refers to the relative distance, in terms of the child's experience and understanding, between what is already known and new information. Neo-Piagetians such as Pascual-Leone (1970) have suggested that there are also aspects of mental capacity such as working memory, discussed later in this chapter, that are involved in readiness. Children need both particular levels of understanding and specific mental capacities to think at higher levels. These concepts have important implications for those working with children. It is important to determine the child's current understanding, and to consider their readiness for learning a particular concept. Piaget's theory directs us to the child as an important participant in learning.

readiness
Having the prior experiences and knowledge needed for learning

closeness of the match
The distance between what is already known and new learning

PIAGET'S COGNITIVE STAGES

Piaget believed that rather than being continuous, children's cognitive development is discontinuous, proceeding sequentially through a series of distinct 'stages' from birth to adulthood, with thinking at one stage building on the one before, and being qualitatively different from it (see Figure 3.5). A stage-based concept of development can be likened to climbing stairs: each step (or stage) in the hierarchical sequence of development involves the progression to a more advanced level of functioning, which is followed by a period of consolidation before an individual proceeds to the next step. Piaget believed that the stages he identified had two very important properties: first, they are ***universal*** (that is, they apply to everyone); second, they are ***invariant*** (that is, unchanging), meaning that the order in which children pass through the stages cannot be varied. Children must progress through them in sequence, beginning with the sensorimotor stage, although some may never reach the final stage of formal operations.

For each of his stages of cognitive development, Piaget identified what he called 'developmental milestones' – key achievements that have to be attained by a child at each cognitive level. A number of developmental milestones have been identified for each of Piaget's four stages, and selected examples from each level are shown in Table 3.1.

Stage 1: Sensorimotor period (birth to 2 years)

Piaget termed the first stage of development 'sensorimotor' because infants act on the world and understand the world through those actions, and particularly through their senses and through motion. We saw this in the examples of the child in the cot, grasping and seeking to explore things with his mouth, and the child in the high chair, dropping the cup. Schemas at this stage are organised patterns of behaviour. When you compare a newborn with a 2-year-old, you become aware of the enormity of the changes that occur over the **sensorimotor stage** of development. Newborn infants are basically helpless and will not survive without assistance. They have no language, very little mobility and primitive social skills (see Chapter 2). The sensorimotor stage usually lasts only two years, but is the period in which

sensorimotor stage
The earliest of Piaget's developmental stages, characterised by object permanence, intentional or goal-directed behaviour and deferred imitation

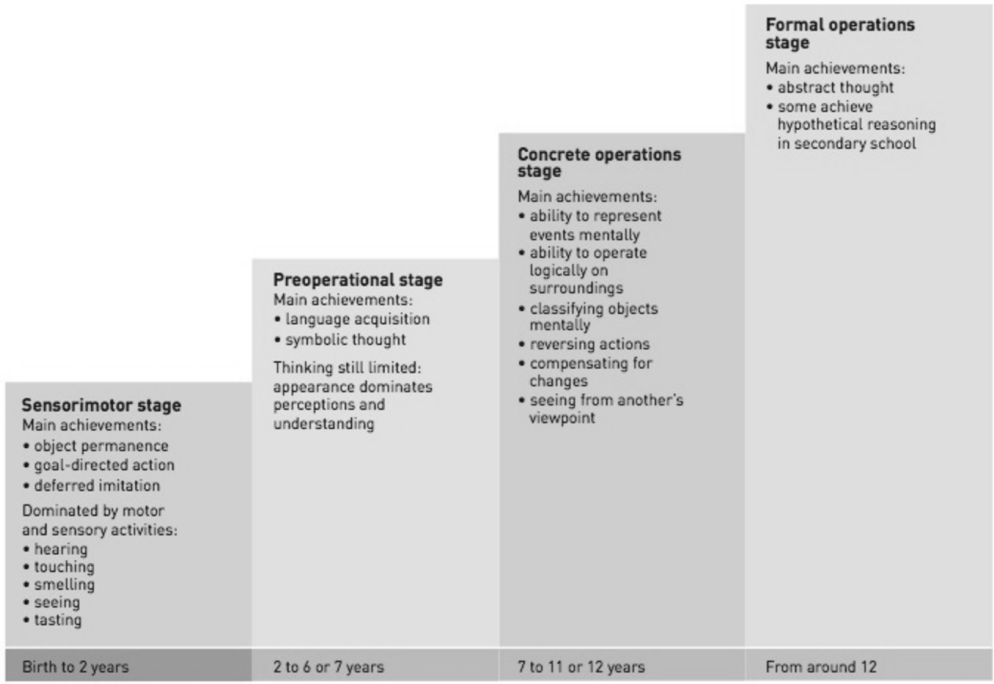


FIGURE 3.5 Piaget's stages of cognitive development.

TABLE 3.1 Main developmental milestones at each cognitive stage

COGNITIVE STAGE	DEVELOPMENTAL MILESTONES	DEVELOPMENTAL MILESTONES IN ACTION
Sensorimotor	*Object permanence* Knowing that something continues to exist even when it is out of sight	• Looking for a lost ball
	Goal-directed or intentional action Actions that are produced consciously for the purpose of achieving a desired end	• Hitting a musical toy to elicit a sound
	Deferred imitation Repeating an action observed on a previous occasion	• Making a sweeping action with a broom after watching someone sweep the floor
Preoperational	*Symbolic thought and language* Using gestures, signs, sounds and words to represent and convey meaning	• Pointing to something of interest • Waving goodbye • Saying 'brm' while pushing a toy car • Asking for 'mo' (more)
Concrete operations	*Conservation* Understanding that objects or quantities remain the same despite changes in physical appearance	• Understanding that the amount of juice remains the same whether it is in a tall, thin glass or a short, fat glass (see Box 3.2 on page 87)
Formal operations	*Abstract thought and propositional reasoning* Attaining the capacity to think abstractly; that is, using propositional and hypothetical–deductive reasoning	• Solving logical problems such as 'If Jo is taller than Sue and shorter than Eve, who is the tallest?' • Hypothesising about future or distant events

the most dramatic developmental changes occur. From being capable of only reflexive actions such as sucking and grasping, infants begin to gain voluntary control over their actions, and steadily develop new strategies and schemes for exploring and interacting with objects and people. They learn to imitate the actions of others and, in the latter months of the sensorimotor period, engage in simple forms of pretend play. Three of the developmental milestones achieved during this period – object permanence, the beginning of goal-directed or intentional action, and deferred imitation – are of particular interest.

Until they reach about four months of age, infants do not fully understand that concrete objects have a permanent existence (Lutz & Sternberg, 1999). However, by approximately eight months (see, for example, Baillargeon, 1991, 2008; Mareschall, 2000; Moore & Meltzoff, 2008; Spelke, Breinlinger, Macomber & Jacobson, 1992) they have attained **object permanence**; that is, if a toy drops out of sight, babies will look for it, even if they cannot reach out to search for it. Research that measured infants' awareness of object permanence by the length of time at which they look at a stimulus and their heart rate or brain wave activity indicates that babies have some awareness of object permanence from as young as two and a half months, although its mastery is not completed until about 14 months (Cohen & Cashon, 2006). Complete mastery of object permanence appears to depend on development of the frontal lobes in the brain's cerebral cortex (Bell, 1998) as well as experience.

object permanence
Piagetian term used to refer to children's understanding that objects continue to exist even when they are out of sight

From about six months of age, infants become capable of **goal-directed or intentional action**, meaning that they begin to use their own actions and vocalisations to influence the actions of others in order to achieve a desired goal, such as attention, comfort or food (see, for example, Tomasello & Carpenter, 2007).

goal-directed or intentional action
A sequence of acts produced intentionally to achieve a desired outcome

Deferred imitation refers to children's ability to reproduce actions they have seen and remembered, such as when, towards the end of the sensorimotor stage, children begin to copy actions, speech sounds and facial expressions they have seen previously. Although Piaget studied deferred imitation by observing his children, and didn't theorise it as occurring until late in the stage, laboratory research has shown babies to show deferred imitation of facial expressions from as early as six weeks after birth (Meltzoff & Moore, 1994). As with object permanence, there is further development of this ability throughout the sensorimotor stage as memory capacity improves.

deferred imitation
Actions copied from models no longer present, the actions having previously been observed and remembered

Piaget's Stage 1 in education

For those working with infants and toddlers in the age range from birth to about two years of age, the skills likely to be of most interest include imitation (immediate or deferred), social interaction and play (appropriate use of objects) (Bochner & Jones, 2003). Most children acquire these skills as a natural outcome of their daily experiences, although children who have an intellectual disability or who are at risk of delay in some aspect of their development may need extra help. Successful progression through Stage 1 is evident in children's play and in the emergence of age-appropriate language and communication skills that facilitate progress to the next stage.

Stage 2: Preoperational period (2 years to 6 or 7 years)

Carlie is sorting her toys and her mother is talking to her about what she has done.

> Mother: 'What are these ones in this pile?'
>
> Carlie: 'They're blue'.
>
> Mother: (pointing to a blue car that is set apart) 'What about this one?'
>
> Carlie: 'That's a big one'.

operations
Actions that are governed by rules and logic, and are performed mentally rather than physically

Carlie is sorting without a 'logical' system. Piaget used the word **operations** to refer to actions that are performed in the mind and governed by rules and logic (Singer & Revenson, 1996). He argued that

the young child's thinking at the **preoperational stage** precedes the ability to perform actions mentally rather than just physically, and to think logically.

preoperational stage
Piaget's second stage, in which a child is not yet able to 'operate' or carry out logical physical actions mentally, but is reliant on manipulating real materials

Symbolic thought is a critical milestone for the preoperational stage, seen in the acquisition of language, and also in children's play. As we saw in Chapter 2, over the period from about two years of age to the first years of formal schooling, some astonishing changes occur in communication and language skills. This acquisition of language permits children to refer to objects that are not present, and to interact with their environment in much broader ways.

symbolic thought
The ability to represent objects and events mentally

The emergence of symbolic (or representational) thought is probably most evident in children's play over the preoperational period. At the simplest level, a toddler learns to pretend that Teddy is drinking from a cup or having a bath. Stones become cakes and a broom is a horse. Language also accompanies this play, and Piaget argued that it directs the child's action and thinking. Play is very important at this stage. It is a platform for developing a child's understanding of symbols and the ways in which symbols can be used to represent objects and events. Later, games are played that involve role-taking (Mummy and Daddy, the doctor, Batman, a princess), and imaginary friends appear. Types of play and their development are discussed in Chapter 4.

During this period, children begin to create their own stories and to draw representational pictures (see Figure 3.6). Earlier, in the sensorimotor stage, children draw largely random scribbles; but gradually they begin to attempt to draw realistically. These developments are dependent on the emergence of representation or the use of symbols.



FIGURE 3.6 Jesse drew these four drawings at age three, four, six and eight. At the sensorimotor stage, children's drawings are largely scribbles. As they develop symbolic thought, they begin to represent familiar objects and people in increasingly realistic ways.

While there are major achievements in thinking in this stage, Piaget identified limitations too. Here, Piaget identified three related issues: egocentrism; centration, or a tendency to be perception-bound; and animism.

Egocentrism, or the tendency for children to think and talk about things from their own immediate perspective, is most evident in children's use of language. For example, a child may talk to a stranger about familiar people or events and be surprised that the stranger does not share the child's knowledge of those people and events. You may be familiar with this when talking to young children on the phone: they are likely to nod for 'yes' and to point to someone in the room with them, not accounting for the fact that you cannot see what they see. Piaget used a task known as the 'three-mountains problem' to

egocentrism
An individual's belief that everyone sees the world in exactly the same way as that individual

explore children's egocentrism. This involved showing children a model of three mountains: one snow-capped, the second with a red cross and the third with a small house on top. The children were then shown some photographs and asked to choose one that represented what a doll sitting at the opposite side of the table would see. Most 4-year-olds did not realise that theirs was not the only possible view of the model. They could not imagine what another person, looking from a different angle, would see. They could only describe what another person might see in terms of what they themselves saw. Their thinking was egocentric.

Researchers following Piaget have challenged Piaget's findings and conclusions about children's egocentrism, and the three-mountains task in particular. Piaget's conclusions have been questioned because of the difficulties presented by the three-mountains task, with its unfamiliar context, use of photographs and abstract nature. In alternative tasks, Borke (1975), Hughes (in Donaldson, 1978) and Newcombe and Huttenlocher (1992) have found that children as young as three years old are aware of others' different viewpoints, when the task is presented to them in a familiar context. This has been one of the key challenges to Piaget's theory: when children's tasks are placed within a familiar context, and they are given a purpose they can understand, they show more advanced thinking than Piaget described.



THINK ABOUT

- What does this suggest about how to support children in classrooms? Think about the kinds of support you could provide to help children to think in more sophisticated ways. See Box 3.4 on page 93 for some ideas.

centration
Concentrating attention on one aspect of a stimulus while ignoring other features

Centration refers to children's inability to focus on more than one or two conspicuous aspects of a situation, and their tendency not to notice other, less dominant features. A characteristic of children at the preoperational stage is that they are 'perception-bound', meaning that they attend to the physical appearance of objects and situations, and that they believe what they see. If one object looks taller than another, they will say that the taller object is the bigger of the two. If one object looks wider, they will say that object is bigger (see Box 3.2).

animism
The tendency to attribute human characteristics to inanimate objects

Katie (aged three) touched an electric fence and got a shock. 'Ow, it bit me – bad fence!' was her reaction. This exemplifies another characteristic of preoperational children, that of **animism**, or the tendency to think of inanimate objects as being alive and capable of thinking and feeling like humans (Flavell, 2004; Piaget, 1929). Later work has extended this to describe magical thinking in children at this stage: for example, young children may believe that the Easter bunny scatters chocolate eggs for them to find, or that the moon is watching over them (Subbotsky, 2010). Some argue that the animism Piaget observed in children's thinking at the preoperational stage is learned, rather than being characteristic of this developmental stage. Adults often talk in animistic ways to children, and children's books and cartoons often include animism and magical thinking (for example, the stories of Peter Rabbit, or Walt Disney cartoons). Understanding the distinction between animate or living things and inanimate objects is a fundamental task in cognitive development (Rakison, 2005; Rakison & Poulin-Dubois, 2001).

Piaget's Stage 2 in education

Those caring for children in Piaget's preoperational stage must give them opportunities to explore their physical world during play and problem-solving activities. It is through such activities that children's existing concepts are challenged and modified, or new concepts formed. 'Hands-on' experiences are needed that involve the many different types of materials generally available in early-childhood settings such as preschools, creches or long-day-care centres. The Early Years Learning Framework for Australia (DEEWR, 2009) spells this out in detail. For most children, the need for access to 'hands-on' activities continues beyond preschool years.

BOX 3.2 RESEARCH LINKS

EXAMPLES OF PIAGET'S CONSERVATION TASKS

The following four conservation tasks are examples of those used by Piaget in his studies of children's thinking. Notice that the materials used in each task are presented in two ways. The first presentation represents the way the task is initially given to children; that is, the first question that is asked and the way the materials are initially set out in front of the child. The second presentation shows the way Piaget changed or rearranged the materials before he asked the second question.

1 Number

> First presentation: 'Are there the same number of Smilies in each row, or does one row have more than the other?'

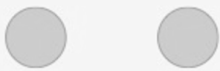


> Second presentation (transformation): 'Now are there the same number of Smilies in each row, or does one row have more?'



2 Substance (mass)

> First presentation: 'Is there the same amount of dough in each ball, or does one ball have more than the other?'



> Second presentation (transformation): 'Now does each ball have the same amount of dough, or does one have more?'



3 Area

> First presentation: 'Does each of these two cows have the same amount of grass to eat, or does one have more than the other?'



> Second presentation (transformation): 'Now does each cow have the same amount of grass to eat, or does one cow have more?'



4 Liquid volume

> First presentation: 'Is there the same amount of water in each glass, or does one have more than the other?'



> Second presentation (transformation): 'Now is there the same amount of water in each glass, or does one glass have more?'



ACTIVITIES

Present one or two of the tasks shown above to children in the four to 12-plus age range. Try to find at least three children, one from each of the 4–5 years, 8–9 years and 12-years-plus age groups. You should use real materials, not the diagrams shown here. Remember to ask the children to explain their answers to your questions.

1 Record your conversation with each child while doing the tasks.
2 Compare the responses of the younger and older children.
3 Can you identify which children have achieved conservation in the areas covered by the tasks you used (for example, conservation of number, substance or area)?
4 Were the results what you expected in terms of the age and developmental level of the children? If not, can you explain any anomalies?



Source: © Tomasz Niewegłowski/Shutterstock.com

FIGURE 3.7 Opportunities to explore the physical world are important to children's development in the preoperational stage.

For teachers, the egocentric and perception-bound characteristics of the preoperational child are the most relevant. Children at this stage have difficulty understanding others' thinking. Researchers since Piaget have investigated this in terms of the development of children's 'Theory of mind' (see, for example, Wellman, 2011). While from late infancy children are aware of others' thinking, their ability to understand how this thinking differs from their own continues to develop through early childhood. Some assistance could be given to help children to understand that others see the world differently. Opportunities to talk both with peers and with adults about activities they are engaged in extend their understanding and language skills. For older children, introduction to early reading and number skills will contribute to this process. (These topics were introduced in Chapter 2.)

Stage 3: Concrete-operations period (7 years to 11 or 12 years)

The developmental milestones for the child at the **concrete-operations stage** are many, but there is one that is particularly significant: **conservation**, or the child's understanding that certain characteristics (such as length or volume) of an object do not change when the object's physical appearance changes. There are a number of logical principles involved in conservation at the concrete-operations stage, but in this chapter we focus on the following five principles: identity, reversibility, compensation, seriation and classification. These can readily be demonstrated in Piaget's conservation tasks (see Box 3.2 on page 87).

CourseMateExpress

Online resources
Explore more examples of conservation tasks with the **Interactive Activity** on this text's website.

concrete-operations stage
Piaget's third stage, in which a child is able to mentally manipulate and think logically about objects that are present

conservation
The ability to see that certain characteristics (size, height, length, amount) of an object do not change with changes in the object's physical appearance

Three of the conservation principles – identity, reversibility and compensation – underlie successful performance of the conservation tasks. All three principles are linked to the very first property of matter children have to understand: that is, object permanence. Children must learn that things have a relatively permanent 'identity' or existence. We saw the beginnings of this understanding emerge in the preoperational period, when children understand that things (and people) continue to exist even when out of sight. In conservation, this is extended to properties such as volume and number. A quantity of water is still the same even though its height changes when you pour it into a flat saucer or into a tall glass. A quantity of playdough is still the same whether you have it in one lump or break it up into 100 little pieces and spread the pieces over a larger space. Children also learn that any changes made to objects and materials can be reversed and the materials changed back into their original form; that is, the water can be poured back into the glass and the little bits of playdough rolled back into one big lump. This is **reversibility**.

Similarly, children learn that changes in any one part of a closed system or situation will lead to **compensation**, or complementary changes in another part. For example, in the water example above, the width of the water in one glass is compensated by the height of the water in a thinner glass. These principles appear in children's explanations for their answers in the conservation tasks. They are acquired very slowly. Piaget argued that young children tend to focus on just one dimension of a situation – usually the most obvious one – which contributes to this limitation in thinking about compensation. An explanation of this tendency to focus on one dimension at a time is young children's limitations in the ability to control attention, which depends on development of the prefrontal cortex (Galotti, 2011).

Seriation is concerned with the ability to order objects according to a dimension such as length or thickness. A child's game of nesting boxes is a good example of seriation: each box must be fitted into the next by size so that at the end of the game, all the boxes disappear inside the largest one. Seriation is important to concepts such as measurement.

Classification occurs when objects are grouped together according to a criterion such as shape, colour, function or size. It includes, for example, the knowledge that dogs, cows and donkeys are all 'animals', and that pencils, computers and words are all 'tools for communication'. Seriation and classification are among the most important achievements of the concrete-operations stage. They develop late in this period and indicate that the child has developed 'logical operations', or the ability to apply logical reasoning to a problem-solving task.

CourseMateExpress

Online resources
Explore development of logical operations with the **Interactive Activity**.

One of the key aspects of classification is **class inclusion**, or the understanding that a number of small collections can be combined in different ways to form a larger collection. This is sometimes called 'multiple classification', such as occurs when a preoperational child recognises that something can be a flower *and* it can be a rose. 'Simultaneous multiple classification' occurs at the concrete-operations stage and is demonstrated when a 5- or 6-year-old looks at his mother quizzically and asks, 'Mummy, when you are at school being a teacher, are you still my mummy?' (WJF, personal communication, October 2001). You can try this yourself. Ask a 5-year-old 'How many boys are coming to your party?' The child might answer 'Eight'. Now ask the child 'How many girls?' and the reply might be 'Two'. 'Are there more boys or more girls?' 'More boys.' 'Will there be more boys or more children at your party?' The child is likely to reply 'More boys'. This last response is not related to the child not knowing what 'children' means, because if you ask the child a separate question, 'What are children?', the answer will be 'Children are boys and girls'. The problem is that the child is focused on only one dimension (in this case, the larger group 'boys') and does not understand that there can be subgroups (that is, 'boys and girls') that can be combined into a bigger, single class (in this instance 'children').

reversibility
The ability to mentally reverse thought, such as adding back something that has been taken away or remoulding something to its original shape

compensation
The ability to see that an increase in one dimension (such as height) is compensated for by a decrease in another dimension (such as width)

seriation
The ability to mentally arrange objects or elements in terms of a dimension such as length, weight or volume

classification
The ability to mentally group objects in terms of similar characteristics; for example, pansies, daffodils and roses are all 'flowers'

class inclusion
Understanding that a number of small collections can be combined in different ways to form a larger collection

At the concrete-operations stage, children may seem to use words such as 'some' and 'all' appropriately, but their understanding of these terms is not yet fully consistent with adult usage. Once children realise that objects can be classified in terms of more than one dimension (that is, the children can solve a class-inclusion problem), they seem amazed if you ask questions such as 'Are there more boys or more children?' and can then respond very quickly to the question. Consider how much of our education system depends on this type of understanding: you can see why these cognitive skills are so important and why children need to master them.

The main limitation in children's thinking at the concrete-operations stage of development is that their understanding of mental operations is restricted to concrete situations. They are concerned with the present and are not yet able to think hypothetically, in the abstract. However, their thinking is no longer dominated by what they see: they can now carry out tasks that require logical or mathematical reasoning; for instance, arranging objects in terms of a dimension such as length or weight (seriation), grouping objects in terms of similar features such as shape or colour (classification), or predicting if various weights placed at different points on each side of a balance beam will tip the balance or keep it horizontal (proportion).

Piaget's Stage 3 in education

The main limitation of children's thinking at the concrete-operations stage is their inability to think in abstractions, so one of their main needs is for teaching to be carried out in contexts that provide plenty of concrete experiences. Opportunities should be provided for students to experiment with materials, to test ideas and to begin to think logically about the problems they encounter. Students' current ways of thinking should be challenged, forcing them to extend and expand their existing knowledge as a basis for later learning. This is congruent with the constructivist principles of learning discussed more fully in Chapter 6.

BOX 3.3 RESEARCH LINKS

THINKING CRITICALLY ABOUT CLASSIFICATION

To assess children's understanding of classification, Piaget used squares and circles of different sizes (large and small) and colours (red and blue). The interviewer presents the squares and circles and asks the child to sort them into groups that are alike. When the child has finished, the interviewer asks: 'Tell me why you sorted the objects into these groups. What shall we call this group? ... And this one?' They then ask: 'Can you think of another way to sort them?' Finally, taking one of the groups (and using the child's labels), the interviewer asks: 'These are all squares; some are red and some are blue. Are there more red squares or more squares?'



- *Level 1:* At age 4–5, children tend to mix the basis of their classification: they may put blue and red circles together (both circles), add a white square to a white circle (both white) and then put a grey square with a white square (both squares).
- *Level 2:* At about age seven, children may sort logically but have trouble with the last question. They do not understand the logical relationship between a class (squares) and a subclass (red squares). If the red squares dominate the group of squares, Piaget argued, then the child has trouble focusing away from what they see.
- *Level 3:* Children typically demonstrate an understanding of class inclusion at about eight years of age. They will answer correctly that there are more squares (and may think you are foolish for asking).

Some researchers have questioned whether the difficulty young children have with this task is a logical reasoning problem or an attention problem: difficulty inhibiting a competing schema for sorting the shapes (Houdé, 2000). In the transition between levels 1 and 2, children may sort logically using one schema (for example, colour) but have difficulty shifting to another schema for sorting when asked to think of another way to sort the shapes (Brooks, Hanauer, Padowska & Rosman, 2003). Thus, the difficulty is one of controlling attention rather than of logical reasoning, as Piaget proposed. The CourseMate Express site includes details of some of the research work investigating this link.

CourseMateExpress
Online resources
Go further: Explore work on the influence of attention on thinking.

ACTIVITIES

Try the classification task with children aged four, seven and 10 years or older. Document and report your findings.

1. Do you get the same results with both younger and older children? If not, can you explain why?
2. Do you think the difference is a result of understanding the task, ability to reason logically, or attention? Go to the CourseMate Express site to see some of the research on this issue.

It is important to remember that children do not progress through the stages at the same rate in all areas of experience. Students do not achieve concrete operations on all tasks at the same time. Conservation of number is usually achieved before conservation of density and mass, and before the more complex concepts of time and speed, but all are gradually attained within the concrete-operations stage. Piaget referred to this as **horizontal decalage**. The term **vertical decalage** is used to refer to students who move from one stage to the next only in selected areas of their experience, such as in mathematics, science or music. For example, vertical decalage might occur in a nine-year-old girl who has been learning the violin very successfully for several years. Most of her thinking will be at the concrete-operations level, but she may have reached the formal-operations stage in music as a result of the advanced level of her studies. This effect can become apparent as students move into the stage of formal operations, with more abstract thinking being achieved gradually, and in areas in which students have been exposed to more stimulating experiences (Sutherland, 1992, p. 24).

horizontal decalage
Gradual development within a cognitive stage, as demonstrated in the gradual attainment of the different aspects of conservation within the concrete-operations stage

vertical decalage
Unevenness in cognitive development, as demonstrated by advanced development in one area compared with development in other areas

For educators, the most important aspect of the concrete-operations stage is concerned with its upper limits and with students' transition to the next stage of formal operations. At this point, students are no longer dependent on concrete experiences to solve their problems, and can begin to think hypothetically. One of the tasks to be addressed by teachers and others working with students at the concrete-operations level is to provide experiences that will promote or stimulate more advanced ways of thinking. Piaget (1972) argued that educational experiences emphasising symbolic thought can promote the emergence of higher-order thinking skills such as formal and abstract thought.

The question of the benefits of directly teaching or training children to solve the Piagetian tasks was widely researched in the 1970s and 1980s. Miller (2011) reviewed this research and found that in many of these studies, researchers were able to teach Piagetian concepts. Strategies included explaining a concept, teaching the underlying thinking required for a task, creating cognitive conflict (through questioning, or exposure to peers' ways of thinking about the task), directing children's attention, and verbalising the rule involved. In line with Piaget's statements about readiness, older children were more able to benefit from training than were younger children.



THINK ABOUT

- How could you apply this to teaching children concepts at school?

Stage 4: Formal-operations period (11 or 12 years to adulthood)

The key characteristic of the **formal-operations stage** is that the young person who has reached this level of cognitive development demonstrates a capacity to think – not just about concrete realities, but also about abstract possibilities or 'an infinite number of imaginable realities' (Siegler, 1998, p. 43). One task Piaget devised to demonstrate this was 'the third eye'. He asked children where they would put a third eye if it were possible to have one, and to explain their thinking (Piaget, 1970). Children at the concrete-operational stage tend to put the eye on their forehead, in a similar position to their existing eyes, whereas by the formal-operational stage, they are more inventive, putting it at the back of their head, in their hand or on a foot (see Figure 3.8), and to imagine other uses for their eye.

formal-operations stage
Piaget's fourth stage, in which the individual is now able to think abstractly and logically, to form hypotheses and to solve problems systematically

Piaget saw 'thinking about one's own thought' as the key element of cognitive development in the formal-operational stage. Kuhn and Franklin (2006) likewise provide evidence to suggest that in adolescence, what develops is an 'executive function' that gives control over thinking and monitoring of thought processes, which makes thinking and learning more effective – we discuss this executive function later in this chapter, and again in Chapter 6, in the section on metacognition. The main developmental task for the formal-operations stage is attainment of the capacity for abstract thought, and for propositional and hypothetical reasoning.

				
Pete (7): 'I'd like it there because if it was anywhere else it would get in the way'.	Daisy (8): 'So then I'd look cool'.	Jesse (14): 'In my hand. Then I could see under the bed, and around corners'.	Hannah (15): 'On the back of the head, so you wouldn't have a blind spot when driving. You could also see people and things behind you'.	Jake (18): 'On the back of my hand, so I could look in the back of cupboards, or up high. Of course, your brain would need to be different to coordinate vision from the three eyes'.

FIGURE 3.8 If you had a third eye, where on your body would you want it to be put? Why?

Adolescents are able to reason logically, speculate and hypothesise far more readily than concrete-operational children, who are more dependent on what they see, hear and experience. Adolescents no longer need a reference to real-life situations in order to do a task. Ideas can be formulated, tried out mentally, and later tested in real-life situations. Reasoning is now **deductive reasoning**, meaning that rules or general principles are used to form hypotheses about possible solutions to specific problems, with these hypotheses then being tested to see if the predictions are true. This can be contrasted with **inductive reasoning**, or the ability to induce general principles or rules from knowledge of specific examples, then apply the rules to predict new instances (see the discussion of discovery learning in Chapter 6). Ideas about infinity, humanity, democracy or compassion can now be conceptualised. The key developmental milestones to be achieved in the period of formal-operational thinking are therefore:

deductive reasoning
Using rules or general principles to find general solutions to specific problems

inductive reasoning
Inducing general rules or principles from observation of specific examples

- 'propositional thinking', or reasoning about the logic of statements such as:

  Edith is fairer than Susan. Edith is darker than Lily. Who is the darkest?

  and

  A is greater than B and B is greater than C. Is A greater than C or less than C?

- 'hypothetico-deductive reasoning', or the ability to form hypotheses and argue from them.

Not surprisingly, in view of his background in science, Piaget used mathematical and scientific-type tasks that involved propositional and hypothetico-deductive thinking in the studies he conducted into formal-operational thinking (Inhelder & Piaget, 1958).

Examples of the scientific-type tasks Piaget used with older children include a problem that involves probability (see Box 3.4), and others that involve a pendulum and a colourless chemical liquid (chemical combination). In the pendulum problem, students are asked to identify the variables that influence the rate of oscillation in a pendulum's swing. Is it the attached weight, the height from which the weight is released, the length of the string, the amount of pressure exerted to set the pendulum swinging, or some other factor that affects the oscillation rate? Children at the concrete-operations stage usually consider all possible factors at the same time and 'have great difficulty in excluding the weight factor' (Piaget & Inhelder, 1969, p. 148). Older children who have reached the formal stage in thinking are able to separate the factors and establish that the rate

BOX 3.4 RESEARCH LINKS

AN EXAMPLE OF PIAGET'S FORMAL-OPERATIONS TASKS

Probability

In a study of the development of formal thinking in adolescents, Flieller (1999) used a problem described by Piaget and his colleague Barbel Inhelder (see, for example, Inhelder and Piaget, 1958) to assess children's understanding of probability. To understand probability, or the likelihood or chance of something occurring, children must understand the concepts of chance and proportion (Wadsworth, 1996, p. 121). They need to be able to consider the ways in which the particular elements of a situation can be combined, and they also need to be able to calculate proportions. Children generally do not understand probability before they have reached formal operations, so this test is best given to adolescents and children in the late primary years.



Source: Matthew Duchesne, © Milk and Honey Photography, 2010

FIGURE 3.9 Students' reasoning about probability reveals an ability to consider how elements can be combined in various ways, and to calculate proportions.

Small coloured discs or tokens are used in this task. Some of the tokens are marked with a large black 'X' and others are unmarked. For each item in the test, the student is shown two sets of tokens, each set including some tokens marked with an 'X' and some unmarked tokens. The sets of tokens are presented in sequences that represent the Piagetian stages.

The student is shown two sets of tokens (for example, 1/4 – one X token and three unmarked tokens in a group of four – and 2/4 – two X tokens and two unmarked tokens in a group of four) and asked: 'If I take one token from each of these sets, from which of the sets will I be more likely to take a token with an X on it, at the first try and without first looking?' Encourage the student to explain the answer that is given.

At the preoperational stage, children's predictions are usually based on a guess or some other factor such as their favourite number. Concrete-operational children will use a reasoning strategy inconsistently. By the time they reach formal operations, children understand the concept of probability and this will be evident in their predictions (Wadsworth, 1996).

Source: Adapted from Flieller, A., 'Comparison of the development of formal thought in adolescent cohorts aged 10 to 15 years (1967–1996 and 1972–1993)', *Developmental Psychology, 35*(34), 1999, 1048–58. Copyright © 1999 by the American Psychological Association. Reproduced by permission.

PIAGETIAN STAGE	ITEMS*	SCORING
Concrete operations	1/4 and 2/4; 3/5 and 3/7; 1/3 and 1/2; and 2/4 and 3/7	Stage reached if more than two items correct
Transition to formal operations	1/2 and 2/4	Correct answer required for this stage
Formal operations (level a)	2/6 and 1/3; 3/9 and 2/6	One correct answer required for this stage
Formal operations (level b)	2/6 and 3/8	Correct answer required

*Note: the numerator represents the number of tokens with 'X' and the denominator is the total number of tokens in each set the student is shown.

ACTIVITIES

Try this task with students in the 13–15 years age range.

1 Keep a record of what the students do and any explanations they give.
2 Do the students solve the problems in the way you expected?
3 Can you explain any unexpected outcomes?
4 Score your results using the categories listed above and compare them with those reported by Flieller for the probability component of his test results (Flieller, 1999, p. 1054).

of the pendulum's swing reflects the length of the string and is unaffected by other factors. In the colourless chemical liquid problem, a child is shown five containers that look the same but contain different liquids (water, diluted sulfuric acid, oxygenated water, bleach and potassium iodide). Water oxidises potassium iodide in an acid mix, turning the mixture yellow. A child is given two glasses, one containing water and the other, sulfuric acid and oxygenated water. The adult puts two drops of potassium iodide into each glass and the child watches the chemical reactions. The child is then asked to reproduce the yellow colour using liquid from the five original containers. There are 25 possible combinations that will produce the yellow colour. Younger children's efforts are unsystematic. They become more systematic at the concrete-operations stage but still largely use trial and error. If the yellow colour is achieved, the children generally cannot explain what they did to get this result. By the formal-operations stage, children systematically combine the liquids and use reasoning to solve the problem (Wadsworth, 2004). There is a version of these tasks that you can try on the CourseMate Express website.

CourseMateExpress

Online resources
Try some formal operations tasks yourself with the **Interactive Activity** on this text's website.

Solving problems such as those of the balance scale, the probability task, the pendulum and the chemical combinations – which involve considering two or more variables – requires the ability to be systematic, to form hypotheses and to make deductions from findings. Many adults find such tasks exceedingly difficult. Even Piaget (1974) conceded that most people only reach a formal-operational level of thinking in the area of their greatest expertise. For many people it is much easier, or less challenging in a cognitive sense, to function at a concrete-operations level. Interestingly, it has been suggested that Piaget's formal-operations stage may not be the final stage of cognitive development. According to this view, adult thinking – when compared with the thinking of children and adolescents – is characterised by greater flexibility, and sensitivity to ambiguity and the impact of social, political and moral influences (Basseches, 1984; Labouvie-Vief, 1980). Most current research has challenged the notion of formal operations as a stage, given that younger children show some deductive and inductive reasoning, and many adults fail to use formal thinking on unfamiliar tasks (Kuhn & Franklin, 2006). View the CourseMate Express site for a review of some of this research.

CourseMateExpress

Online resources
Go further: Is formal thinking a 'stage'? Read about research on deductive and inductive reasoning on this text's website.

Piaget's Stage 4 in education

Teachers need to provide opportunities for more advanced students to be challenged cognitively, so that students can be encouraged to find creative solutions to unusual problems that can later be tested in real-life contexts. Students can be grouped into teams to work on problems, with each team including students who think at both the concrete- and the formal-operational levels. This would allow the more advanced thinkers to challenge and stimulate the thinking of the less advanced students. Implementing the best plans would provide the 'formal' thinkers with opportunities to test their ideas in real-life situations, while also giving the more 'concrete' thinkers the opportunity to operationalise or work out their ideas in practical ways.

Piaget argued that the hallmark of formal operations was the ability to 'operate on operations' – or metacognition (Flavell, 1979). Numerous studies have demonstrated that metacognition can be taught (Pennequin, Sorel & Mainguy, 2010) and that metacognitive knowledge and skill is related to academic achievement, to reasoning (Kuhn, 2000) and to intelligence (Sternberg, 1985; see Chapter 9). Metacognition is discussed further later in this chapter, and its relation to learning is explored in Chapter 6.



BOX 3.5 CLASSROOM LINKS

HOW CAN STUDENTS BE SUPPORTED TOWARDS MORE ADVANCED THINKING?

One of the key challenges to Piaget's theory also provides suggestions for supporting the development of children's thinking. When the tasks are presented in different ways, children at various ages have been shown to be able to think in ways that Piaget's theory would suggest is not possible or consistent with their stage of thinking. Miller (2011) suggested that these studies may reveal the beginnings of more complex concepts in young children's thinking. They challenge Piaget's notion of structurally distinct stages of thinking.

Performance factors that challenged Piaget's description of the competence of children of various ages include:

- *Task complexity* – presenting tasks with simpler demands led to earlier demonstration of competence (for example, having fewer places for infants to search in the object permanence studies) (Wellman, Cross & Bartsch, 1987).
- *Task familiarity* – designing tasks with scenarios that were familiar to children (using a character from *Sesame Street* (Borke, 1975) or a policeman/person hiding scenario (Hughes & Donaldson, 1979) in the three mountains task, preoperational children were able to take the perspective of another).
- *The role of experience or expertise* – studies by Chi (1978) with chess champions showed that they used formal thinking in reasoning about chess – an area of expertise – and concrete thinking in other areas.

What do these studies suggest to teachers wanting to support children's thinking?

1. When children are being introduced to a concept, and when they are having difficulty with a concept, reduce the complexity of tasks or activities. For example, one-to-one counting is acquired earlier with small groups of items than counting with larger groups (Gelman & Gallistel, 1978). Similarly, children can be challenged or extended by increasing the complexity of a task.
2. Present new concepts in a familiar context, with familiar examples. Use familiar ideas when students are required to reason in complex ways.
3. Develop and strengthen students' content knowledge before requiring them to manipulate or reason about this knowledge. For example, Marzano and Simms (2014) suggested a questioning sequence in which students are prompted to build knowledge and understanding before they are asked questions that require them to analyse and evaluate.
4. Teach concepts in order. If students are having difficulty with a concept, go back to the foundational understandings that underpin it.

Opportunities for challenging students' thinking at both the concrete and formal levels can be identified in most teaching situations. For example, the plot in one of Shakespeare's plays can be studied in terms of a sequence of events that follows logically from beginning to end. At the same time, attention can be directed to the more abstract themes that underlie the action: compassion, jealousy, pride, desire. Hypothetical situations can be identified from the plot, and a sequence of events identified as being possible if alternative actions had been taken or different motives followed. Here, the main focus is to encourage and provide opportunities for students to begin to think abstractly about possibilities, divergent solutions and so on. These thinking patterns are most likely to be achieved in areas of activity in which students are 'experts'. Teachers at the secondary level who want to stimulate more advanced patterns of thinking in their students can begin by capturing students' interest and creating enthusiasm for the curriculum area in which they are working. Teachers cannot assume that all high school students are able to reason hypothetically, as would be expected if they had attained formal operations. Many will still reason at the level of concrete operations.

Some studies suggest that children in primary classrooms are able to reason hypothetically (Metz, 1995). Furthermore, Piaget's contention that children develop cognitively as a consequence of their interaction with the environment, as well as from maturation, suggests that providing these experiences for primary students is important to developing their thinking skills. Metz (1997) argues that teachers should not avoid hypothetico-deductive tasks in primary school programs.

STRENGTHS AND LIMITATIONS OF PIAGET'S IDEAS

Strengths

Piaget taught us to listen to children and to appreciate the intelligence they bring to the task of attempting to make sense of their world. Piaget was interested in how children think and how they come to understand concepts such as time, space, movement and self. The types of tasks and the procedures he used to collect data stimulated new ways of thinking about children's cognitive development. Probably Piaget's most important contributions to the study of child development concern the way in which we think about children and the methods we use to study them (Feldman, 2013; Miller, 2011). Piaget's focus on analysing the errors children make when they solve problems was also significant (see, for example, Gelman and Gallistel's 1978 work on children's understanding of number concepts).

Piaget viewed children's cognitive development as a gradual process of change, with new mental schemas emerging from pre-existing structures. This view has resulted in a general recognition by educators that it is the *stage* of development a child has reached that is important – not the age. Some curricula in Australia and New Zealand have taken up this notion. The term 'developmentally appropriate education' is sometimes used to refer to this idea. The 'stage not age' concept, or the idea of matching instructional strategies to children's current level of understanding, means that teachers need to be aware of their students' level of reasoning, and plan accordingly. For example, younger students who still need concrete experiences in their learning need real objects, diagrams and the written word, not just verbal instruction. At the secondary level, teachers cannot assume that students are thinking hypothetically; adolescents may need considerable assistance not only to begin to reason at this level, but also to reason at this level consistently. Indeed, many studies (see Moshman, 2004, for a review) have found that only a minority of adolescents show advanced formal-operational thinking.

One aspect of Piaget's theory that has not been challenged is the idea that children actively create their own learning and that direct experience is essential for such learning to occur. Constructivism, discovery learning, inquiry-based learning, cooperative learning and other related approaches (see Chapters 6 and 7) are extensions of this principle. Piaget's theory also reminds us that children's thinking is not the same as that of adults. It is both different and less efficient. Teachers need to be aware of the process of thinking, not just the outcome. It is not just a question of children getting a problem right or wrong, but how they do the task, the types of errors they make and the processes they use to reach an answer that are important for teachers to assess their understanding.

Challenges to Piaget's ideas

Anyone who strives to develop a grand theory is likely to be criticised, and this is true of Piaget. The length of time that elapsed between his first publications in the area of children's cognitive development (in the 1920s) and his last (in 1981), the amount of data he collected and the very large number of his major publications make such criticism inevitable (Lourenco & Machado, 1996). There was remarkable coherence in Piaget's work over these six decades (Brainerd, 1996), but there was also variability as his ideas and research methods changed direction and new interpretations and emphases emerged (Beilin, 1992). However, much of the criticism that has been levelled at Piaget's theory has stimulated further research that, in turn, has expanded our understanding of how cognitive

development occurs. In this sense, criticism can be seen to have had a positive effect on the field of educational psychology as a whole.

Ages and stages

One of the first criticisms often made of Piaget's theory concerns his ideas about the timing of children's attainment of developmental milestones within the different stages. For example, studies have shown that he overestimated what the average 12-year-old could do and underestimated what the preoperational child could do. In particular, researchers have pointed out instances in young children's behaviour of taking others' perspectives into account (such as when they use baby talk to talk to younger children, or turn a picture around to show someone else), and the ability to show higher levels of reasoning when tasks are simplified or put into a familiar context. Children also show evidence of deductive reasoning earlier than Piaget proposed, with gradual improvements over time towards formal reasoning (Kuhn & Franklin, 2006).

Piaget himself commented that the ages at which different stages are attained are highly variable, and depend on the child's experiences and social environment (Piaget, 1972). The important issue here is the *sequence* of changes that occur in the way children think, rather than the ages at which such changes occur. Research generally supports this sequence of changes, although researchers take issue with the notion of stage-like development, as proposed by Piaget.

Stage concept

Doubts have been raised about Piaget's notion of stages. Evidence such as that we have discussed from studies showing partial understanding of formal operations (such as deductive reasoning) earlier in childhood, and an ability to take others' perspectives in early childhood, suggests development is not a matter of the absence and then the sudden presence of skills, as Piaget described, but a gradual acquisition of these abilities. Other studies showing that children can be trained to successfully respond in the Piagetian tasks (for example, Beilin, 1978; Siegler & Svetina, 2006) also challenge the notion of stages, as such training builds on basic understandings children have developed.

Questions have also been raised about whether stages are general, applying across domains, or particular to specific content domains, such as number, spatial awareness or social understanding. Neo-Piagetians such as Case (1992, 1998) and Fischer (Fischer & Rose, 1996) describe development within a domain as proceeding in a stage-like manner; but rather than a single staircase, Case describes development as multiple staircases that link together. Fischer and Bidell (2006) describe a net of pathways to competence in a domain, with multiple skills and understandings contributing to competence. Their theory is not as neat as Piaget's, but the picture of development gained from research is not neat either. The theory accounts for the variability that is observed within and between children in development, which is discussed later in this chapter.

Absence of skills

A further criticism concerns the very negative view of development that Piaget presented, particularly in relation to the thinking of young children, who are described in terms of what they *cannot* do, rather than what they can do. For example, Piaget saw the preoperational child as incapable of thinking logically and lacking any understanding of seriation, conservation, reversibility and so on. His focus was on a transition from the absence to the presence of a particular type of understanding (with hypothetico-deductive reasoning as the pinnacle), rather than on the quite remarkable cognitive capacity that the preoperational child has already achieved. In Piaget's defence, it is claimed he did not see children at the sensorimotor or preoperational stage as lacking specific abilities, but rather as being capable of certain types of understanding that are gradually transformed over time into new schemas or cognitive structures (Smith, 1993). It may be more useful, as Piaget did in one work (1951), to describe children's

thinking in terms of tendencies rather than abilities; that is, his theory describes what children usually do, rather than what they are capable of in ideal conditions. Interestingly, his description of adults' thinking appears to take the opposite approach: describing what thinking adults are capable of, rather than the ways in which they usually think.

Role of social context

Some critics of Piaget's theory claim that Piaget's explanation of cognitive development pays insufficient attention to the role of others or to the child's social environment. However, you might recall that social interaction is one of the contributors to development Piaget identified. He was particularly interested in peer interaction as a means for children to expand their ideas, to overcome conflicts (disequilibrium), and to achieve shared solutions (equilibrium) that are more mature than individual efforts (Brown, Metz & Campione, 1996). The place of peer interaction is particularly evident in Piaget's work on moral development (see Chapter 4). However, while it had obvious implications for education, the theory had no significant role for educators. Within a Piagetian-based curriculum, the role of the teacher is primarily concerned with assessing the level of children's thinking and providing appropriate experiences rather than teaching students directly. By describing children as 'solitary scientists', Piaget places them at the centre of their development, and interactions with others are one of several environmental influences that might prompt development in the child's thinking. Piaget focused on the child's role, and did not explore the corrective feedback and explicit teaching that occurs not just in schools but at home, and which is a large part of children's experience of the world. Vygotsky's theory, described later in this chapter, describes a different role for adults and peers in development.

Additional factors in development

Other limitations often attributed to Piaget's model, particularly by theorists interested in information processing and motivation (see Chapters 6 and 8), are that it does not sufficiently take into account memory, motivation and emotion (that is, feelings or 'affect'). Feldman (2013) pointed out that Piaget was not writing a theory of psychology (or education) but of knowledge, and so it should not be surprising that he did not focus on these factors. In fact, Piaget perceived memory as part of the process whereby children create schemas to represent aspects of their experience, such as with the concept of a 'dog', and then reactivate these schemas when retrieving (remembering) information during their next encounter with a dog. Motivation is seen as an element in the process of disequilibrium, in that the experience of cognitive conflict motivates children to strive to resolve their uncertainty and to regain equilibrium. Cognitive development occurs as an outcome of this process. Emotions contribute to development by influencing the selection of what is attended to. Children are most likely to become involved in an activity if their interest (and emotion) is roused. Work on emotion (discussed in Chapter 4) and motivation (discussed in Chapter 8) attributes more complex roles in development to these factors than Piaget described.

Individual differences

Criticisms of Piaget have also included claims that he paid insufficient attention to individual differences among children; for example, differences in gender or cultural background, or the presence of a disability. Piaget did not report any differences in the ways in which males and females develop intellectually, for example (Sutherland, 1992; Wadsworth, 2004). His aim was to identify the universal processes of cognitive development. Differences in the ages at which children reached each stage might occur depending on children's experience, but the processes and structure of development would not vary.

Many cross-cultural studies have tested the universality of the theory and, when adjustments are made for language, context and content of test items, have found that the same structure of development exists, although rates of development appeared to vary in some studies (see, for example, Dasen, 1973,

1977; Goodnow, 1962). Studies showing that years of formal, Western-style schooling affect the age at which children attain concrete operations and formal operations as measured by standard Piagetian tasks can be explained by the familiarity children in schools have with the testing situation, which can be overcome with fairly brief training in the testing and by adjusting task content to more closely reflect the child's culture (Lightfoot, Cole & Cole, 2009). At the same time, participation in related activities as part of everyday experience contributes to developments in cognition, just as Piaget's theory described. McDevitt and Ormrod (2010) describe a village of potters in Mexico whose children reach conservation much earlier than would be expected in Piaget's theory, because of their experiences with clay and water. A number of studies have suggested that formal schooling is necessary for the development of formal-operational thinking, because the experiences offered in formal schooling demand abstract reasoning (Segall, Dasen, Berry & Poortinga, 1999).

In fact, Piaget's studies have been successfully replicated in many different contexts involving children with a range of disabling conditions and from a variety of cultural backgrounds. He appears to have been successful in identifying the universals he sought, at least in the sequence of cognitive development.

Variability

Cultural context aside, considerable variation within, as well as between, children has been noted in research (Siegler, 2007). This challenges Piaget's claims that development happens in the same way for all children, and that development reflects structural changes leading to qualitatively different forms of reasoning. Children (and adults) do not reason at a consistent level at any point in time – their reasoning may vary, depending on context, experience and knowledge of the topic – and Siegler (2007) reported that children use different strategies on similar problems they are presented with close together in time.

Box 3.6 contains some issues relevant to classroom applications of Piaget's ideas, as well as some suggestions for classroom activities derived from Piaget's theory of cognitive development.



BOX 3.6 IMPLICATIONS FOR EDUCATORS

APPLYING PIAGET'S IDEAS IN THE CLASSROOM

Some of the issues relevant to classroom instruction that are highlighted by Piaget's theory (see also Table 3.2) include the need for teachers to:

- listen to children and observe what they do, in play and in other activities
- take into account the critical factors that influence children's cognitive development, including maturation or biologically based changes associated with growth, which may result in individual differences in development
- give children time to explore their world and to work things out, recognising children's role as 'miniature scientists' and the learning that results from their physical and mental activity
- consider children's interaction with adults and other children, providing opportunities for them to discuss their thinking and to debate viewpoints
- ensure that children maintain equilibration or cognitive balance between new experiences and what is already known, challenging their thinking by providing opportunities for them to find links between the unfamiliar and existing knowledge, which may involve creating new schemas or adjusting existing ones
- ensure that information given to children is close enough to their current level of understanding so that linkages can be made between the old and the new.

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TABLE 3.2 Summary of Piaget's ideas

STAGE	CLASSROOM ACTIVITY	EXAMPLES OF ACTIVITIES
Sensorimotor (birth–2 years)	Turn-taking; imitation of actions and sounds; appropriate play	• Play peekaboo; roll a ball or toy car back and forth; build a tower of three blocks and knock it over while saying 'uh-oh', with the child to do the same • Sit beside the child in front of a mirror, imitate actions (smile, poke out tongue, touch nose); sing songs such as 'Everybody do this' and 'Old MacDonald had a farm'; look at books together, naming objects and making appropriate sounds ('cow, duck, dog' or 'moo, quack, woof-woof') • Provide a variety of materials for play; model appropriate behaviour
Preoperational (2 years to 6 or 7 years)	Hands-on experiences that allow child to 'construct' own knowledge; group activities involving peers; variety of activities to encourage symbol development and language (early literacy and numeracy)	• Provide practical experiences with a variety of concrete materials (sand, water, blocks; see free-play areas in early-childhood programs) • Keep in mind children's egocentrism; encourage activities that increase awareness of others' points of view, such as 'pretend' (imaginary) games; play turn-taking games such as lotto and board games • Sing nursery rhymes; play word games (I spy); read alphabet books; play rhyming and counting games; do sorting, matching, pattern-making and counting activities in play and during daily routines
Concrete operations (7 years to 11 or 12 years)	Concrete experiences to allow for experimentation, for testing ideas and for beginning to think logically; situations that challenge existing ideas, create disequilibrium and expand vocabulary; opportunities to explore new areas, expand experience and develop a wider knowledge base; work in groups	• Provide concrete resources to support learning • Provide opportunities for problem solving and logical thinking using a variety of materials • Encourage students to discuss problems, share ideas, identify possible solutions, plan alternatives, implement plans and revise, finding solutions as needed (for example, work out how to better organise the space in the classroom so that they don't keep bumping into each other) • Encourage group work, with students challenging each other's ideas; give a range of experiences to expand knowledge base and vocabulary
Formal operations (12 years to adulthood)	Think hypothetico-deductively; understand and appreciate irony, satire, fantasy and paradox	• Provide opportunities for students to extend their knowledge and ideas, challenge current assumptions, express their ideas in written forms through a variety of different genres (including poetry and prose) and express their ideas orally by engaging in discussions and debates on hypothetical and theoretical topics

VYGOTSKY'S SOCIOCULTURAL THEORY

Lev Semanovich Vygotsky (see Box 3.7) was a contemporary of Piaget's for a short period, from when Piaget began publishing in 1920 to Vygotsky's death in 1934. Pass (2007) reports that Piaget and Vygotsky communicated and exchanged ideas for about five years, and suggests that they may each have adjusted their theories as a result. In Vygotsky's first collection of writings (*Thought and language*, 1934), he criticised some aspects of Piaget's theory, such as Piaget's concept of egocentrism and, in particular, egocentric language.

In many ways there was significant overlap between Piaget's and Vygotsky's work. For example, like Piaget, Vygotsky's early interest in psychological research arose from a request to replicate Binet's intelligence test in Russia (Shayer, 2003). There were also major differences in their ideas, which reflected, in part, the differences in their social and cultural backgrounds. For example, Piaget focused

BOX 3.7 ABOUT LEV SEMANOVICH VYGOTSKY

Lev Semanovich Vygotsky (1896–1934) was born into an intellectual Russian-Jewish family that lived within the restricted territory (the Pale) in the southern Byelorussian town of Gomel, close to the Ukrainian border (Dixon-Krauss, 1996). His father was a bank manager and his mother was a teacher. Lev was the second-born of eight children.

Intellectually gifted and with an extraordinary memory, Vygotsky was educated at home and, at the secondary level, at the local gymnasium (a European secondary school that prepares students for university). As a Jew, his access to education was severely restricted, as there were strict limits on the number of Jews who could undertake university studies (Bodrova & Leong, 1996). However, Vygotsky won a place at the University of Moscow in 1913, and received a degree in law, with a specialisation in literature, in 1917. He was widely read in literature, poetry and the arts (Miller, 1993).

Vygotsky returned to Byelorussia after his graduation and taught a range of subjects to adults and children, including language and literature, logic and psychology, and art history and theatre (Dixon-Krauss, 1996, p. 2). He became interested in children with learning difficulties and intellectual disabilities, and established several clinics that conducted research into the problems of such children. He was particularly interested in devising ways in which to assess children's intellectual abilities and to evaluate the efficacy of intervention strategies (Wertsch, 1985).

In 1924, Vygotsky was invited to join the Institute of Psychology in Moscow. He moved there with his family and began a collaboration with two other Russian psychologists, Alexander Luria (1902–77) and Alexei Leontiev (1903–79). Together, they developed a 'cultural-historical' or 'sociohistorical' view of human development that emphasised cognitive activities such as thinking, memory and reasoning (Miller, 1993). The three worked together until Vygotsky's death in 1934, the year his most popular book, *Thought and language*, was published in Russia.

From the early 1930s, the Communist Party increasingly controlled the intellectual life of Soviet academics, and Vygotsky's work was banned from 1936 to 1956 (Miller, 1993; Palmer, 2001). By the 1960s, when Piaget's theory was becoming more widely known in the West, interest in Vygotsky's work and access to his writings outside Russia began to increase. An English translation of *Thought and language* was published in 1962, and the first of six volumes of Vygotsky's collected writings appeared 15 years later (Miller, 1993).



FIGURE 3.10 Vygotsky emphasised the social nature of children's learning and the contribution of social interaction to this process.

on the individual, but, by contrast and largely as a result of the social and political system operating in the Soviet Union at that time, Vygotsky's concern was with learning and development occurring within a sociohistorical and sociocultural context. This orientation was an outcome of the particular society, period of history and culture in which he worked. Vygotsky argued very strongly that the child and the environment interact to mould cognition in culturally appropriate ways. This view is evident in the themes that distinguish Vygotsky's ideas, including the sociocultural and sociohistorical origins of cognitive development, language as a mental tool, the role of private speech and the zone of proximal development.

SOCIOCULTURAL ORIGINS OF COGNITIVE DEVELOPMENT

While Piaget was interested in describing what was universal in children's cognitive development, Vygotsky was interested in differences, and particularly in how those differences arose from the social, historical and cultural context in which children grow.

Vygotsky's ideas about the way in which our social, cultural and historical background and experiences shape cognition are demonstrated in descriptions of children's behaviour in early infancy (see, for example, Bruner, 1975; Kaye, 1982; Lock, 1978). According to Vygotsky, infants are born with an inherited capacity for specific patterns of action. They have also had prenatal experiences. But from the time of birth, their task is to acquire a sequence of skills and competencies that are uniquely human, with language being probably the most important of these skills. This acquisition, or learning, is achieved through social interaction. As carers interact with infants, they unconsciously structure the baby's experiences in ways that reflect the carers' own social, cultural and historical background.

In this way, the child develops not just as an individual, but as a member of a particular society and culture. The role of adults in development is to help to *socialise* the child (see Chapter 11) – to develop his or her thinking in ways particular to the culture and society in which they live.

Vygotsky described humans' mental abilities as:

- 'lower mental functions' (meaning inherited, involuntary capacities such as vision, hearing and taste) that are controlled by external objects and events
- 'higher mental functions' (meaning those developed through social interaction, including logical and abstract thinking, and language) that operate internally (that is, 'in the head') and are used to control lower mental functions, to think and to solve problems concerning external objects and events.

In reviewing Vygotsky's ideas about adults' role in structuring infant cognitive development, Lock, Service, Brito and Chandler (1989) highlight his notion that the developmental process is primarily concerned with the infant gaining control over lower mental functions, such as hearing and vision, that are present at birth. A child has to learn which of the many stimuli in the environment are considered (by carers) to be important and should be attended to. For example, Dad points to Mum getting into the car and says 'Wave goodbye to Mum', but the baby finds Dad's eyes much more interesting to look at and to touch. Dad turns the baby's head towards Mum, points and says 'Look!' Vygotsky argued that children learn to control lower mental functions and begin to acquire higher-level functions through such interactive experiences.

In their 'peekaboo' study, Bruner and Sherwood (1975) gave a fine example of the emergence of early communicative behaviour in mother–infant pairs. They cited data from observation of one mother–infant pair who were seen, over a period of time, to play peekaboo 22 times, the first time when the baby was 10 months of age, and the last when the baby was aged 15 months. The game always began with face-to-face contact between mother and child, and sometimes included a vocalisation by the mother to attract the child's attention. The mother initiated almost all of the episodes observed (19 out of 22), her face being hidden almost as often as the child's face was hidden. In the few instances in which the game was initiated by the child, the child's face was hidden, not the mother's face. Peekaboo is a good example of the 'social-structuring' process described by Vygotsky. Here, the helpless newborn is gradually transformed, through recurring interactive experiences with familiar partners, from passive respondent to active participant, with increasing control of cognitive functions. The skills learned have been internalised. Note that in thinking about these exchanges, Vygotsky recognised that what is passed from adult to child includes aspects of current and past experience, knowledge, attitudes, and the beliefs and values of the child's social group, as represented by the carer. This explains the use of both 'sociocultural' and 'sociohistorical' to refer to Vygotsky's model.



Source: Larry Williams/Corbis

Source: Douglas Kirkland/Corbis

FIGURE 3.11 Interactions between parents and children help children to take on cultural knowledge, such as this child is learning about communication.

INTERNALISATION

One of the key concepts that distinguished Vygotsky's theory of cognitive development from that of Piaget is the notion of **internalisation**. This is the notion that individuals internalise the ideas and processes they observe and participate in during social interaction as new ways of thinking. Their thinking is gradually transformed through interaction. Like Piaget, Vygotsky described individuals as active agents in their development. While Piaget focused on the individual as the agent and constructor of their own cognitive development, Vygotsky saw development as arising out of social interaction (in which the child is a participant), and from there, being internalised by the individual. Vygotsky expressed it in this way: 'The true direction of the development of thinking is not from the individual to the social, but from the social to individual' (Vygotsky, 1986, p. 36). Consider how this might work in the classroom, when a teacher is discussing the causes of the First World War with her students. In the course of the discussion, the students put forward theories, while the teacher extends their thinking about the topic with questions and evidence from her knowledge of history. She responds to students' ideas, corrects misconceptions, and asks questions to prompt them to think in new ways about history. Students also draw on and respond to one another's ideas. As a result of the discussion, students *internalise* these new ways of thinking, and may apply them to other topics.

internalisation
The transformation of external processes into internal processes that guide action and thought

SOCIAL INTERACTION

Vygotsky argued very strongly that it is in interaction with others that we learn how to think. The teacher's mediation of the students' learning in the above example is not merely a passing of knowledge from expert to novice, nor is it simply construction by the student of new ideas about history. It is a co-construction, made by both the teacher and the student together as they interact. Thus, for Vygotsky, the individual is active in development, but so are others; their development arises from social interactions. He argued that this is particularly important when thinking about the development of higher mental functions:

> Every function in the child's cultural development appears twice: first, on the social level and, later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory and to the formation of concepts. All the higher functions originate as actual relations between human individuals.
>
> Source: Vygotsky (1978, p. 57).

A study that explored this issue (Wertsch, McNamee, McLane & Budwig, 1980, p. 1219) looked at how individual mothers interacted with their 3-year-old when the child was presented with a simple shape-puzzle. The researchers found that mothers structured the task, giving assistance rather than just letting the child do it randomly. A mother would direct attention to a relevant piece, pointing to a wheel piece and asking: 'What is happening here?' Similar results are reported in studies of children teaching other children to play a board game that they had earlier constructed with another child (LeBlanc & Bearison, 2004). In the board game example, the (teacher) child begins by demonstrating and stating the rules and goal of the game while the (learner) child indicates that the instructions are understood by affirming or restating the information given, as in this example involving two six-year-old boys:

> T (teacher): One (small game piece in the shape of a robot) goes here (in the centre of the board). Then you put this (a second small robot) here (also in the centre).
>
> L (learner): So this (robot) is one player and that's (robot) the other?
>
> T: Yeah.
>
> L: So you have to spin this (spinner)?
>
> T: No, you don't. That's not the way you do it.
>
> L: OK.
>
> T: You use these (dice).

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Later, the learner may contribute to the development of the game by suggesting new rules that enhance the complexity of the game, as in the following exchange between 10-year-olds:

> L: What happens when it (the spinner) lands on the black (the line dividing the different coloured spaces on the spinner)?
>
> T: We don't have to worry about that. It doesn't happen.
>
> L: But it could, right?
>
> T: Yeah, I guess it could.
>
> L: Then what do you do?
>
> T: Spin again.
>
> L: But black is the colour on the board (the outer edge of the board). Maybe we could use it?
>
> T: Yeah, we could say that you have to land on the black and then you have to stay there until the other person goes around the board once.
>
> L: Yeah, that's good.
>
> T: OK. We'll play it like that.

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In the section on scaffolding (see page 108) we discuss this role of experts in helping children to achieve new or difficult tasks further.

LANGUAGE AS A MENTAL TOOL

Vygotsky argued that each culture has a set of artefacts – physical and mental tools – through which the culture is expressed and passed on. Just as technological tools are used to shape the environment, mental tools shape thinking, and are part of the process of construction of ideas. These mental tools are particular to each culture, and shape individuals' thinking in the ways of the culture. The mental tools passed from adults and peers to children during social interaction include language, as well as 'various systems for counting; mnemonic techniques; algebraic symbol systems; works of art; writing; schemes, diagrams, maps, and mechanical drawings; all sorts of conventional signs, and so on' (Vygotsky, 1981, p. 137, cited by Daniels, 2011).

If Vygotsky had lived into the 21st century, he no doubt would have included telephones, word processors and computers on his list of mental tools. Computers exemplify the way in which a mental tool can shape thinking (see Chapter 12). Miller (1993) used the invention of (and access to) paper to illustrate changes in the mental tools needed by children growing up in earlier centuries or in more primitive societies with oral rather than written traditions. A similar example can be found in the impact of maps and other technologies on navigation at sea. The southern continents of Australia and New Zealand were located by navigators such as Captain James Cook using primitive charts, a compass and a sextant. By contrast, the island of Tahiti had earlier been located by people from the Hawaiian Islands travelling in large canoes, their navigators reading the waves, stars and the flight of birds, and using charts made of sticks and knotted twine (Lewis, 1972). In the 21st century, these earlier methods appear very primitive. Navigators now work with computers and satellite technology to plan their routes. Imagine how varied the mental maps of the Pacific Ocean would be for these different groups of navigators. These examples illustrate Vygotsky's claim that the mental tools acquired by individuals are the products of their social, cultural and historical backgrounds. One of the responsibilities of adults, including parents and teachers, is therefore to give children the mental tools or cognitive strategies they will need to function effectively and independently within their own cultural and social environment.

For Vygotsky, language is the most important mental tool. Initially, it has a social function, providing a means for interacting with others. However, as children's language skills increase, it begins to serve an intellectual function, as a tool for problem solving and self-regulation. The change is reflected in a shift from reliance on external devices for solving problems (for example, counting on fingers, or tying a knot in a handkerchief to remember something) to speech that is 'internalised' (that is, 'in the head'), or **private speech**. With very young children, self-instructional language – egocentric speech, in Piaget's terms – is often spoken out loud. Piaget thought this **self-talk** was just a primitive way of using language, since it drops out as children develop. But Vygotsky thought such language was actually helping children to think. He gave an account of a child of five-and-a-half years who talked to himself as he was drawing a picture of a tram. While drawing a wheel on the tram, the child pressed too hard on the pencil and the lead broke. When the child tried to finish the wheel by pressing hard on the paper, there was no mark on the paper apart from the indentation made by the blunt pencil. When this happened, the child said 'Broken'. He then put the pencil down, picked up a paint brush and began to draw a tram that had broken down after an accident and was being repaired. He continued to talk to himself about the broken tram as he worked on the drawing.

private speech
Speech used to guide own thinking and actions; it can be both internal (silent) and external (audible)

self-talk
Private speech uttered aloud

Vygotsky noted that the pencil breaking, the child's awareness of his difficulty in drawing with a broken pencil, and his utterance ('Broken') represented a turning point in the activity. The drawing changed from a picture of a tram to a picture of a tram being repaired. In this situation, the self-talk was clearly a part of the child's thinking and not simply something that accompanied that thinking (Vygotsky, 1987, p. 70, cited by Newman & Holzman, 1993, p. 116).

Vygotsky used tasks with increasing levels of difficulty to explore the use of self-talk, finding that as thinking became more sophisticated, this type of speech ceased or the children became silent. Box 3.8

BOX 3.8 RESEARCH LINKS

STUDIES OF PRIVATE SPEECH IN YOUNG CHILDREN

Vygotsky (1978, 1986) proposed that private speech is used to communicate both with others and with ourselves, and that it is a tool for thinking, particularly for logical thought, self-monitoring and self-direction.

Vygotsky found that private speech increases when tasks become more difficult. Research since has likewise found that private speech helps children with motor control and task performance (Fernyhough & Fradley, 2005), and that children who use private speech tend to have greater levels of attention and involvement (Winsler, Naglieri & Manfra, 2006). The answer to the question 'How much should teachers in early childhood settings allow children to talk to themselves in classrooms?' seems clear, but should they *encourage* children to do this?

Winsler, Manfra and Diaz (2007) examined this in a preschool setting with children with and without behavioural difficulties, and found that both groups of children talked aloud when asked to, and that their performance on motor sequencing and counting tasks was improved when they were asked to talk to themselves while working. (Indeed, some children were not able to stop talking when asked to complete a task in silence.)

Corkum, Humphries, Mullane and Theriault (2007) compared the private speech of children with and without ADHD, and found that those with ADHD produced more external private speech, irrespective of language ability. Some of this was relevant to the task and some was not. The authors suggest that private speech is an important way in which these children compensate for their difficulties in attention.

The implications of the studies are that external (verbalised) private speech may be relied on by children with behavioural difficulties to control their behaviour and thinking, particularly when undertaking difficult tasks. When this self-talk is relevant to the task, it should be encouraged, as it may help with self-regulation.

ACTIVITIES

1. Sit quietly near a 4- or 5-year-old who is engaged in a practical activity such as drawing or painting, building in a sandpit, or playing with blocks and farm animals. Pretend to be reading a book or to be involved in some similar activity. Look and listen for any self-talk. Keep a note of what the child says and does.
2. Think about what is happening as the child talks. Is the language simply an accompaniment to the activity, or is it more closely involved in the child's thought processes? What is the social context?

describes research on the role of private speech in regulating attention. Attention is addressed further later in this chapter.

Vygotsky suggested that private speech has an intellectual function, being an important tool for structuring intellectual activity. Children often model (or replicate) the process of moving from external language to inner speech when they learn to read. In the early stages, printed symbols are recognised and sounded aloud, initially in a social context such as a classroom, or with the help of a tutor. As word-recognition skills increase, the reader becomes more confident and the need for social support diminishes. Reading aloud is replaced by 'mumble reading' , which contributes to fluency (Frandsen, 2011), and then by silent reading. The shift from dependence on external and social processes to internalised (or purely mental) functioning has been achieved. Reading has become a tool for use in intellectual activities.

THINK ABOUT

Consider your own behaviour when you are faced with a challenging task.

- Under what circumstances does your own private speech become 'self-talk'?
- What is the function of such speech?

ZONE OF PROXIMAL DEVELOPMENT

In thinking about the social context in which children learn, Vygotsky identified what he called the **zone of proximal development**, or the distance between what children can do by themselves and what they can do with the help of others.

zone of proximal development
The distance between children's current level of competence on a task and the level they can achieve with support or guidance

This is illustrated in the following example (also see Figure 2.17 on page 64). A student was given an addition and a subtraction problem to solve. He was able to solve the addition problem independently. When solving the subtraction problem, however, he had difficulty. The teacher gave him a hint, asking 'What number did you start with?' to help him restart at the correct point. Following this assistance from the teacher, the child was able to successfully solve the problem. This task was in his zone of proximal development – something he was unable to do on his own, but capable of carrying out with the teacher's assistance. Importantly, the teacher did not tell the student how to solve the problem, but gave him the amount of assistance he required to solve it himself. The child was still active in learning. In time, with further practice of this type, this problem will also be something the child can achieve independently, and the teacher will move him on to more difficult problems.

Vygotsky argued that teaching should be focused on the zone of proximal development, and that assessment should aim not to determine what children can do independently (what they have already learnt to do), but to find out what the child can do with assistance – what is in their zone of proximal development. This is so that teaching can be directed at the optimum level for each child, to lead their development forward. This example also shows the role of the teacher in Vygotsky's theory, which is to assist children to develop understandings and to regulate their own learning, rather than to tell or demonstrate to them what they are required to know.

Think about this. If you give a series of tasks to two children and they perform at the level of the average 8-year-old, most people would say the children were performing at the same level. This represents their unassisted level, or what they can do by themselves. Now, imagine a situation in which you give both children the same amount of assistance to do the task. You might give a series of hints or prompts, or structure the task to make it easier – such as setting out the materials in the order in which they should be used, or simplifying the instructions. After getting this help, one child performs like a 12-year-old and the other like a 9-year-old. Given this outcome, can you claim that the two children are at the same level? Vygotsky argued that what differs between the two children is their zone of proximal development. One child is able to benefit much more from your assistance than the other. The one who progresses further is in some way more advanced in relation to the required area of knowledge than the other child. This difference between what children can do by themselves and what they can do with the help of others is very important, and gives educators and other experts a significant role in assisting learners to progress (Rasku-Puttonen, Etelapelto, Arvaja & Hakkinen, 2003; Warwick & Maloch, 2003).



Source: © Corbis/Tracy Kahn

FIGURE 3.12 In Vygotsky's view, adults and older or more knowledgeable children play important roles in the development of children's thinking. What are some of the contributions one child might be making while helping another child play a game?



THINK ABOUT

- Do you learn best alone or with others – studying by yourself or with the help of experts?
- Consider something you have learned recently. To what degree did your learning result from direct instruction, from discussion, and from your own thinking?

Pretend play as a zone of proximal development

Vygotsky described pretend or make-believe play as a zone of proximal development in which the activity supports children as they try out the roles and skills of adults, and learn to take on cultural modes of behaving. When Natalie (aged two years) picked up a toy phone and said 'Hello. Oh, OK. Goodbye', she was practising the telephone-answering behaviour she would use when older.

Consider a child 'playing schools'. While engaged in this play with others, he will learn about and practise how to coordinate his actions and wishes with others in the game, regulate his emotion and behaviour to fit the game, and explore how adult and child talk is different, as well as what happens at school. In taking the role of another person, his perspective-taking ability will also develop. The play context allows children to act in roles beyond their current situation, and to develop the skills these roles will require – a zone of proximal development.

There are other ways in which Vygotsky described pretend play as contributing to development, too: in substituting real for imagined things (a broom for a horse, a bowl for a bath), he argued that children learn to separate ideas from the objects they represent, and to recognise that ideas and words can be used to guide action. Additionally, Vygotsky suggested that pretend play helps children to understand social roles and ways of behaving, and to behave in accordance with them. Both Piaget and Vygotsky asserted the importance of play to children's learning, as have other influential educationalists such as Rousseau and Montessori. The Australian Early Years Learning Framework describes play as 'a context for learning through which children organise and make sense of their social worlds, as they actively engage with people, objects and representations' (DEEWR, 2009, p. 46).

Bodrova and Leong (2005) found that quality play experiences in the pre-school years are related to improved memory skills, language development and self-regulation, all skills related to children's academic success at school. Researchers working in information processing claim that play supports development of self-regulation, and metacognition in particular, which are necessary for problem solving and creativity (Whitebread et al., 2009). Other researchers have also linked children's involvement in pretend play with cognitive skills such as attention, memory, logical reasoning, language, emotional understanding, metacognition, impulse control and perspective-taking (see Berk, 2009, for a review of this research).

BUILDING ON VYGOTSKY'S IDEAS

Vygotsky's theory was developed in the 1920s, and a number of psychologists have since built on and developed the theory and its applications to education.

Bruner's notion of scaffolding

scaffolding
The support provided to learners to enable a task to be done successfully and more independently by adjusting the assistance to fit the learner's current level of performance

Revisit the examples given above of the teacher helping the child with his mathematics task, and the child teaching his friend how to play a game. Jerome Bruner talked about this particular type of support given by adults (and expert peers) as **scaffolding**, using the metaphor of a scaffold that supports a building during construction, but is later removed (Wood, Bruner & Ross, 1976). This is the support provided to learners to enable a task to be done successfully and more independently by adjusting the assistance to fit the learner's current level of performance, by breaking the task into small parts, directing the learner's attention, giving both general and specific strategies to solve the problem, and providing lessons in 'how' to learn. However, there is also a gradual ongoing exchange of knowledge

between teacher and learner, as suggestions made by the learner for modifying the rules are considered. Vygotsky described this as *learning through teaching* (LeBlanc & Bearison, 2004, p. 513). Collaboration with another, particularly in a naturalistic context such as a board game, leads to an exchange of roles of teacher and learner, and cognitive growth in both participants. What is happening here? Who does the problem solving? To begin with, one child (the teacher) knows how the game is played and the other child is learning. But as the learner becomes more confident, they gradually co-construct new rules for the game. This is an example of what Vygotsky meant when he said that thinking can be a social activity. It is quite different from Piaget's ideas about the child as 'solitary scientist', or even the role he gave to social interaction in development. It also suggests a more active role for educators and teachers. Scaffolding is more than a matter of teachers guiding a child through an activity; the social interaction and co-construction of knowledge are important features.

Educational terms associated with this type of learning are 'active learning', 'assisted learning', 'reciprocal teaching', 'assisted discovery' and 'collaborative cognition'.

The metaphor of the scaffold also extends to the temporary nature of the support – it is given only until the student is able to perform the task independently. This is one of the features that distinguishes scaffolding from other types of teacher support. The student is assisted to become an independent learner, at increasing levels of cognitive complexity. Bruner (1986) argued that it is through scaffolding that a child's zone of proximal development moves forward.



THINK ABOUT

- Can you describe examples of scaffolding in your own experience, both as learner and teacher? Think about times when you may have worked with someone else on a task at which you were still a novice.

Rogoff's notions of cognitive apprenticeships and guided participation

Barbara Rogoff (1993, 2003) examined children's learning through their participation in communities, both in and out of school. From her observation of communities in a number of cultures, she argued that various cultures have differing ways of apprenticing children into the ways of learning, thinking and acting in that culture. Thus, children are involved in **cognitive apprenticeships** through the activities of their cultural group. These apprenticeships operate on distinct levels: they may involve being taught directly, children's involvement in conversations and activities alongside adults, or the involvement of children as observers – observing and listening to adults as they engage in adult activities. Different cultural groups may place more emphasis on one of these levels than another. In Western societies, we tend to separate adults and children into distinct settings and activities, and to emphasise explicit teaching. Rogoff et al. (2003) described how, in cultures in which children are involved in community activities alongside adults, observation and listening are emphasised as ways of learning.

cognitive apprenticeships Relationships within communities, in which children learn adult ways of thinking, through both explicit teaching and more indirect observation and listening to adult talk

Rogoff's notion of **guided participation** has been taken up as a way of developing similar apprenticeships in the Western school context. In some communities, as children are involved in activities with adults in their community, they may at first observe, then be supported to take part in a limited way, before moving towards full, adult-like participation in the activity.

guided participation Support provided to enable students to participate in expert activities in increasingly expert ways

Consider how this might work at school. A class of Year 7 students observe and listen to their Science teacher explaining how to use a microscope by using the interactive whiteboard to demonstrate each step. They are then given a sheet of instructions to work through to guide their use of the equipment for a very specific task. The teacher also moves around the room to help students who are having difficulty, and to remind them of key points such as the order in which to insert the slide and adjust the eyepiece and focus. With continued guided practice of this type, by the following year, the students are confident

in preparing slides and using the microscope to view them. Another example is the 'modelled, guided and independent' activities in teaching literacy (discussed further in Chapter 6). The balance of explicit modelling, guided participation and independent practice will depend on the individual student's needs, and their point in development. Language is an important part of this process: it makes the teacher's thinking explicit to the learner, and the student's thinking explicit to the teacher. It is also part of the collaborative learning that takes place in the course of social interaction.

Building on Vygotsky's ideas about how children learn

Extending Vygotsky's ideas about the link between mental tools being passed from adults to children over time during shared activities, Wells (2000, pp. 7–8) suggested that:

- *classrooms are a type of collaborative community* – they involve not just a collection of individuals, but a collaborative group participating in shared activity
- *purposeful and meaningful learning activities involve the whole person* – they are not restricted to a set of isolated skills and separate items of information
- *all activities are unique in terms of participants, place and time* – although there may be shared features, each activity has its own history, which affects the way in which the activity unfolds
- *curriculum is a means and not an end in itself* – therefore, the aim of education should be to engage students in activities that are personally and socially productive, with knowledge and skills identified in the curriculum seen as items in a 'cultural toolkit' that are needed to engage in meaningful activities
- *outcomes of learning activities cannot be known or prescribed in advance* – goals may be identified prior to an activity, but the way in which the activity is implemented depends on the actual situation, including the participants, the available resources and the problems encountered
- *activities must allow for originality and diversity* – for both individuals and the group as a whole, problem solving requires novel solutions, otherwise current activities are endlessly recycled with no possibility of development for either individuals or the community.

An application of the theory: reciprocal teaching

reciprocal teaching
A teaching approach in which a teacher guides a group of students to ask questions that guide learning

Reciprocal teaching was pioneered by Annemarie Sullivan Palincsar (1982) and her colleague Ann Brown (Palincsar & Brown, 1984, 1989; Palincsar, Brown & Campione, 1993) to assist learners with their reading comprehension. Since then, it has been adapted for a range of contexts and cultures (see, for example, Roh, 1997; Taylor and Cox, 1997). Reciprocal teaching combines teacher intervention and student-directed learning (Palincsar, 1998). It adopts the Vygotskian principles of scaffolding, social interaction, and the use of language to direct thinking through collaborative learning (see Chapter 6), in that peers assist each other but learning takes place under the guidance of an expert – usually the teacher – who helps the group with understanding the content matter and with group-thinking processes (Rogoff, 1998). Cole (1996) found that, by encouraging student interaction, reciprocal teaching improved students' engagement with learning by enhancing their opportunities to make meaning of their learning in a social context.

Reciprocal teaching involves four strategies – 'predicting', 'questioning', 'summarising' and 'clarifying' – with the aim of helping readers to construct the meaning of a text and to monitor their comprehension of it (see Box 3.9). Teachers explicitly model each of the four strategies, with the intention of increasing students' responsibility for their own strategy use by asking them to take turns leading the discussion of the text (Palincsar, 1998). As students lead discussions, teachers provide support to assist them as they practise predicting what will happen next or practise clarifying the meaning of a text portion.

BOX 3.9 RESEARCH LINKS

RECIPROCAL TEACHING

Findings from several studies of primary and secondary school students confirm the positive effects of reciprocal teaching on reading comprehension. Palincsar (1986, 1987) and associates (see Brown & Palincsar, 1989; Palincsar & Brown, 1987; Palincsar & Herrenkohl, 1999) experimented with reciprocal teaching in several ways, such as:

1 whole-group instruction
2 small-group instruction
3 one-to-one tutorials
4 small-group sessions led by peers.

Reading comprehension improved in each situation.

Reciprocal teaching has been particularly effective in improving the reading comprehension skills of students with learning disabilities (Klingner & Vaughn, 1996; Lederer, 2000; Little & Richards, 2000). Often, reciprocal teaching is combined with other approaches, as discussed in Chapter 6. For example, Koutselini and Hadjiyianni (1999) report on the success of an intervention program designed to help Year 3 students become conscious of their own deficiencies in reading comprehension, and to assist them to develop metacognitive strategies and improve their reading comprehension. The program combined reciprocal teaching and cooperative learning with the explicit teaching of metacognitive strategies.

Wilson's (1994) research involving children from years 4 and 5 in a middle-sized rural school in Australia found that reciprocal teaching was a major contributor to building students' confidence in their abilities as problem solvers.

Rosenshine and Meister (1994) reviewed 16 studies on reciprocal teaching and additional related studies, and found that students who had been engaged in reciprocal teaching achieved significantly higher reading-comprehension scores than students who had not engaged in such activity.

Similar findings were reported in a New Zealand study of Year 8 adolescents who had reading comprehension deficits (Westera & Moore, 1995). Greenway (2002) found that reciprocal teaching enhanced the autonomy and self-regulation of a group of Year 6 students who followed the teacher's example and gradually adopted the teacher's role and style of questioning (as used in the reciprocal teaching method) as they became more confident in their learning (see also King & Johnson, 1999).

A similar approach has been used to teach writing, where the four strategies of reciprocal teaching were used to help 7- to 9-year-olds develop their story-writing skills. Peer collaboration combined with teacher guidance resulted in forms of writing that were more mature than writing children had produced when working alone (Daiute & Dalton, 1993). Box 3.10 further discusses results from research into reciprocal teaching.

STRENGTHS AND LIMITATIONS OF VYGOTSKY'S THEORY

Strengths

One of the most influential of Vygotsky's ideas is that cognitive development is essentially a social process. Ways of thinking and acting are first acquired through social interaction and then gradually internalised, or processed silently in the mind, so that learning proceeds from the 'outside in' (Lutz & Sternberg, 1999, p. 292). Vygotsky's focus on the social nature of children's learning, and the extent to which social experiences structure the way children think – and in particular the meaning they attribute

to language concepts – is one of the most influential of his ideas for psychology and education (Duveen, 1997; Wells, 2000).

Vygotsky's work underpins much of the group work and interactivity that is characteristic of learning spaces in the 21st century (see Chapter 7). Thus, it may be said that one of the key strengths of his approach to cognitive development is its wide-ranging applicability to learning and teaching, particularly in classrooms with a diverse social and cultural mix (Winsler, 2003). These advantages are highlighted in Chapters 6 and 7, in which we discuss the practical applications of Vygotsky's ideas.

Limitations

As with Piaget, criticisms of Vygotsky's ideas are frequently associated with the vagueness or very general terms in which the ideas are expressed (Miller, 1993). This can lead to problems when practitioners attempt to apply them. Some of the problems associated with Vygotsky's concept of the zone of proximal development concern the vagueness of the concepts involved. For example, is the width of a child's zone the same across all areas of learning? Does it vary at different times of the day, or with different levels of motivation in the child or the partner in a tutoring situation? Is it generally stable? Is it wider if a child is unfamiliar with a particular curriculum area or tutor, and narrower if the child has already received some help or is familiar with the tutor? Is there always a gap between what a child can do alone and what can be done with assistance? Concern has also been raised about the risk that excessive teacher support – such as ensuring that children understand key concepts before introducing a topic – may act as a barrier to spontaneous discovery and independent learning (Myhill & Warren, 2005), and to children's development of self-regulation skills (de Corte & Verschaffel, 2006). Commenting on the concept of the zone of proximal development, Bryant (1990) suggested there is no direct evidence to prove that children's *cognitive skills* develop as a result of help from a parent or tutor, although research has shown that cooperative and collaborative learning approaches were effective in mathematics, particularly with students with special education needs (Baker, Gersten & Lee, 2002; Kunsch, Jitendra & Sood, 2007). However, the concept of the zone of proximal development has been further developed by theorists (see Daniels, 2011, for a review).

There has also been doubt expressed about the relevance of Vygotsky's ideas – developed in 1920s and 1930s Soviet Russia in the context of Marxist–Leninist ideology – to Western education systems in the 21st century (Lambert & Clyde, 2000). Another criticism concerns Vygotsky's failure to acknowledge the role of developmental influences, such as physical maturation.

Rogoff (1993) has commented on an overemphasis on the role of language in intellectual development in Vygotsky's theory. In cross-cultural studies, she has shown that in many societies, observation and participation in activities alongside adults are the primary means of learning, rather than language. Eickelkamp (2008) describes the practice of sand storytelling, or *milpatjunanyi*, among girls in Ernabella in central Australia, which she argues is less about the transmission of knowledge from adults to children than about the individual's role in shaping development and culture. The activity itself contributes to understandings about the world – the act of drawing in the sand is not just a thinking tool, shaping thought through the images used, but it also shapes understandings about individuals' relationship to the earth.

You will notice that this critique of Vygotsky's work is much briefer than that of Piaget's work. One reason for this is that Vygotsky's views of cognitive development were not developed as extensively as Piaget's stage theory. Nevertheless, Vygotsky's ideas offer a very useful, socially oriented perspective on cognitive development (see Box 3.10) that complements Piaget's individualistic model, and has inspired subsequent research work. Constructivist approaches to learning, such as discovery learning, inquiry learning and cooperative learning, discussed in Chapter 6, build on Piaget's and Vygotsky's ideas about how children's thinking develops.



BOX 3.10 IMPLICATIONS FOR EDUCATORS

APPLYING VYGOTSKY'S IDEAS IN THE CLASSROOM

In interpreting Vygotsky's ideas for classroom application, teachers need to do the following:

- In assessment, take account of what children can do independently and also what they can do with assistance or social support. This is sometimes referred to as 'dynamic assessment' (see Chapter 13).
- Centre instruction at the point between what the child can do without support and what can be achieved with assistance from an adult, a more advanced peer or even an interactive computer program (see Chapter 12).
- Start with the learner. Focus on the learner's potential, rather than on a set of predetermined outcomes (Daniels, 2011).
- Ensure active participation of the learner; for example, in collaborative activity.
- Remember that learning and teaching can occur at the same time when children working in pairs or groups interact to share knowledge and solve problems cooperatively. This is sometimes called 'collaborative cognition'.
- Recognise that Vygotsky's approach potentially assists all learners, including children experiencing problems resulting from learning difficulties or intellectual disabilities, given that much of Vygotsky's work was in the area of 'defectology or mental abnormality' (Lambert & Clyde, 2000, p. 26) (see Chapter 10).
- Structure tasks by breaking them into manageable parts, repeating instructions, limiting the number of components presented at one time or providing appropriate resources (Rogoff, 1990). This is sometimes called 'guided participation'.
- Transfer control of learning to the learner (Daniels, 2011). There may be shifting back and forth between the teacher taking the lead in instruction and the learner being given more control, but the goal should be for the learner to have control of the learning as it develops.
- Allow opportunities for children to engage in play, particularly pretend play in the preschool years, recognising its support for development as children practise and explore roles.
- Provide opportunities for students to see complete or expert models of tasks that lead them towards more expert practice (Cairney, 1995).
- Allow for social negotiation of learning and teaching. Think of the classroom as a community of learners, of whom the teacher is one (Rogoff, 1994). This opens possibilities for co-construction of knowledge.

LINKING PIAGET AND VYGOTSKY

Shayer (1997, 1999, 2003; Shayer & Adhami, 2007, 2010) provides information on the outcomes of a series of large-scale research projects in which the ideas of both Piaget and Vygotsky were used in primary and secondary school programs; for example, CASE and CAME (Adey, Robertson & Venville, 2001; Adhami, Johnson & Shayer, 2002). Shayer (1999) described how the CASE program was used to promote formal-operational thinking in 12- to 14-year-olds in the area of science. The aim of this study was to ensure that students reached formal operations during secondary school, as this is the level of cognitive functioning that is a prerequisite for success in Science, Mathematics and other areas of the curriculum at the major examinations held at the end of Year 9. To achieve this goal, Piagetian-type activities were devised and implemented using a Vygotskian framework that included a combination of discussion and individual work. Shayer (2003, p. 484) described this process as combining Piaget's ideas about cognitive development with Vygotsky's concern with classroom management and the social processes that underlie learning. The results of the studies reported by Shayer and colleagues suggest that

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the programs are successful in increasing the achievement level of the students involved – not only in the target curriculum areas, but also more generally (see Shayer & Adey, 2002; Shayer & Adhami, 2010).

A further significant application of Vygotskian theory is the recognition of the role that social interaction plays in promoting cognitive development. Social interaction may occur in various forms in the classroom. Using group work and encouraging children to learn from each other in pairs within larger groups is one application of Vygotsky's and Piaget's theories. Social interaction in productive, carefully organised groups can promote cognitive development, while group work allows students to use language as a tool for learning and for scaffolding the learning of others. It also allows students to experience 'cognitive apprenticeship' (Roth & Bowen, 1995), a related application of group work that recognises the value of social interaction in the use of 'experts' to scaffold novices' learning in the classroom. In the early years, this process occurs at home, where parents and family members – the 'experts' – communicate with and scaffold the infant's or novice's cognitive development in the course of everyday interaction. In the school context, this can continue when parents, community helpers and older students are invited into the classroom to assist teachers and to work with individuals or small groups to develop skills such as reading. In a multicultural classroom, it is particularly helpful if these 'expert' assistants represent a range of multicultural backgrounds, as this helps to recognise and validate the contribution of individuals from a range of cultures within the sociocultural context. Chapters 6 and 7 of this book expand on the use of group work in teaching and learning.

INFORMATION-PROCESSING APPROACHES TO COGNITIVE DEVELOPMENT

While Piaget and Vygotsky described development in terms of global changes in children's thinking, another group of theorists has explained cognitive development in terms of changes in children's ability to process information. Information-processing approaches are not associated with any one theorist, but describe an approach taken by many psychologists who have examined the particular mechanisms, strategies and structures by which we process information. In doing so, they have also uncovered developmental changes in cognition, which variously explain, challenge and go beyond a number of the observations about children's cognitive development made by Piaget and Vygotsky.

Early models of information processing used the computer as an analogy of the human brain, and one research approach has been to develop computer models to simulate thinking. Of course, when you consider how complex factors such as emotion, social interaction, motivation and creativity influence thinking, you may conclude that the human brain is in fact more unlike than it is like a computer; however, this approach has yielded important information about how thinking works. Much of the language of information processing continues to use terms borrowed from the computer metaphor, such as processing, **encoding**, storage and **retrieval**.

encoding
Process of storing information in the long-term memory

retrieval
Process of bringing information stored in long-term memory back to be manipulated in working memory

THINK ABOUT

- Consider ways in which your thought process works like – and unlike – a computer. You might like to make two lists, and add to them as you read through this section.

There are many models of information processing. One of the most widely used is the **multistore model**, built on a computer analogy first described by Atkinson and Shiffrin (1968) and progressively developed since by a range of theorists (for example, Baddeley & Hitch, 1974). Figure 3.13 gives a representation of the model. Note that there are various *stores* of information, and *processes* by which we act on the information to move it from one store to the next.

multistore model
Depicts how information is processed and stored in memory

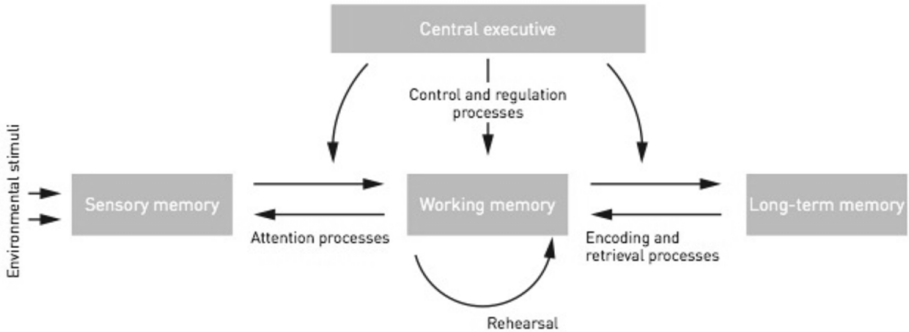

FIGURE 3.13 The multistore model identifies a number of stores of information and processes that move information between these stores.

INFORMATION STORES AND PROCESSES

Shani comes to class with her friends, who are chattering with her about the party they all attended on the weekend. On the wall are posters displaying some of their work and lists of vocabulary. Already in the classroom are groups of other students, some talking, some unpacking bags, and the teacher, who is setting up the computer for the interactive whiteboard. Shani notices the boy she is keen on, and sees that he is also watching her. Gradually the class becomes quiet – the teacher has signalled that it is time for class to start. Shani shifts her attention to the teacher, and what she is saying, ignoring the students who are still finishing their chat behind her. As the teacher introduces the lesson, Shani recalls the work that was done on this the previous week, and opens her book to add to her notes. There is a sudden laugh behind her as someone makes a joke. Everyone turns to look, then shifts back to the teacher as she puts up on the whiteboard a concept map for the topic and asks them to fill in what they currently know. At first Shani struggles to remember anything much, but gradually she finds the ideas coming more easily as the map is filled in.

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Online resources
Explore the Multistore model in action with the **Interactive Activity** for Chapter 6 on this text's website.

What is happening here? There are a number of fundamental thinking processes:

- *Sensation* (sights, sounds, smells, tastes, touch) that surrounds Shani's experience of the class, and *perception*, which happens as Shani recognises and makes sense of these things. Some, but not all of these, are attended to – she perceives the posters on the way in, but pays no *attention* to them; she sees and recognises other students in the room, but attends to the boy she is interested in (maybe there's another boy who is also looking at Shani whom she does not notice). Shani directs her attention in a purposeful way to the teacher when required, *screening out the distractors* in the room.
- When the lesson starts, Shani *recalls* information that she has stored from the last lesson and starts to *work with* that information by *organising* it into the concept map. While doing this, she is also *storing* it for future use.
- In later lessons, she may use this information to *reason* about an essay question or *solve a problem* in an assignment. These are the more complex cognitive processes that rest on the basic ones.

Each of these fundamental processes is present in infancy, and improves with development. According to information-processing theorists, development involves improvements both in the capacity of the stores and in the efficiency of the processes. A number of information-processing theorists argue that the cognitive differences Piaget observed between children at different stages of development are actually due to differences in these basic processes (for example, Case, 1992; Demetriou, Christou, Spanoudis & Platsidou, 2002; Halford, 1993).

Later in this chapter, we summarise the factors associated with information processing that influence cognitive development (see Box 3.11 on page 122). We will return to this model in Chapter 6, when we consider its implications for learning. In this chapter, our focus is on children's development of the various components in the information-processing system.

Sensory memory

sensation
Information taken in from the environment through the five senses

perception
Allocation of meaning to an experienced sensation

We take in information from the environment through our senses (**sensation**) and make sense of it (**perception**) almost automatically. Sensory facilities are largely developed in infancy, with the visual cortex, for example, fully developed by the time the child is in preschool (Kellman & Arteberry, 2006). Some aspects of perception continue to improve into the early school years, as a result of learning and experience – in particular the ability to discriminate between sounds, and to segment syllables and words: the phonemic awareness that is foundational for reading and writing. Learning to read also involves visual discrimination between letters that are similar, such as b and d, p and q. This is a matter of perceptual learning rather than development (Galotti, 2011; Gibson & Gibson, 1955) – hence the importance of early language experiences to literacy learning and development, as noted in Chapter 2.

sensory memory
Stores new information, which enters via the sensory register through the five senses, for between one and three seconds

According to the multistore model, information taken in through the senses and perceived is held in a store within the **sensory memory**, with separate stores for information from each sense. However, the sensory memory has a very limited capacity – at most two or three seconds for auditory, and less than a second for visual information, after which the information is lost (Schneider & Bjorklund, 1998). In order for the information we take in to be retained and made use of, it must be attended to.

Attention

attention
Allocation of resources to process information

The number and range of stimuli that constantly bombard us exceed the amount we can process, and as we cannot process everything, we must be selective. The central process associated with this stage is **attention**. When we focus on certain information with the aim of remembering it, we are said to be 'paying attention'. If we attend to information, it moves to the next storage box, the working memory, for further processing. If we do not pay attention, the information decays and disappears.

Children's ability to control their attention improves with age; its several components are:

- *sustained attention*: also called 'attention span'
- *selective attention*: ability to focus on relevant details – and screen out or inhibit distractors
- *adaptive attention*: ability to shift focus of attention when required.

In infancy, children attend to novel and eye-catching stimuli, but have difficulty sustaining this attention. By the age of two to three years, children are less attracted to novel things and exhibit sustained attention, particularly during play. In early childhood, children start to show regulation of their attention, with intentional, goal-directed behaviour – although they are still easily distracted. You may have noticed this with preschoolers who appear totally focused on a particular game or task, sometimes for quite lengthy periods. Adults contribute to this ability by keeping children's attention on an activity or stimulus with interaction, questions and comments.

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Online resources
Go further: Try your own capacity for inhibition with the Stroop test on this text's website.

In middle childhood, this sustained attention is paired with an increase in selective attention: the ability to attend to relevant stimuli and ignore distractions. These distractions can be internal as well as external stimuli. The ability to inhibit irrelevant thoughts and responses to stimuli is also important in children's social and emotional development, as we will see in Chapter 4.

School experience is likely to play a role here – teachers employ multiple strategies to sustain students' attention, and also require their students to gradually take responsibility for this. This ability increases from six to 10 years, and continues to improve into adulthood. During this stage children also show the ability of adaptive attention, flexibly adapting their attention to the demands of particular tasks.

In adolescence, self regulation of attention is facilitated by development of the executive function (see below) as students employ strategies to control and direct their own attention in increasingly more efficient and sophisticated ways.

Working memory

Information that is taken in through the sensory register, and attended to, may be operated on in the **working memory**. This is sometimes referred to as short-term memory, with emphasis on its storage function. The term 'working memory' acknowledges the manipulation of information that is vital to all thinking, and that is proposed to take place within this store. A further function of working memory proposed by Baddeley (1986, 2012; Baddeley & Hitch, 1974) is the central executive control of processes such as attention, and strategies such as elaboration and organisation that organise, monitor and regulate thinking.

working memory
A working space for short-term storage and manipulation of small amounts of information; contains your conscious thought

Working memory has limited capacity and duration. It contains only that information being processed at a current point in time. So once we stop processing the information, it will disappear – either to be lost or stored in long-term memory. To maintain information in the working memory, we need to rehearse it. (Think of someone giving you their phone number – you will say it over in your head as you search for a pen to write it down, thus keeping it in your working memory.) Otherwise this information decays rapidly, as with the sensory memory, within 18–20 seconds according to Peterson and Peterson (1959).

When measured as the number of random items remembered just after they've been presented, adults have been shown to have a working-memory capacity of seven plus or minus two items (Miller, 1956), although these limits are smaller in children: six items at age nine to 10, and four items at age four to five (Schneider & Pressley, 1997). Speed of processing is one factor in these differences, with younger children taking longer to repeat the words, so that duration of working memory interacts with capacity (Case, Kurland & Goldberg, 1982). Another factor is knowledge. One way in which we increase the number of items in working memory is through chunking; for example, when learning to spell a new word such as 'metacognition', you may view some parts of it as chunks – 'meta', 'cogni', 'tion' – so that rather than having to hold and order 13 separate letters in your working memory, you need process only three chunks. Children have less knowledge with which to do this, so their working memories operate less efficiently than those of adults.



THINK ABOUT

- Consider the implications of this for the material you present to children of different ages. You may need fewer and simpler items for younger children, while older children can process increasingly more complex information. Observe classrooms at different stages to see this in action.

What happens when the information is too complex or there is too much to be processed? Try this yourself. Have someone read the following list of 20 words to you, with about five seconds between them, then write down as many as you can remember. How many did you recall? At what point in the list did you think to yourself 'There are too many words here'?

dolphin	castle	vineyard	bedroom	suitcase	spectacles	snow
cheese	table	teeth	violin	detective	forest	train
weed	candle	stove	paintbrush	fire	boat	

Improvements in the capacity of the working-memory store contribute to children's ability to coordinate a number of ideas. For example, think back to the coordination of perspectives that

Piaget observed emerging in the concrete-operations period (see page 88). Case (1996) explained this developmental difference in terms of differences in working-memory capacity. In adolescence, greater working-memory capacity allows students to weigh up a number of factors when making decisions. Working-memory capacity has also been related to children's achievement at school (Alloway, Gathercole, Willis & Adams, 2004) and the acquisition of vocabulary (Baddeley, Gathercole & Papagano, 1998).

There are also qualitative improvements in working memory with age prior to the age of six; for example, younger children may not automatically integrate phonological and visual information, but will show a preference for visual processing (Fry & Hale, 2000). Baddeley (2012) proposed that these are held in different stores in the working memory, so it may be that their integration occurs after the child starts school, when further improvements in working memory are all about speed and capacity. Halford and Andrews (2004) argued that it is not only the number of items remembered that is important, but also the relationships between them, and have shown that the capacity to represent increasingly complex relations improves with age.

One contributor to improvements in working memory with age is automaticity: as particular processes become automatic, they free up space in working memory for other thinking. So, for example, as you read this paragraph you do not need to take up working memory for the process of reading itself, but can allocate this precious resource to thinking about the ideas being presented. This is one reason why time is spent in primary schools (and in homework) developing fluent reading, or automatic retrieval of number facts. Case (1998) has argued that automaticity is the basis for the development of children's thinking from one Piagetian stage to the next through the freeing up of working memory for more complex tasks as schemas are automatised.

Central executive

central executive
Controls the processes and flow of information in the information-processing system

Baddeley (2012) proposed that as well as storage and processing of information, the working memory controls the allocation of resources for information processing through a **central executive** function. It is believed that such a system plays a critical role in controlling attention for single and multiple stimuli, shifting between tasks, retrieving information from the sensory and long-term memory stores, and generally moving information back and forth between the working memory and the long-term memory. In particular, the executive control system may help us inhibit or suppress attention from distracting stimuli, and may help us process more than two types of information simultaneously. Thus, processes such as attention and use of strategies for encoding and retrieval of information from long-term memory are all controlled within the central executive of the working memory.

Development of the central executive is reflected in developments observed in children's abilities to sustain attention, to selectively attend to particular stimuli, and to adaptively attend to a new task. Developments in children's use of strategies, described below, also reflect development of the central executive. Its development has been linked to maturation of the frontal lobes of the cerebral cortex (see Chapter 2), which also affects the broad increases observed in children's ability to regulate their social, emotional and physical behaviour from infancy to adolescence and into adulthood.

One aspect of this central executive is *metacognition* – or thinking about thinking. This has also been a key process in the theories of Piaget and Vygotsky, although the term itself was first used by Flavell in the 1970s (see Flavell, 1979). Metacognition is theorised to have several components: metacognitive awareness; metacognitive knowledge, which includes knowledge of self, tasks and strategies; and metacognitive strategy use, which is the implementation of strategies that enable the regulation of thought through planning, monitoring and evaluation. Chapter 6 reviews these concepts in further detail.

Children have been shown to have awareness of thinking from quite young – 3-year-olds have awareness of thinking as separate from action (Flavell, Green & Flavell, 1995), although they tend to see this as a passive rather than active thing. As we shall see with memory strategies below, young children tend to overestimate their ability to remember, and so tend not to use strategies even if they

know of them – their metacognitive knowledge is weak. In middle childhood, and with schooling, children become more aware of the need to use strategies, as well as gaining knowledge of a wider range of strategies, and becoming more adept at applying them. These developments relate to the metacognitive knowledge and metacognitive strategy dimensions of metacognition. It is in adolescence and early adulthood that metacognition reaches maturity, with abilities to plan, monitor, evaluate and self-regulate thinking advancing during this stage (Kuhn, 2006). Maturation of the cerebral cortex during adolescence is likely to contribute to these developments (see Chapter 2 for details).

Long-term memory

The **long-term memory** store contains information that we are not currently thinking about. Unlike the other stores, long-term memory is believed to have unlimited capacity and duration. Information stored in long-term memory must be retrieved from here back into the working memory in order to be manipulated (thought about). Hence the key processes associated with long-term memory are *encoding* and *retrieval*. These processes involve particular strategies, and it is strategy use that explains developmental differences in memory at this level.

long-term memory
A permanent storage facility for information

Strategies of rehearsal, organisation and elaboration

Rehearsal. We introduced this strategy above, when thinking about the typical approach to keeping a phone number in your working memory. You may also have used it in learning the list of words above. Before about the age of seven, children are unlikely to use strategies to remember a list of items. It is thought that their awareness of their thinking (metacognition) is weak, and they are unrealistic about their ability to remember the items. At about this age, they may start to rehearse, but inefficiently. For example, they may repeat each word separately ('dolphin, dolphin, dolphin') whereas you may have rehearsed the words in a list ('dolphin, castle, vineyard').

rehearsal
Repeating items as a memory strategy

Organisation. In learning the list of words, you may perhaps have grouped them in particular ways. Organising information helps to provide cues that facilitate their retrieval, thus improving memory. Children spontaneously use organisation strategies from about eight years, and may at first do this inefficiently – simply pairing items together rather than using larger categories (Galotti, 2011).

organisation
Process associated with storage and retrieval of information in long-term memory

Elaboration. You might also have linked the words in a story to help you remember them. Elaboration is another strategy that provides cues for retrieving information from long-term memory. For example, if your story involved items in the rooms of a castle, visualising these areas would have helped you to remember the words by providing cues for your memory. This strategy tends not to be used by children until approximately 12 years (Galotti, 2011). Elaboration and organisation are not just useful for learning lists of words. They also help us to remember more complex information, as, for example, when you add new information to something you already know (elaboration), make connections between ideas, or organise your knowledge in a concept map (organisation). Children's increasing use of these strategies with age contributes to improvements in memory abilities.

elaboration
Process of linking new information with what is stored in long-term memory

If taught these strategies, young children will use them, but they do not tend to spontaneously apply them themselves, or generalise the use of a strategy to a later task.

With development, children's knowledge of strategies improves, and they become more skilled in planning and using strategies. As they start to use a strategy, children may

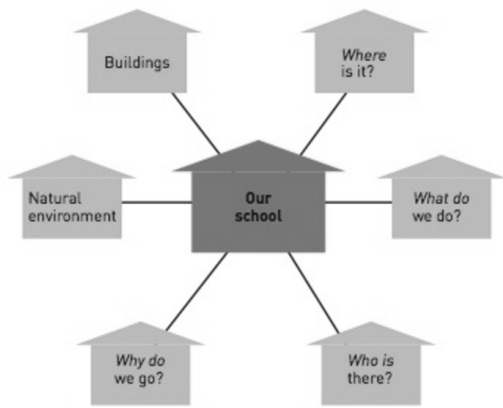

FIGURE 3.14 Younger students may not spontaneously use strategies of organisation and elaboration, but teachers can encourage this through use of graphic organisers.

use it imperfectly or with indifferent results, and may fall back on more familiar strategies. Gradually, however, they are likely to use it more regularly, become more skilled in its use, and see the value of the strategy. Older children may use a combination of strategies effectively to improve memory. (See Schneider and Bjorklund, 2003, for a detailed review of the research on memory strategy use.)

overlapping waves model
Siegler's model of strategy use, which states that people have a set of strategies they choose from, and that over time, less efficient strategies are replaced with more efficient ones

Siegler (2006) has developed a theory to describe the pattern of gradual acquisition of strategies called the **overlapping waves model**. He observed that children (and adults) have a wide range of strategies that they employ during any period of time, rather than just one, as described by Piaget. For example, Alibali (1999, cited in Siegler, 2006) found that children in years 3 and 4 used six incorrect and four correct strategies when solving a particular set of mathematical problems – maintaining some strategies, generating new strategies and abandoning old ones during the course of the session. The pattern is similar to that of memory-strategy use described above.

Although Piaget described a linear transition from less efficient to more efficient strategies in thinking, Siegler has observed that, on the same problem, people may go backwards and forwards in the sophistication of strategies they choose from a wide repertoire. Over time, however, the set of strategies they choose from becomes more efficient. Furthermore, Siegler found that this process is adaptive: high initial variation in strategy use predicted later learning on a task.

MECHANISMS OF COGNITIVE DEVELOPMENT ACCORDING TO INFORMATION-PROCESSING RESEARCH

Speed of processing. Whether measured by response time or task completion, the processing of information gets faster from early childhood through to mid-adolescence (Demetriou, Christou, Spanoudis & Platsidou, 2002). Why should faster processing make a difference to problem solving or memory? One theory proposes that faster speed leads to greater operating space, more efficient connections, and the ability to inhibit irrelevant stimuli or responses (Case, 1992).

Capacity of stores. The working memory, in particular, increases in capacity throughout childhood, allowing more information to be held and manipulated at one time. This contributes to more complex thinking in late childhood and adolescence.

Strategy knowledge and use. Linked with increased working-memory capacity is children's increasingly efficient use of strategies to optimise working-memory space, through chunking and rehearsal. With age, children also employ more strategies to encode and retrieve information linking long-term and working memory more efficiently.

Contributors to development

Neurological maturation. In the preceding section, we have seen numerous examples of cognitive capacities that improve with developments in the cerebral cortex. In particular, speed of processing increases with myelination, which, as you may recall from Chapter 2, is the insulation of the axon that greatly speeds transmission of messages between neurons. Neurological maturation is not simply a matter of growth, however. One of the developments observed in adolescence is a reduction in grey matter as inefficient connections are pruned (Casey, Giedd & Thomas, 2000; see Chapter 2). If we consider the pattern of memory-strategy use with development, we can see one example of a more efficient neural network that replaces less efficient connections with age.

Language. Language provides children with conceptual categories that help them to organise information and make linkages between ideas, and with a means of regulating their thinking, as Vygotsky proposed.

Experience. As we gain experience in particular skills, these skills become automatic, freeing space in working memory for other thinking. We gave examples of this for children learning to read or use mathematics. Learning to write, spell, drive or use particular software on a computer are other examples. Experience also contributes by strengthening particular neural connections, and weakening and eventually leading to the pruning of other, less used, less efficient connections. As we saw in Chapter 2, the particular experiences children engage in are important in shaping their thinking.

Knowledge base. Older children and adults have greater knowledge than younger children, and this knowledge base allows them to remember, elaborate and organise new knowledge more readily. Chi (1978) demonstrated this with child chess experts, who were better than adults without chess expertise at remembering chessboard arrangements. On a test of memory of numbers, however, the adults showed better memory than the children. Schneider and Bjorklund (1992) showed that child soccer experts used strategies of organisation to aid memory, while non-experts did not use such strategies – which suggests that knowledge base is a factor in strategy use.

These contributors to information-processing development work together in a complex and dynamic system. For example, working-memory capacity may not be sufficient on its own; knowledge and experience are also important. Maturation may provide the upper limits for children's development, but their learning experiences, particularly at school, are crucial for potentials provided by maturation to be realised. Learning experiences also contribute to maturation by strengthening neural networks and determining which connections might be pruned through infrequent use.

STRENGTHS AND LIMITATIONS OF INFORMATION-PROCESSING THEORY

Strengths

Using the computer as a metaphor for the human mind, the classical views of information processing help us understand the complexity of cognitive processing and the many stages and processes involved in storing and recalling information. This approach facilitates close study and analysis of cognitive processes, and details the processes involved in the developments Piaget observed, such as categorisation.

Limitations

The detailed focus on individual processes makes it difficult to build this into an overarching picture of cognitive development such as that of Piaget. Researchers such as Case have attempted to address this by combining the two approaches.

Studies tend to be laboratory based, isolating particular processes, which helps in understanding how the processes work, but limits our understanding of the complexity that is the reality of children's lives. For example, how might emotion or interaction with adults and peers influence children's attention, memory, or strategy use in processing of information?

Finally, information processing describes one part of the picture of cognition, but not the whole picture. Demetriou, Christou, Spanoudis and Platsidou (2002) examined relations between processing abilities and higher-order reasoning in children aged eight to 14, and found that information processing is necessary, but not sufficient, for higher-order reasoning to develop. They proposed that there are other cognitive structures above and operating upon the information-processing system. We must also recognise the roles of learning experiences, both in contributing to brain development and strategy use, and in providing the context for the application of information processing.



BOX 3.11 IMPLICATIONS FOR EDUCATORS

APPLYING IDEAS FROM INFORMATION-PROCESSING RESEARCH ON COGNITIVE DEVELOPMENT IN THE CLASSROOM

- *Attention:* Make explicit what students need to attend to, and make this easy for them by reducing distractors. Rather than putting the whole day's (or lesson's) activities up on the board, reveal them one topic or activity at a time.
- *Working memory limitations:* If your students can only hold between two and five chunks of information in their working memory at a time, limit what you give them to work with to the essentials. For young children, direct them to do each step in turn. For older children, have steps written down so students don't have to use working memory to remember them. Allow students to use other strategies – visual prompts, drawing or writing – to include extra material if this is necessary. See also the section on cognitive load theory in Chapter 6.
- *The value of drill and practice:* Skills, such as automatic retrieval of number facts or spelling and fluent reading, that come with practice are important to free up space in working memory for other thinking.
- *Scaffolding organisation and elaboration of material:* Although students may not spontaneously use organisation and elaboration strategies in their learning, they can still be helped to remember information by the teacher:
  - making connections between ideas
  - linking new knowledge to what students already know
  - organising information using visual maps (see Figure 3.14 on page 119)
  - encouraging elaboration of concepts through discussion and student-created notes.
- *The importance of the knowledge base and experience:* We saw that knowledge base influences strategy use. Providing multiple experiences with a concept, and exploring it from various angles, will help students to remember, to have deeper understanding, and to engage with the concept in more sophisticated ways.

In Chapter 6 we look in detail at the implications of information-processing research for learning.

CONCLUDING COMMENTS

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Online resources
Take a moment to consider your philosophy of learning and teaching. You may wish to use the **Develop your philosophy** tool on the textbook's CourseMate Express website.

As we have seen in this chapter, Piaget, Vygotsky and information-processing theorists have asked similar questions about the origins of children's cognitive development, and the reasons they think and behave in the ways they do. Although their focus has been different, and they have not agreed on all aspects, there has been considerable overlap in their ideas. Each tradition has had profound influence on teachers' ideas about learning and instruction, particularly by highlighting the need for teachers to start by observing the child and their current level of understanding, and working from there, and to recognise the contribution to the learning process of factors within the learner's social and physical environment.

CHAPTER REVIEW

- Cognitive development is concerned with how our capacity to think, reason and remember develops over time.
- Two of the most influential theorists in the area of cognitive development are Piaget and Vygotsky. Piaget viewed the child as a 'little scientist', whereas Vygotsky saw cognitive development as occurring within a social context that is framed by the child's social, cultural and historical background.
- Piaget identified four universal and invariant stages of cognitive development: the sensorimotor stage (birth to two years), the preoperational stage (approximately two years to six or seven years), the concrete-operations stage (approximately seven years to 11 or 12 years), and the formal-operations stage (approximately 11 or 12 years to adulthood).
- Piaget also identified four factors that together influence the development of children's thinking from early childhood to adulthood: maturation, activity, social interaction and equilibration.
- The strengths of Piaget's ideas concern his focus on children's thinking, the questions he raised and the research methods he pioneered in this field of study.
- Doubts have been raised about Piaget's notion of stages, particularly in terms of his failure to take into account the impact of contextual factors on children's performance of his tasks.
- Vygotsky was interested in the way in which our social, cultural and historical background shapes our thinking. He argued that infants and children interact from birth with carers, who scaffold the child's experiences in ways that reflect the carer's own background.
- Vygotsky saw language as a mental tool that can be used to control intellectual activity. Initially its function is social, but it is gradually internalised as inner or private speech and used for self-regulation.
- Vygotsky identified the zone of proximal development as the distance between what a child can do alone, without help, and what the child can do with assistance from a more experienced partner. He argued that teaching should be aimed at this zone – at what is just beyond the student's current capacity.
- Vygotsky's theory has been extended to further consider the roles of adults in a child's cognitive development. Scaffolding, cognitive apprenticeships, collaborative learning and guided participation are all concepts that have been applied to education contexts out of this work.
- Information-processing theorists study the mechanisms, strategies and structures by which we process information. They argue that cognitive development results from changes in these aspects of information processing.
- The multistore model proposes a number of stores of information: the sensory memory, working memory and long-term memory; and processes that move information between the stores: attention, rehearsal, encoding and retrieval. A central executive allocates resources and coordinates movement of information between stores. Each of these stores and processes shows increases in capacity and efficiency with age.
- Information-processing research identifies speed of processing, capacity of stores, and strategy knowledge and use as key mechanisms in cognitive development. Contributing to these mechanisms are neurological maturation, language, experience and the knowledge base. All of these factors work together and mutually contribute to one another.
- Information-processing research has enabled close analysis of the various processes involved in cognition, and their development. It has helped to explain many of the observations Piaget and Vygotsky made about children's cognitive development. At the same time, the information-processing approach is lacking in an overall framework, in its ability to explain the complexity of thinking in real-life situations, and is limited to one part of cognition.

ONLINE STUDY RESOURCES

COURSEMATE EXPRESS

Visit http://login.cengagebrain.com and use the access code that comes with this book for 12 months' access to the student resources for this text.

The CourseMate Express website contains a range of resources and study tools for this chapter, including:

- a **self-check quiz**
- **crosswords**, **flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.

SEARCH ME! EDUCATION

Explore Search me! education for articles relevant to this chapter. Fast and convenient, Search me! education is updated daily and provides you with 24-hour access to full-text articles from hundreds of scholarly and popular journals, ebooks and newspapers, including *The Australian* and *The New York Times*. Log in to Search me! through http://login.cengagebrain.com and use the search terms listed in the 'Education databases' section (page 125) as a starting point.

QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1. Define Piaget's concept of 'schema' and give an example of how a schema develops.
2. According to Piaget, what are the four main factors that influence development?
3. How has Piaget's work been taken forwards? What new insights into cognitive development have been gained by recent research?
4. Compare and contrast the ideas of Piaget and Vygotsky concerning the role of social interaction in children's development.
5. How does the notion of the zone of proximal development help to explain the process of cognitive development?
6. What did Vygotsky refer to as 'mental tools'? How do they work to shape thinking?
7. Explain how teachers and students learn together in a Vygotskian approach. What is the role of the teacher? What is the role of the learner?
8. How can the ideas of Piaget and Vygotsky be applied to teaching, learning and assessment?
9. Draw the multistore model and describe your processing of information you have been learning about in this chapter through its components.
10. Explain how children in kindergarten, Year 6 and Year 10 would go about learning how to spell a new word. How could you best help the child at each stage?
11. Create a visual representation of the factors influencing cognitive development of information processing. How might this help you to remember the ideas?

KEY TERMS

accommodation
adaptation
animism
assimilation
attention
central executive
centration
class inclusion
classification
closeness of the match
cognition
cognitive apprenticeships
compensation
concrete-operations stage
conservation
constructivism
deductive reasoning
deferred imitation
disequilibrium
egocentrism
elaboration
encoding
equilibration
formal-operations stage
goal-directed or intentional action
guided participation
horizontal decalage
inductive reasoning
internalisation
long-term memory
multistore model
object permanence
operations
organisation
overlapping waves model
perception
preoperational stage
private speech
readiness

reciprocal teaching
rehearsal
retrieval
reversibility
scaffolding
schema
self-talk
sensation
sensorimotor stage
sensory memory
seriation
social interaction (social transmission)
sociocognitive conflict
symbolic thought
vertical decalage
working memory
zone of proximal development

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'COGNITIVE DEVELOPMENT' AND MATERIAL IN OTHER CHAPTERS

- Look back at the number framework in Chapter 2 (see Table 2.1 on page 66). How could you use an understanding of children's strategy use to group children for challenging and stimulating thinking?
- How might children's play contribute to their social and emotional development (see Chapter 4)?
- Chapter 11 describes some cultural differences in understandings about learning. How might these understandings be communicated to children, according to Vygotsky's theory?
- Chapter 6 looks at information-processing research as it applies to learning.

FURTHER RESEARCH

RECOMMENDED READING

Daniels, H. (Ed.). (2005). *An introduction to Vygotsky*. New York: Routledge.
Galotti, K. M. (2011). *Cognitive development, infancy through adolescence*. Thousand Oaks, CA: Sage.
Palmer, J. A. (Ed.). (2001). *Fifty modern thinkers: From Piaget to the present*. London: Routledge. (Available as print or electronic resource.)
Wadsworth, B. J. (2004). *Piaget's theory of cognitive and affective development* (5th ed.). White Plains, NY: Longman.

RECOMMENDED WEBSITES

Jean Piaget Society: www.piaget.org
Lev Vygotsky archive: www.marxists.org/archive/vygotsky
Educational Psychology Interactive – the information processing approach: www.edpsycinteractive.org/topics/cognition/infoproc.html

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

- attention
- deductive reasoning
- encoding
- inductive reasoning
- information processing
- long-term memory
- memory development
- Piaget
- private speech
- rehearsal
- retrieval
- scaffolding
- Vygotsky
- working memory
- zone of proximal development.

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

Chapter 4

SOCIAL, EMOTIONAL AND MORAL DEVELOPMENT

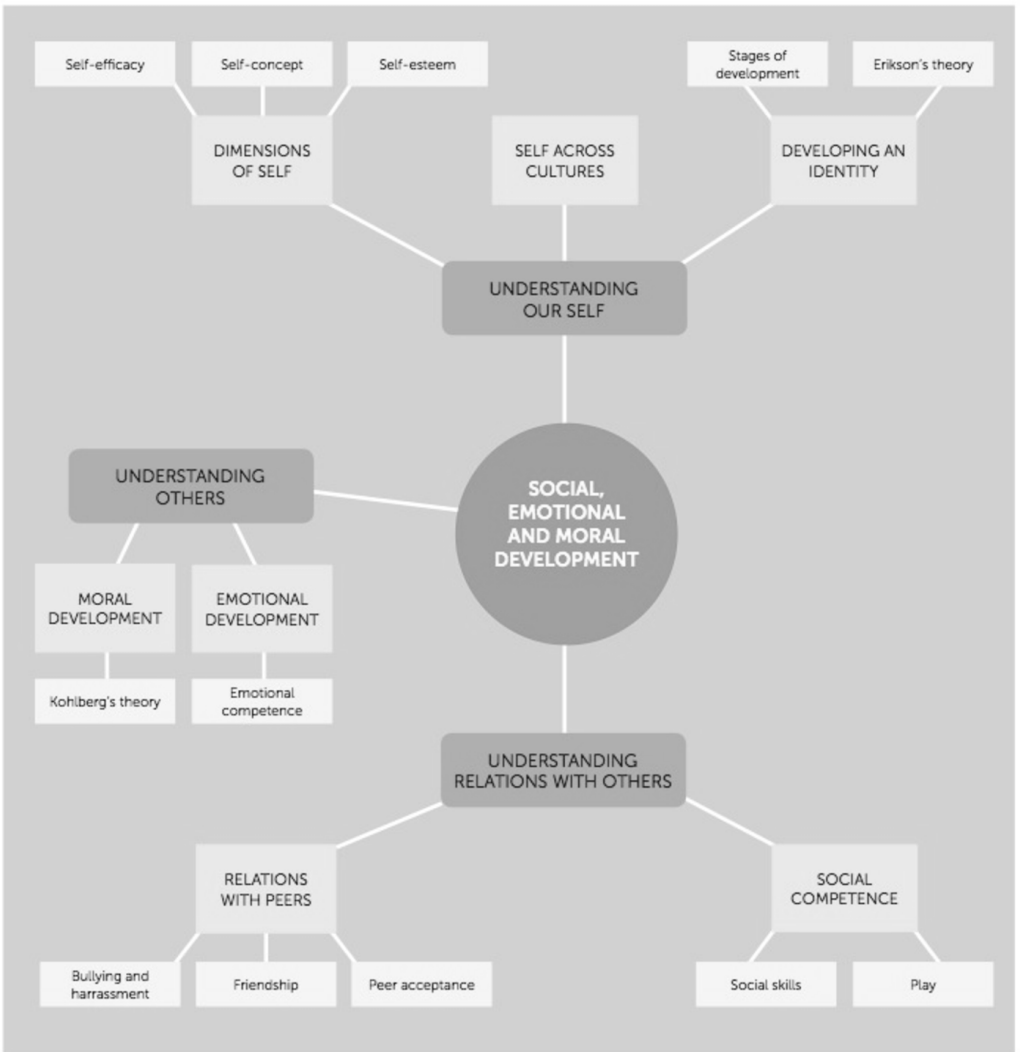

FIGURE 4.1 Chapter 4 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- What is the difference between self-esteem, self-concept and self-efficacy?
- What are the self and identity challenges faced by school-aged children?
- What is the teacher's role in fostering a healthy sense of self?
- How do we develop a sense of right and wrong?
- How is emotional competence related to understanding others?
- How do peer acceptance and friendship contribute to development?

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INTRODUCTION

Taylah is four years old and her brother Jake is 10 years old. It is only fairly recently that Taylah has started to talk about herself using terms like 'I'm a big girl now. I've got a brother and a sister. My favourite colour is pink'. Jake, meanwhile, has been bragging about himself for a while: 'I'm a pretty good skater; so are my mates. We muck around a bit but I try not to do bad stuff, like Jonno found 10 bucks in his mum's car and didn't tell his mum, he bought us drinks at the skate park. But I don't do stuff like that. I'm OK at school but much better at sports'. Their older sister Sarah is 15 and seems to understand herself very well: 'I'm 15 years old and my friends say I'm a pretty nice person and they are all really nice people too. You know, very caring, and we like volunteering and helping out. We all do OK at school too, like we are in the top classes. My best subjects are Maths and Science, but I'm only average at English. My friends always get better marks than me. Embarrassing! But I try to be pretty cool about it, not make a big deal of it. I like relaxing and hanging out with my friends, they are great and we understand each other; we all like the same kind of things'.

As Taylah, Jake and Sarah have grown up, their understanding of self; notions of right and wrong, or morality; and their relationships with other people have developed and become more sophisticated. Does this explain why Taylah's self-description is so different to Sarah's? What factors influence Jake's sense of right and wrong when he is skating with his friends? Why is Sarah able to describe her feelings so well, while Jake and Taylah didn't mention these things? This chapter presents an introduction to three major areas in the study of personal development. First, it focuses on the connections between our concepts of self and the development of a sense of self-identity. Next, it focuses on the gradual development of emotional, moral and social understanding. Finally, this chapter explores the formation of relationships with other people, looking closely at peer relationships, and interactions between the self and others in contexts such as classrooms.

UNDERSTANDING OUR SELF

As we can see in the case of Taylah, our sense of self is very closely related to our cognitive and emotional development. Taylah talks about herself in very 'concrete' and tangible ways, while Jake's self-report is more complex. Increasingly, our self-understanding is related to relationships with others, and like Jake and Sarah, we often compare ourselves to friends or classmates as we grow up. The sense of self is also

influenced by our social and moral contexts, so both Jake and Sarah seem to report friendships with people who have similar habits or 'likes' or preferences as themselves. As our emotional understanding develops, we become much better at using emotional language to talk about our moods, personality or other people, as shown in Sarah's story. They are all saying 'This is who I am!' and this sense of **self** differentiates each person as a unique individual and separates us from one another. It lies at the core of who we are.

self
Who we are, what makes us unique and who we believe ourselves to be

According to Susan Harter (2012, p. 1), one of the most prominent researchers in the area, 'the construction of the self is inevitable … our species has been designed to actively create *theories* about our world, including the construction of a theory of self in order to make meaning of our experiences'. Over time, notions of the 'self' have changed and today the word 'self' is most commonly attached to other words, such as 'self-concept', 'self-esteem', 'self-control' and 'self-help'. As early as 1890, one of the earliest researchers in this field, William James (1890, as cited in Harter, 2012), stated that individuals form *multiple Me-selves* that describe the multiple roles individuals need to perform in society. Today, it is a common view that the self is not a single entity; rather, we are made up of many 'selves' and dimensions (Barrett, 2000; Fogel, 1995). These dimensions of self become more complex over time as we develop and interact with our environment.

DIMENSIONS OF THE DEVELOPING SELF

When we listen to the self-reports of Jake and Sarah, we might ask: How are their beliefs about the self linked to their thoughts, feelings and actions? Here we focus on three dimensions of self – self-concept, self-esteem and self-efficacy. All have been linked to making choices about behaviour, our emotional state and academic performance.

Self-concept

self-concept
A collection of information, ideas, attitudes and beliefs we have about ourselves

Self-concept refers to the collection of knowledge, ideas, attitudes and beliefs we have about ourselves. It is formed through interaction with our environment and the people in it. Self-concept is particularly influenced by feedback and evaluation from significant others, such as teachers, peers and parents (Marsh, 1990). As shown in Figure 4.2, it is also influenced by social comparison, such as comparing performance or grades with those of classmates. Self-concept is a cognitive appraisal and has no concrete or observable features as seen in areas of physical development, but it plays an important part in understanding ourselves.



Source: Matthew Duchesne, © Milk and Honey Photography, 2010

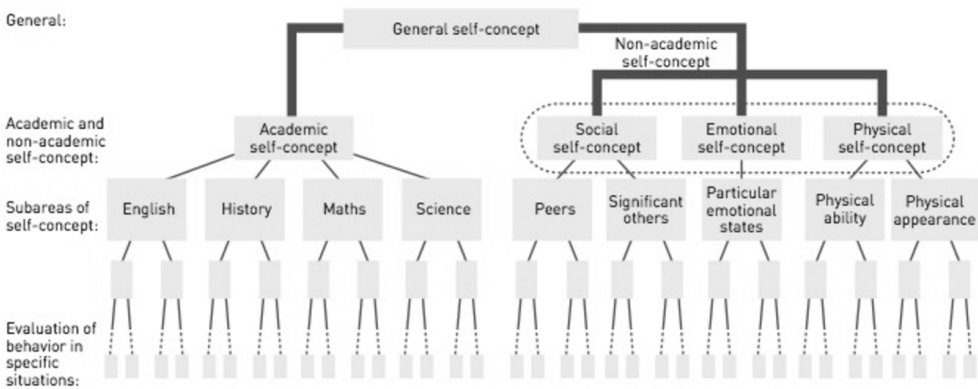
FIGURE 4.2 Social comparison plays a significant role in learners' academic self-concept.

For many years it has been accepted that self-concept is multidimensional and differentiated. This is evident when we look at Sarah's self-report. Sarah clearly has a self-concept of her ability in Maths and Science. It seems to be quite high, or very positive. On the other hand, she does not feel so sure of her ability in English and reports embarrassment about her marks; her self-concept in this subject appears to be lower. Sarah also seems to have a positive self-concept about her relationships with other people, and seems generally quite sure of herself.

More than two decades of research has found strong evidence for this multidimensional and differentiated nature of Sarah's self-concept (Marsh & Craven, 2006). We could say that Sarah's self-concept is *multidimensional* because it has dimensions of academic and social self-beliefs. We could also say it is *differentiated* because academic self-concept is separated into at least three different components, namely Maths, Science and English. If we probed further, Sarah might also say she is good at Geography but not so good at History: 'All that writing, ergh!' In Figure 4.3 you can see that academic self-concept can be made up of differentiated beliefs in different domains of learning, such as Maths, Science or English. Similarly, the non-academic sense of self could be broken up into any number of domains, such as social or physical self-concept.

This theory of a multidimensional self-concept has been well studied in the area of academic self-concept. 'Academic self-concept' is derived from views of personal achievements in curriculum areas such as Maths and Reading. Further study has confirmed that as we develop as learners, self-concept perceptions become more defined and specific across academic areas such as Economics, Foreign Languages and the Arts (Marsh, Byrne & Shavelson, 1988; Vispoel, 1995; see also Byrne & Gavin, 1996). Some of the most important findings illustrate a link between our academic self-concept and academic achievement (Hay, 1997; Marsh, 1992; Marsh, Kong & Hau, 2000; Marsh & Yeung, 1998). For example, Marsh and Yeung (1998) found that the level of an adolescent's self-concept can predict their later performance in school. However, their research also showed that the level of self-concept can be affected by prior academic achievement, suggesting that the relationship between academic self-concept and achievement is a reciprocal one.

Another very important research finding concerns the way in which adolescents develop their academic self-concept. One type of research has examined the theory that students develop their academic self-concept in two ways: first, through social comparison to external sources of



Source: Adapted from Marsh and Craven (2006). © 2006 by SAGE Publications. Reprinted by permission of SAGE Publications.

FIGURE 4.3 A theoretical view of a multidimensional and differentiated self-concept.

information, such as peers; and second, by comparison to internal sources of information, such as their ability in one subject versus another (Marsh, 1986). This idea of social comparison to external sources has been used to examine the effects of different types of academic streaming on student self-concept.

In schools where academic streaming occurs (that is, where students are grouped in separate classes according to their abilities), social comparison plays a significant role in students' perceptions of their academic abilities. This occurs because students tend to make comparisons with others in upward or downward directions. Upward comparisons to students better than one's self can result in feelings of inferiority and low self-concept. In contrast, comparing one's self to someone of lower ability (a downward comparison) is somewhat protective of the self-concept and does not lead to lower self-views. This is demonstrated in studies such as that by Burleson, Leach and Harrington (2005), which tested the role of social comparison on artistic self-concepts of adolescents moving to a selective art school. By measuring those with whom the students were comparing themselves, the researchers were able to determine if they were upwards or downwards comparisons. Consistent with self-concept theory, those students who made upwards comparisons suffered a reduced artistic self-concept. Such effects seem to occur when high-ability students attend academically selective schools and are faced with a larger pool of highly competent peers with whom they compare themselves. This paradoxical situation is known as the 'big-fish-little-pond effect' (see Box 4.1), in which their self-concept may actually decline once they are no longer the biggest and 'brightest' fish in the school pond (see Figure 4.4).

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Online resources
Go further: View the material on measuring self-concept on this text's website.

BOX 4.1 RESEARCH LINKS

BIG-FISH-LITTLE-POND-EFFECT

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Online resources
Go further: Read the case study about the big-fish little-pond effect on this text's website.

Research consistently demonstrates that students in high-ability and academically selective classes have lower academic self-concepts than same-ability students who are educated in average-ability or non-selective environments (Marsh et al., 2008). This effect is known as the 'big-fish-little-pond effect' (BFLPE). As students move from relative success in one school where they are like big fish dominating a little pond, to a school where the competition and pressure to succeed are increased, academic self-concept tends to suffer and self-esteem declines. Once this effect has been established it can increase and even be maintained for several years after the student graduates from high school (Marsh et al., 2007). Figure 4.4 demonstrates the relationships between an individual's ability, their academic self-concept and the average ability of the class or school in which they are learning. A student's individual ability is positively related to academic self-concept. However, when the average ability of the class or school is high, it exerts a negative influence on academic self-concept. In fact, the strongest BFLPE effects have been found *within* classrooms, meaning that students are mostly comparing themselves to students within their own classes (Marsh et al., 2014). The BFLPE is also evident across cultures. Using data from the Program of Student Assessment (PISA) database, Seaton, Marsh and Craven (2009) demonstrated that the BFLPE is universal, being apparent across a large sample of students from 38 countries. Moreover, Marsh et al. (2014) found that such effects are true for both high-ability *and* weaker students.

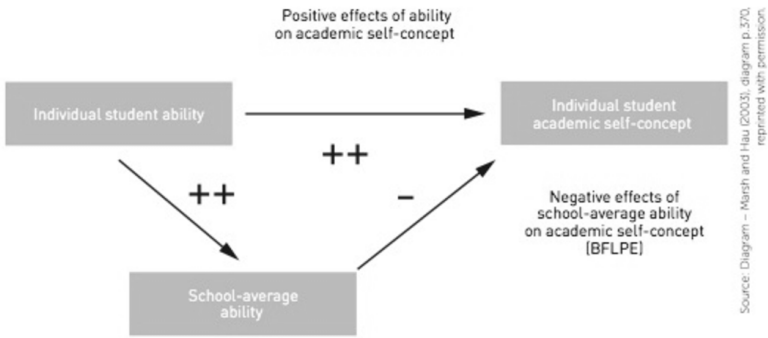

FIGURE 4.4 The big-fish-little-pond effect (BFLPE): theoretical predictions.

Self-esteem

Self-esteem and self-concept appear to be closely related concepts, with many researchers using the terms interchangeably, which can cause confusion (Byrne, 2002). Theoretically, self-concept and self-esteem are different ways of evaluating the self. In self-concept evaluations, it is believed that we are making a cognitive (thoughtful) judgement about our competence in different domains that are relevant in our lives (for example, 'I am good at Maths, but not so good at English'). Self-esteem, on the other hand, is believed to reflect a higher-order cognitive evaluation of our self that describes our integrated sense of our worth as a person. It is ***not*** believed to be a simple summary of our differentiated self-concept but rather a higher-order integration of many different aspects and views of the self (Harter, 2012). Harter's research appears to show that this global sense of self is revealed when we develop the verbal ability to make global statements about our sense of self (Harter, 2006). This is seen in measurement of the global sense of self with somewhat abstract higher-order questions such as 'I feel that I am a worthwhile person'. Although it is thought that younger children's behaviours can indicate a global sense of self, it is harder for younger children to articulate the less concrete and rather more abstract sense of person-hood or 'worthwhileness' that the global self-esteem is thought to reveal.

self-esteem
The level of satisfaction and pride that individuals have in the self

The distinction between self-esteem and the differentiated self-concept becomes apparent when we look at their association with specific and differentiated domains of our life. For example, the differentiated academic self-concept is highly correlated with academic achievement in those domains. The global sense of self is less correlated with academic achievement (Marsh & Craven, 2006). On the other hand, self-esteem does seem to be strongly associated with particular self-concept evaluations such as our physical self-concept.

Self-esteem seems to be associated with many critical areas of our life that contribute to our wellbeing, and may also reflect certain cultural factors in our lives. For example, self-esteem is consistently and strongly correlated with our sense of physical appearance, often measured as our physical self-concept. Various studies by Harter (2012) have found that perceptions of physical appearance are a stronger predictor of global self-esteem for young children right through to adult populations. This has been measured in studies of gifted children and children with learning disabilities where it was predicted that academic self-concept would most strongly predict their self-esteem. Similarly, in a study of children with conduct (behavioural) disorders, it was thought that their behavioural self-perceptions would most strongly predict their global self-esteem. In each study it was found not to be the case. Rather, the

perceived physical appearance of each group of children was the strongest correlate with their global self-esteem (Harter, 2012).



THINK ABOUT

- How could we explain the strong association between our sense of physical appearance and global self-esteem? Think about the range of reasons why this might be the case.
- Is the physical self-concept any different to other types of self-concept?
- Are there any cultural factors that might explain why our self-esteem is so linked to our perception of our physical appearance?

Many studies have shown that self-esteem plays an important role in our lives and is associated with our overall wellbeing in many ways. Self-esteem is strongly associated with depression (particularly in studies of persons with body image or weight concerns). By adolescence, a history of low parental support and low peer support are associated with dangerously low levels of self-esteem, depression and a sense of hopelessness. As children grow up, peer support increasingly predicts global self-esteem from late childhood to early adolescence (Harter, 2006). As we will read later in this chapter, this period of life is particularly important for the development of closer and more supportive peer relationships.

The association between self-esteem and other aspects of our lives means it is frequently used as a measure of a person's self-regard in many different fields of research. For example, a generally high sense of self-esteem has been associated with a myriad of positive personal and social outcomes, while a low self-esteem has been associated with a range of emotional and behavioural difficulties (Leary, Schreindorfer & Haupt, 1995). Research indicates a connection between low or negative self-esteem and adolescent drug and alcohol abuse (Finke & Williams, 1999; Irving, Wall, Neumark-Sztainer & Story, 2002), depression and suicide (Bos et al., 2010; Leslie, Stein & Rotheram-Borus, 2002; Raab, 2001), eating disorders (Gila, Castro, Gomez & Toro, 2005), and crime and violence (Ackard & Neumark-Sztainer, 2002). Because self-esteem is related to many social and personal factors, Marsh and Craven (2006) have argued that it plays an important role in academic achievement via those factors. For example, they found that adolescents with low self-esteem had much poorer life outcomes 10 years later than adolescents with higher self-esteem, even after their IQ, gender, depression and socioeconomic status were accounted for. Those who had low self-esteem as adolescents had poorer physical and mental health and worse economic outcomes due to leaving school early, and lower attendance at university.

However, self-esteem, like all self-views, is also variably associated with positive and negative outcomes (Baumeister, Campbell, Krueger & Vohs, 2003). For example, Wheeler (2010) found that although high self-esteem predicted lower substance abuse by early adolescent females, it did not predict substance abuse by boys; nor did high self-esteem among the same girls influence their decision to engage in early sexual activity one year later. Unlike this longitudinal study, many of the research studies are correlational, and we must take care not to assume causation in any of the links between self-esteem and the other variables measured. This is a general rule that should be applied to all studies based on correlational evidence.

Self-efficacy

self-efficacy
An individual's sense of being able to manage a task effectively and successfully in a particular domain

A third dimension of self relates to an individual's belief about their ability to perform tasks successfully. This is known as **self-efficacy**, which is a highly specific cognitive judgement of our ability, and closely reflects our belief that we can accomplish actions and tasks effectively. For this reason it is also known

as our 'can do' judgement of self. Perceptions of self-efficacy influence how we feel, think and act (Bandura, 1997). Of all the self-constructs, self-efficacy is the most specific form of self-judgement. This means that we may have high self-efficacy for writing creative stories, for example, but low self-efficacy for writing argumentative essays. Self-efficacy is based on Albert Bandura's social cognitive theory of **human agency**, which is a belief that people can intentionally influence, control and direct their actions to make things happen (Bandura, 2001). It is through this sense of agency that our self-efficacy emerges.

human agency
The capacity of a person to act on and shape their world

As we will discuss in Chapter 6, when proposed by Bandura in 1977, the concept of human agency represented a significant shift from the behaviourist philosophy of the time, which believed humans had little or no influence over their own behaviour and instead learnt to respond to external forces. In contrast to these behaviourist philosophies, Bandura proposed that human behaviour was shaped by a combination of internal and external factors. He believed that human beings had the capacity to observe and learn from their social environment, internalising and forming cognitive beliefs about their experiences in the social world. This theory gradually became known as *social-cognitive theory*, reflecting the combined influences of social (external) and cognitive (internal) processes. These social and cognitive processes are reflected in four factors that are believed to build and shape our sense of efficacy (Bandura, 1997):

1 *Enactive mastery experience*: This refers to the valuable experience we gain from performing tasks successfully. A sense of success and mastery provides us with an 'I can do it!' attitude towards future tasks. Failing a task undermines this sense and does not build self-efficacy. For example, 15-year-old Sarah doesn't feel positive about her ability in English. Perhaps this is because her high school English classes focus on essay writing and argumentative prose; Sarah has never achieved a high grade in those tasks and thus she has never experienced mastery in her Year 9 English tasks.
2 *Vicarious experience*: This refers to the experience we gain when we see others perform a task successfully. These modelling effects are strongest when the model is someone we can relate to, such as a peer. Seeing someone else complete a task successfully leads to an 'If they can do it, so can I' sense of belief (Pajares, 2002). Ten-year-old Jake has a strong perception of his skating ability and his skating skills have been enhanced by watching his peers master certain skating tricks. He thinks 'If they can do that trick, I can give it a try too'. The vicarious experience of seeing his peers learn a new trick successfully has a very powerful influence on Jake's self-efficacy for trying the same tricks.
3 *Verbal persuasion*: This refers to the verbal feedback we get from other people. This feedback has a powerful persuasive force. If teachers are hoping to use persuasion, they must do it carefully and realistically within the bounds of the person's capability. Negative feedback undermines efficacy. Young children like Taylah are particularly susceptible to verbal persuasion from adults or older peers. Taylah's phrase 'I'm a big girl now' probably reflects adult forms of praise or persuasion when they are encouraging more 'grown-up' behaviours from Taylah as she gets ready to start school. As children get older, however, verbal persuasion such as praise needs to be more specific and closely related to the skill or task the child is trying to master. Self-efficacy develops when the verbal persuasion tells the child they can be successful or were successful at a specific task, and especially when this is followed by or associated with a successful mastery experience.
4 *Our physiological and affective state*: Feelings caused by anxiety and stress (such as butterflies in the stomach or a depressed mood) provide us with important information about our sense of efficacy. Strong feelings and reactions act as a cue to warn us about our feelings of success or failure on a task. Sarah tells her mum that she feels sick on the morning of her English exam, but she seems almost too relaxed on the morning of her Maths exam. Sarah's negative experiences with English

have become associated with a physiological feeling in her stomach, further influencing her self-efficacy as she walks into the English exam.

While both self-efficacy and self-concept show similar levels of association with academic achievement, self-efficacy is particularly associated with self-regulation – a key factor associated with academic success. Self-regulated learning behaviours such as greater task persistence, goal setting, planning and monitoring of learning are more frequently reported by high efficacy learners (Pajares & Shunk, 2001). Individuals with a strong sense of efficacy tend to be self-confident about their ability to cope with demanding challenges and stressors in a particular domain or range of contexts (Klassen, 2002; Pajares, 1997; Schwarzer & Fuchs, 1995). Self-efficacy theory proposes that feeling efficacious promotes a sense of agency and control. High-efficacy learners generally have a greater sense of control over their work and may even select more difficult tasks if given the choice.

However, learners with low self-efficacy beliefs often feel powerless and incompetent. These negative feelings have a far-reaching effect on thoughts, behaviour and motivation. Low self-efficacy may be associated with depression, anxiety and feelings of helplessness (Bandura, 1994). Learners in this category tend to have low self-esteem and are pessimistic about their accomplishments and personal development (Brophy, 1998; Lane, Jones & Stevens, 2002).

The sense of enablement that comes with high perceived self-efficacy is particularly important to adolescents who find themselves managing major biological, educational and social-role changes concurrently (Pajares & Urdan, 2006). In the school context, adolescents experience major environmental changes as they move from primary school to the high school environment. They experience new social arrangements, as they may have six or seven different classes with a different peer group in each. During this period, young adolescents may experience some loss of personal control, become less confident in their self, and experience lower levels of self-efficacy (Bandura, 1997; Eccles & Wigfield, 1995; Jacobs et al., 2002).

Addressing teenagers' self-efficacy requires close attention to the sources of self-efficacy. Extensive research has demonstrated that self-efficacy can be enhanced with structured interventions to improve a wide range of life outcomes such as health, physical activity, smoking cessation, parenting and, of course, learning. Such interventions, whether they be in health or educational settings, provide opportunity for mastery experiences, effective models and positive verbal persuasion, and reduce the stress or anxiety the person may feel while trying the new tasks. These strategies are demonstrated in Box 4.2, which explains how teachers might intervene to increase the writing self-efficacy of students like Sarah, who finds essay writing difficult in her Year 9 English classroom.



BOX 4.2 CLASSROOM LINKS

INTERVENTIONS TO ENHANCE WRITING SELF-EFFICACY

For teenagers such as Sarah, the changing nature of the school curriculum can place additional demands on their sense of efficacy. Sarah enjoyed writing in primary school, but as the tasks became more demanding and focused on argumentative or persuasive essay writing in high school, Sarah's self-efficacy declined. Sarah's teachers realised that it was not only Sarah who appeared to be experiencing a decline in interest and engagement in English classes in the middle years of high school. They identified a number of students who appeared to be experiencing similar problems. An analysis of recent essays submitted by students revealed two common writing problems: some students appeared to have a weak understanding of essay writing strategy, and others seemed to have good strategies but few skills in revising, proofreading or monitoring their own writing. The teachers decided to hold small-group workshops during their English classes where they targeted the development of these skills using specific self-regulation strategies, and through which they hoped to increase the writing self-efficacy of their students.

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In the first group, the teachers employed a writing strategy intervention where they modelled and explained the steps of essay writing. At each step they carefully explained how valuable the step was by linking it to the argument in the essay. Students practised the strategy and took turns explaining to each other the steps they had used to build their argument. They were trained to give words of encouragement to their peers by pointing out the actual steps the peer had employed correctly and how these had improved their argument. Students also set personal achievement goals (a form of self-regulation) where they practised each step in an assigned essay writing task and evaluated the learning outcome, keeping a recording of their progress against their essay-writing goals.

In the next group, teachers modelled writing revision strategies and employed peer modelling, where students shared their own writing examples during the tasks. Students were specifically taught how to reduce long or repetitive sentences into smaller, more succinct sentences by reducing redundant phrases and practising transitions between ideas and paragraphs. The teacher helped students understand the revision strategy by showing examples of her own writing and self-correcting and removing the redundancies and repetition, and using transitional phrases to link ideas. Students then examined their own writing with the help of a peer and practised correcting their sentences using the steps that had been modelled. The teacher gave lots of positive feedback and specifically commented on how the steps taken had improved the sentences or flow of the paragraph as the students were practising. Finally, the students were set process goals and asked to record the number of steps practised correctly to arrive at improved sentences and paragraphs.

In both groups of learners, the teachers found that students improved. Sarah was a little bit ambivalent at first but said to her friend, 'Finally, it's like someone has given me a recipe for writing an essay! I know what an argument is now and I can do it step by step!' Learners in the revision group continued to use the revision strategies, and some kept working with their peers to review each other's work and correct sentences using the steps they had been shown. Both groups' sense of writing self-efficacy had improved.

Identifying the effective components of self-efficacy interventions

There are several examples of effective practices in these simple classroom interventions:

- *Enhancing self-regulation* – As we discussed earlier, self-efficacy and self-regulation are closely linked. Each strategy was based on the principles of self-regulated learning by allowing observation of role models, demonstrations of the effective strategies, opportunities to practise by the self, opportunities to set goals, and opportunities to self-regulate and employ the strategy by the self. It is imperative that interventions are guided by such theory to ensure effective strategies are put in place and the student is supported to develop a 'can do' sense of efficacy.
- *Mastery modelling* – Students had the chance to see a model effectively applying a self-correction strategy. This is much more effective for these students than simply viewing a model completing the skills effectively in the first place. Modelling the strategies of revision and self-correction developed self-regulation and addressed the students' 'can do' sense of self-efficacy for writing revision.
- *Peer modelling* – It can be useful to expose students to multiple models and multiple sources of persuasive feedback, both by seeing peers perform the strategy but also receiving feedback from peers. Students are likely to feel efficacious if they realise peers can do it too.
- *Feedback* – Positive and constructive feedback is an important source of verbal persuasion. It provides reassurance, and immediate correction avoids failure experiences. It is important that interventions provide a 'safe' learning environment through monitoring student performance, applying feedback and correcting skills as practice occurs.
- *Differentiated environments* – By placing students in small groups, teachers were able to address specific self-regulation goals and closely monitor each student. This differentiation may reduce anxiety and avoids potential boredom or distractions in students who may not need certain types of skill development.

Source: Adapted from evidence in Schunk and Zimmerman (2007).

DEVELOPMENT OF OUR SENSE OF SELF

Our sense of self across the various self-constructs develops gradually and changes over time. Many of these changes are influenced by other processes of development, including the development of more sophisticated cognitive skills (such as abstract thinking) and improvement in our memory and language skills – quite simply, we become better at reflecting upon and describing ourselves in greater detail as we get older. As we grow older, we also acquire more life experience, information about our self greatly expands, and the number of categories of self-concept and self-efficacy beliefs also expands. As summarised in Table 4.1, in early childhood, children's self-descriptions are very much concerned with concrete and observable characteristics of the self. These self-descriptions are usually very positive, sometimes unrealistically so, as illustrated in the following account of exceptional feats of strength and bravery from a 3-year-old: 'I can run real fast … I can kick a soccer ball real far … I can climb to the top of the jungle gym, I'm not scared! I'm never scared! … I'm really strong. I can lift this chair, watch me!' (Harter, 2012, p. 29).

TABLE 4.1 Development of sense of self over time

DEVELOPMENTAL STAGE	SELF STATEMENT	CHARACTERISTICS OF THE STATEMENT
Infancy	No language-based statements	Gradually comes to recognise self in mirror Attachment to caregivers forms a basis for a model of self
Early childhood	'I am a boy. I like soccer.'	Concrete self-perception based on appearance, observable characteristics and favoured activities
Middle childhood	'I watch my brother do it first, then I know I can do it!'	Descriptions become more elaborate, specific competencies noted, social comparison becomes an important source of self-perceptions
Adolescence	'I'm fairly shy with new people but I'm pretty "out there" with my friends!'	Interpersonal characteristics such as emotions, personality or other traits; differentiates ability and efficacy in different social contexts

As children move into middle childhood, they start developing categories of information about the self and can describe some strengths and weaknesses. They also start making comparisons to their younger self – recognising how much they have changed or improved. By later childhood, older children develop a firmer sense of stable characteristics and use a wider range of descriptive terms about the self, such as 'popular', 'smart', 'dumb' or 'nice' (Harter, 2012). When older children are using these terms, they also seem to understand that a person can be 'smart' or 'dumb' in different school subjects, or may be popular with their friends but still pretty shy when meeting new people.

In adolescence, self-descriptions reveal stronger links with the social context of the individual, and show great sensitivity to social comparison and feedback from significant others, particularly peers. Young people may compare themselves with school peers and measure their strengths and weaknesses against their peers (Marsh, 1990; Witt, 2000). In contrast to the self-descriptions of younger children, adolescents are likely to use many more abstract terms to make higher-order generalisations about their self, such as 'I'm pretty intelligent' or 'Sometimes I'm simply an airhead' (Harter, 2012, p. 75). The sense of self grows in adolescence to acknowledge the multiple roles that



Source: Matthew Duchesne, © Mix and Honey Photography, 2010.

FIGURE 4.5 Rejection by peers contributes to low self-esteem and low self-efficacy.

a person may take on in different contexts, and the expanded range of skills and tasks to which the adolescent is exposed. As observed in Figure 4.3 (see page 129) the older adolescent would have a sense of self in many academic domains of self-concept and a sense of self-efficacy in these domains, reflecting the expanded nature of subject choices in high school. Harter (2012) has also illustrated that adolescents' social self-understanding expands to include a clear distinction between the sense of self with friends versus the general peer group, and in later adolescence includes a romantic sense of self.

If you look carefully at the differences in self-description from early childhood to adolescence, you might notice some parallels with cognitive development. However, Harter (2012) cautions that we cannot apply the rigid Piagetian stages to explain the changes in children's understanding of self. Instead, she suggests that cognitive advances in combination with improvements in memory, language skills and the social context all help explain the gradual development of the sense of self.

Social comparison is believed to be particularly important in developing a sense of self-efficacy and self-concept. In particular, peers serve as models for new or unfamiliar tasks. Watching a peer complete a task can provide an important source of information on which a child can base their sense of efficacy (Pajares & Schunk, 2001). As illustrated in the example of the 'big-fish-little-pond effect', social comparison can result in favourable or unfavourable self-concept outcomes. If students only make comparisons to performances better than their own, then their sense of self is likely to decline. Similarly, inward comparisons to the self also need to be carefully monitored. Self-efficacy is vulnerable to decline if the child's experience at a task never results in success or mastery.

The social context appears to be particularly relevant during adolescence, when young people are particularly vulnerable to perceptions of support from the peer group or susceptible to social messages about physical appearance. In each case, when early adolescents perceive a negative

or unsupportive relational environment or have low physical appearance self-perceptions, the self-perception tends to decline (Harter, 2012). The point of transition to high school has been identified as a vulnerable point when many adolescents report a decline in self-esteem and academic self-concepts (Eccles et al., 1989). Eccles and colleagues proposed that the changed environmental (and relational) context of high school prompts such a decline. However, other research has shown that self-esteem gradually grows and increases from age 14 through to adulthood (Erol & Orth, 2011).

Gender differences in self-concept are not easily summarised, as the research findings are equivocal. Recent research by Erol and Orth (2011) noted that self-esteem trajectories of male and female adolescents did not differ. Nevertheless, the most consistently significant gender difference across age groups are in the areas of physical appearance and physical ability, with girls reporting significantly worse body image than boys (Davidson & McCabe, 2006), and boys regularly expressing more positive views of their physical abilities than do girls (Hau et al., 2005). These gender differences, although relatively small, continue to adolescence, and may be explained by the greater emphasis placed on girls' physical appearance and boys' participation in sports and games.

Box 4.3 discusses programs and strategies that relate to building and enhancing self-concept, self-efficacy and self-esteem in the classroom.



BOX 4.3 IMPLICATIONS FOR EDUCATORS

BUILDING SELF-CONCEPT, SELF-EFFICACY AND SELF-ESTEEM

Enhancing learners' self-perceptions is central to teaching and preparing students for life beyond school. Many helpful programs have been developed to help teachers and young people, such as Kiwi Can in New Zealand (see www.fyd.org.nz/kiwican) and the Resiliency Resource Centre (www.embracethefuture.org.au/resiliency). KidsMatter (www.kidsmatter.edu.au) and MindMatters (www.mindmatters.edu.au) are particular resources for primary and secondary school teachers, with many strategies to use in the classroom. A common theme in these programs is valuing individuals for who they are and what they bring to the learning context. Suggested strategies include the following:

- Look for ways in which to monitor your students' self-perceptions, particularly when these are negative and may interfere with their learning, peer relationships and general wellbeing. This may involve looking for signs of self-deprecating statements, beliefs that they will fail tasks, and withdrawal or avoidance of tasks or playground situations.
- Build learner resilience by developing their strengths and enhancing their capacity to successfully adapt to stressful and changing circumstances.
- Teach self-regulatory strategies for goal setting, self-monitoring and self-correction. Help learners to see that they can succeed if they use strategies and a step-by-step approach to learning.
- Celebrate students' achievements but de-emphasise unhealthy comparisons and competition – all learners need to understand their personal strengths and see their work celebrated.
- Maintain a healthy sense of the learner's strengths and a sense of how they can develop areas of weakness. Look for opportunities to encourage and develop strengths while working on areas in need of development.
- Provide 'can do' opportunities for all students to gain mastery and to experience success – self-efficacy depends on it.

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- Look at the experience and achievements of the learner beyond the classroom, including their involvement in sport and community activities, as a way of fostering a positive area of self-perception.
- Examine the values you are promoting when you give feedback or pass judgement on students' work, bearing in mind that self-esteem is grounded on what the learner values.
- Value differences, whether they be of ethnicity, race, language, ability, gender, sexual orientation or appearance.
- Encourage peer-support programs and 'buddy programs' in which older students team up with younger students to offer them support. These focus on developing communication skills, self-confidence and self-esteem, and can help students resist peer-group pressure that may be harmful to them.



THINK ABOUT

- How will you identify students with low self-perceptions in your classroom?
- What practical strategies will you use to enhance student self-concept and build their self-efficacy in your teaching?

DEVELOPING AN IDENTITY

Another 'self'-related concept is the notion of **identity**. While psychology has held a long interest in self-perceptions, another field of psychology has studied the concept of identity to explain the deeply personal quest to find out 'who we are'. Influenced by the earlier work of Sigmund Freud (1856–1939), psychologists began to adopt a **psychoanalytic approach** to explaining the personality, development and competence of individuals. Although psychoanalytic approaches have declined in influence, the notion of a 'search for identity' continues to play a central role in everyday language about the process of growing up, particularly during adolescence.

identity
An internal self-structure in which we organise our beliefs, abilities, needs and self-perceptions

psychoanalytic approach
A theoretical stance proposing that personality develops when children move through a series of stages that present conflicts that have to be resolved

ERIKSON'S THEORY OF IDENTITY DEVELOPMENT

Erik Erikson (1902–94) was one such identity theorist who studied the interrelationship between psychological development and the way individuals interact socially and with their environment. He argued that psychological and social facets of development occur concurrently and are interdependent. Erikson viewed development as occurring in stages, with development in each stage dependent on development in previous stages. According to this theory, the stages of development are invariant and build progressively on one another, yet they are qualitatively different.

Theory overview

Erikson proposed that we move through a series of eight **psychosocial development** stages in which our selfhood, independence, identity and self-worth may be developed or crushed, depending on how we resolve issues and interact with others along the way. Each stage is characterised by a **psychosocial crisis**, or 'turning point' (see Table 4.2). During these turning points, we experience a temporary state of conflict and disequilibrium that must be resolved before we may move to the next stage of psychosocial development.

According to Erikson, in each psychosocial stage, individuals face a choice between two ways of coping. One way is to resolve crises in a positive way, which leads to healthy personality development. The alternative is to resolve crises in a negative way, which leads to difficulties and problems in later

psychosocial development
Psychological development in a social context

psychosocial crisis
A 'turning point', where individuals experience a temporary state of conflict and disequilibrium

stages if issues are unresolved. As individuals resolve crises they develop psychosocial strength, which in turn helps them move to the next stage. Erikson believed that those who fail to resolve particular conflicts may continue to struggle with these conflicts later in life. He saw the tension between negative and positive polarities as necessary for healthy psychosocial development. The ways in which individuals interact with others help to determine how each crisis will be managed.

Stages of psychosocial development

Erikson's theory is very significant because it represents a lifespan view of development from birth to death. Table 4.2 identifies the characteristics of each stage of development. In each stage, the child's or adult's relationship with significant others is clearly implicated in how they resolve the psychosocial crisis.

TABLE 4.2 Erikson's stages of psychosocial development

STAGE (AGE)	PSYCHOSOCIAL CRISES	CHARACTERISTICS
1 Infancy (0–1 year)	Basic trust vs basic mistrust	Warm and responsive care leads to trust, while infants who are treated harshly or not comforted develop mistrust.
2 Early childhood (2–3 years)	Autonomy vs shame and doubt	Children want to test new skills and abilities. Reasonable free choice can assist in development of autonomy. Discouragement can lead to shame and doubt.
3 Play age (4–6 years)	Initiative vs guilt	'Initiative' is a sense of independence and responsibility fostered when children are praised for new initiatives. Guilt emerges if adults exercise too much control and punish children for their actions.
4 School age (7–12 years)	Industry vs inferiority	Children develop a sense of 'industry' through school work and working with others. Inferiority develops when negative experiences and failure lead to self-doubt and incompetence. Teachers play a role in reinforcing a sense of competence.
5 Adolescence (13–18 years)	Identity vs role confusion	Adolescents search for a definition of their self and their place in society. Confusion arises when they remain uncertain about their place and future role in life. Peer groups and adult role models provide important feedback about identity.
6 Young adulthood (the 20s)	Intimacy vs isolation	Young adults try to achieve intimate ties to others, but isolation arises if they cannot form such ties and lasting relationships.
7 Adulthood (late 20s to late 50s)	Generativity vs stagnation/ self-absorption	'Generativity' refers to the act of giving to the next generation of people through child rearing, work or caring for other people. 'Stagnation' arises when we become 'self-absorbed' and do not take on a productive role in society.
8 Old age (60s and beyond)	Ego integrity vs despair	At about the age of retirement, individuals reflect on life and come to a sense of 'ego integrity', but despair is felt by those who are dissatisfied and fear dying.

Source: Adapted from Erikson, E. H., *The life cycle completed: A review*, pp. 32–3.
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Identity development in the school years

The focus of this section is identity development in the school years addressed by Erikson's Stage 3 (ages four to six years) and Stages 4 and 5 (middle childhood and adolescence). Each of these stages presents implications for the relationships between teachers and their students.

The preschool and kindergarten years

The early years of school or preschool are described in Stage 3 as 'initiative versus guilt'. Young children attempt to show initiative based on their observation of adults around them. They may try adult activities such as cleaning house or attempting simple chores, and enjoy using miniature toys that are just like Mum and Dad's 'big tools'. You might remember trying to show initiative in the kitchen by trying to make toast but burning it instead. If children are punished for such mistakes and made to feel guilty for being 'naughty', Erikson suggests that guilt and self-doubt arise in the young child. However, if children are praised or supported for taking initiative, they learn to try new things and test boundaries without feeling anxious or guilty. Erikson suggests that the central task of this stage of life is to build independence and autonomy without feeling too much guilt or shame.

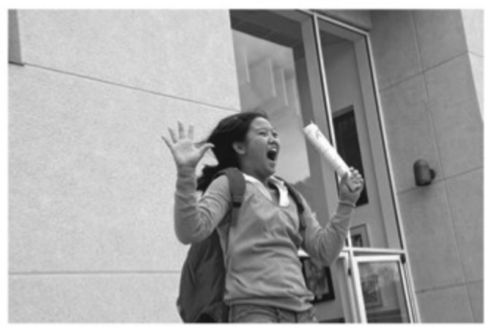
Crises or 'turning points' emerge because children of this age are also starting to understand a range of more complex emotions, such as guilt and shame. A growing sense of moral responsibility means they might feel guilt when they misbehave or have ideas they believe to be wrong or unacceptable in the eyes of parents or significant others. A parent or carer may also promote feelings of guilt through punishing misbehaviour. Once again, Erikson argued for a balanced approach. If children experience excessive guilt, they may become inhibited and afraid to try new activities for fear of making mistakes. However, the crisis or turning point must be managed to ensure children grow up with a healthy sense of responsibility. Encouraging children to take the initiative and to think for themselves, while considering the consequences of their actions, helps to promote a healthy personality in preparation for the next stage of psychosocial development.

The primary school years

Stage 4 spans the ages of approximately seven to 12 years. During Stage 4, most children are at school and industriously engaged in activities related to acquiring basic skills and the social and cultural tools that enable them to participate in society. The dominant task for children at this stage is to appreciate the value of industry and productive activities while avoiding an excessive sense of inferiority. Erikson understood that healthy or normative development must be understood within the context of each culture. In indigenous societies, for example, children may be educated within the wider family group – learning to track animals, find food or make utensils (Crain, 2000) – while in Western cultures, children typically attend school and learn basic literacy and numeracy skills.

Children need to experience feelings of success, whether at home or in a wider learning environment, whether academically or socially (see Figure 4.6). If they experience repeated failure, they are likely to develop a sense of inferiority or incompetence. Additional sources of inferiority mentioned by Erikson include racism, sexism and other forms of discrimination. Teachers play a particularly important role (Erikson, 1959), as they can encourage skills and a sense of competence among learners.

Crises or turning points occur in this stage because children are seeking a balance between industry and inferiority, but the



Source: © Ian Shaw/Alamy.

FIGURE 4.6 Teacher feedback contributes to students' sense of industry or inferiority.

conflicts of earlier stages do not disappear. For example, young children starting school must develop trust in teachers and a sense of autonomy in their new school environment in order to develop as successful learners. Although each stage of the theory builds on the conflicts resolved in previous stages, people may revisit the conflicts of earlier stages when they encounter new social situations and contexts.

The high school years

Stage 5 describes the period of adolescence, beginning with puberty and ending at about 18 or 20 years of age. The primary task during adolescence is to develop an identity, which lays the foundation for adulthood. Although the identity-forming process is lifelong, it is most intense during adolescence (see also Erikson, 1997). Identity means knowing who you are and how you fit into the larger society. Think about all the roles you played as an adolescent: a son or daughter, a good mathematics student, a naughty student, a popular person, and many more. How did you resolve the tension between all of your roles? Were you satisfied with your identity or did you long to be someone else? This is all part of resolving the identity-versus-role-confusion conflict.

'Role confusion' may result when adolescents have difficulty deciding which roles to play in life, and may stem from uncertainty about their place in the world. The idea that adolescents are confronted by role confusion has led to the populist use of the phrase 'identity crisis' for this stage of life. The term 'crisis' should be used with caution, however. Some people have the perception that adolescence is, by definition, a tumultuous period characterised by rebellion, and that it is traumatic for parents, teachers and teenagers alike. You may know of some adolescents who fit this stereotype, but many adolescents pass through adolescence with little difficulty (Bandura, 1997). As a result of this stereotype, some researchers have set out to challenge these negative ideas about adolescent development. The Positive Youth Development (PYD) perspective (Eccles & Gootman, 2002; Roth & Brooks-Gunn, 2003) emphasises the strengths of positive development during adolescence by focusing on the 'Five Cs': competence, confidence, character, connection and caring (Lerner et al., 2012).

Erikson's use of the word 'crisis' was meant to reflect the fact that the stages of development reflect the interaction of the individual with the demands of their social context. As we discussed in the previous section on the development of self-perceptions, some personal and societal factors pose new challenges for adolescents. In particular, the onset of puberty means accommodating a new sense of the physical self as the body and physical appearance start to change (see Chapter 2), and the formation of sexual identity as interest in more intimate relationships develops. For some students, the development of sexual identity presents a real challenge, particularly those with gay or lesbian identities who may experience serious harassment and ostracism from their peers (Berlan et al., 2007; Ford, 2004). Homophobic sentiments are a common form of sexual harassment in the middle years of high school, suggesting that sexual identity and related themes are frequent features of school bullying (Espelage, Basile, De La Rue & Hamburger, 2014).



Source: © Corbis/Kristy-Anne Glubish/Design Pics

FIGURE 4.7 What issues of identity might these students face over the next few years? What approaches could they take to dealing with identity?

Social, political and economic influences may also have an impact on adolescents' identity development. Harris (2006) documents a challenging social context for youth development in Australia and New Zealand. She suggests that young people growing up in each of these countries have experienced the positive features of an era that pays greater attention to

basic human rights and freedoms, including antidiscrimination legislation and equal employment opportunity. These factors may present young people with many more freedoms than their parents' generation. At the same time, this freedom may be contradicted by economic or labour market forces that may mean 'freedoms' are curtailed in other ways, such as longer periods of mandatory school education, later entry to the workforce, and longer periods living at home. Teachers can play an important role in this stage of identity development, as teenagers look for appropriate role models and a trusting environment in which to discuss and share ideas during uncertain or changing periods of their life (see Box 4.4 on page 145).

CourseMateExpress
Online resources
Go further: Read the article 'Adolescents and sexual identity: challenging homophobic abuse' on this text's website.

Identity status in adolescence

The period of adolescence has captured the attention of many researchers who have extended Erikson's seminal work, including Marcia (1980, 1993, 2002), who expanded on adolescent identity development. Marcia was interested in the developmental process by which adolescents *committed* to an identity, and the extent of this commitment (Kroger & Marcia, 2011). He developed an interview measure of this commitment and proposed four identity statuses – **identity achievement**, **identity foreclosure**, **identity diffusion** and **moratorium** – which describe the ways in which adolescents attempt to resolve the conflict of identity versus role-confusion. These four statuses are outlined in Table 4.3.

identity achievement Occurs when adolescents explore several identity roles, but resolve conflicts and feel comfortable with who they are and who they hope to be

identity foreclosure Describes adolescents who typically form their identity by adopting the occupational and ideological goals of significant others, often their parents

identity diffusion Occurs when young people have little direction, their life and career goals are unclear, and they do not know who they are or who they want to be

moratorium Refers to the state of adolescents who postpone making a definitive commitment to a single identity or set of values

TABLE 4.3 Marcia's four identity statuses

IDENTITY STATUS	DESCRIBES YOUNG PEOPLE WHO:
Identity achievement	• May have explored several identity roles, but have resolved the conflicts and generally feel comfortable with who they are and who they hope to be • Pursue self-chosen occupations or studies and ideological goals
Identity foreclosure	• Avoid the dilemma of role confusion by adopting the occupational and ideological goals of significant others such as parents, but also of religious cults, militaristic organisations or groups divorced from mainstream society • May follow in the footsteps of others without working through identity issues for themselves
Identity diffusion	• Have no direction for the future • Are unclear about their goals and do not know what occupation to pursue • Have not made any decision about their identity and may feel confused and frustrated
Moratorium	• Postpone a definitive commitment to a single identity or set of values • Choose to take time out between childhood and adulthood before making a commitment about who they want to be • Experiment with different roles in areas such as gender, occupation and family

Source: Adapted from Marcia (1980, p. 161).

Marcia believed that the central task of adolescence is about recognising the need to develop an identity in preparation for adult life, and that true identity achievement occurs when the adolescent has made a commitment to an identity pathway. However, the avoidance of any commitment can cause role confusion, and not exploring different roles or pathways can prematurely shut off or 'foreclose' on a sense of identity. The process of committing to an identity has been linked to self-esteem, anxiety and a range of other factors. Adolescents in the status of identity achievement, for example, generally

have the highest self-esteem (Ryeng, Kroger & Martinussen, 2013). In contrast, those in moratorium generally have higher anxiety scores (Lillevoll, Kroger & Martinussen, 2013). Subsequent research has confirmed Marcia's classification of identity (Meeus, 2011) but has also refined ideas about how identity develops. Rather than viewing identity as a series of stages or steps, researchers tend to view identity formation as a continuous process of moving between commitment, exploration of those commitments and then reconsideration of those commitments (Meeus, van de Schoot, Keijsers & Branje, 2011).



THINK ABOUT

- Think about the sense of identity in each of Erikson's and Marcia's stages.
- Can you remember passing through any of these stages?
- Why are teenagers in a state of 'moratorium' likely to experience higher anxiety?
- What are some of the ways in which a teacher can support the formation of positive self-identity?

Strengths and limitations of Erikson's theory

Erikson's theory has much to offer the classroom teacher, but the theory's benefits and utility should always be interpreted in light of its possible limitations.

A stage theory

Erikson's stage approach is helpful because it provides a framework for interpreting psychosocial development across the lifespan. However, stage theories have limitations (see Chapter 3). For example, Erikson describes a single central conflict in each psychosocial stage, whereas in reality, individuals confront many conflicts that may not be restricted to particular stages. Questions have also been raised about the universal applicability of the order of stages and the relevance of this theory's lock-step approach to development. For this reason, some theorists prefer the terms 'phases' or 'transitions' rather than 'stages'.

The role of society and culture

A useful aspect of Erikson's theory is his emphasis on the role of social relationships in development. This is especially important for classroom teachers, as they need to understand their students' development in social and cultural contexts. However, Erikson's theory is primarily Western in orientation, and many argue that his stages do not apply across cultures and across historical contexts. For example, Barrett (2000) questions whether Stage 2 (autonomy versus shame and doubt) holds true for collectivistic cultures (see the next section, 'The self across cultures') in which autonomy and independence are not valued as highly as they are in individualistic cultures. Erikson and other researchers have argued that the general stage pattern and characteristic psychosocial crises do hold across cultures (Wang & Viney, 1996), although social and cultural factors play a significant role in shaping identity (see, for example, Comunian & Gielen, 2000).

Biological determinism

A controversial aspect of Erikson's work is his assumption (in agreement with Freud) that personality differences between the sexes are biologically based. Erikson believed that we are genetically programmed to proceed through stages of development, and that our biological make-up interacts with social and cultural factors to contribute to development. Some theorists have challenged this view, seeing it as deterministic and problematic.

Gender differences

Critics of Erikson's theory say the theory is more applicable to males than to females. Gilligan (1982) argues that Erikson's focus on autonomy, independence and industry is more characteristic of males than of females, who tend to consider themselves in terms of relationships rather than in terms of separateness and individuality.

In balance, Erikson's theory offers several important insights into the interrelationships between physical, psychological and emotional development in a social context, and has inspired ongoing research, particularly in the area of identity development. Erikson's work has many practical implications for classroom teachers.

The table in Box 4.4 gives guidelines and examples for activities with students in stages 3 to 5.



BOX 4.4 IMPLICATIONS FOR EDUCATORS

Erikson's theory of psychosocial development has several implications for classroom practitioners. Table 4.4 below presents guidelines and sample activities for classroom application.

TABLE 4.4 Erikson's psychosocial stages in the classroom

STAGE	GUIDELINES FOR TEACHERS	EXAMPLES OF ACTIVITIES FOR EACH STAGE
Stage 3: Initiative vs guilt (preschool and early primary years)	Foster initiative and creativity; encourage responsibility; balance punishment for wrongdoing with encouragement of individuality	• Encourage students to make decisions about a group project or about how a game will be played • Allocate free-choice time where learners select their activity • Be flexible and listen to students' ideas. If they suggest inappropriate or dangerous activities, discuss ways of reworking their suggestions in acceptable ways rather than discouraging and ignoring them
Stage 4: Industry vs inferiority (primary school years)	Value hard work and industry; encourage individuals to do their best no matter what their ability; some competition is healthy, but discourage excessive competition, which may lead to feelings of inferiority and low self-worth	• Set tasks to match students' ability levels, being aware of each learner's abilities and trying to develop activities accordingly • Provide choices to allow for different interests and abilities • Help students to set learning goals for themselves to encourage a sense of achievement • Be patient when students make mistakes. Avoid public humiliation. When students feel they are not keeping up with their peers, they will want to give up, so develop individual learning programs and encourage students to work at their own pace • Acknowledge successes outside the classroom in sport or other endeavours
Stage 5: Identity vs role confusion (high school years)	Provide opportunities to explore and discuss different identities and viewpoints; be aware that adolescents will experiment with different roles; be observant regarding potential risk-taking and harmful behaviours; encourage open communication with parents, teachers, peers and significant others; be supportive, especially during students' times of uncertainty	• Invite guest speakers to discuss relevant life issues such as safe driving. Provide role models, such as sportspeople, who discuss the value of healthy life choices • Provide a forum for students to discuss problems and share ideas. This should be done in a safe classroom environment. Adolescents appreciate the opportunity to express themselves in writing; they may also use online technologies or some other medium • Acknowledge students' interests: learn a bit about their sports, magazines or music, and provide for this in assignments – for example, one assignment topic could be based on a hobby or sports magazine of their choice (which you have approved!)

THE SELF ACROSS CULTURES

As Erikson acknowledged, the self should be understood in light of our relationships with others and our environment, recognising that cultural contexts bring unique perspectives to the question of self or identity. Culture plays a critical role in determining how we view ourselves, how we relate to others and what we value. Until the late 20th century, most of the documented theories of self came from Western researchers, but research indicates that views of self differ across cultures (see, for example, Purdie et al., 2000; Wang, 2004). One way of explaining these differences is to categorise cultures into 'individualistic' and 'collectivistic' cultures, and to contrast them (although conclusions that arise from such a generalised approach should be treated cautiously).

individualistic culture
Focuses on the self as an autonomous individual; successful pursuit of individual goals is valued

collectivistic culture
Typically group-centred, viewing individuals in terms of their relationships, roles and responsibilities in the community

In **individualistic cultures** the focus is on the individual self, which is thought of as autonomous and unique. The successful pursuit of individual goals is most highly regarded in such cultures. Western societies such as those of the United States of America and Australia are typically classified as individualistic societies. On the other hand, **collectivistic cultures** tend to be group-centred, viewing individuals in terms of their relationships with others in a cohesive community group.

In collectivistic cultures, focusing on individual goals may seem rude or even be a cause for embarrassment or shame (Shweder & Haidt, 2000), as individuals are typically defined in terms of their roles, responsibilities and relationships within their community. Although the multidimensional nature of self-concept holds true for both Indigenous and non-Indigenous Australians (Purdie & McCrindle, 2004), it has been suggested that some Indigenous Australian youth may also base their identity on factors such as kinship group, sense of communal history, language, traditional practices and place (Purdie et al., 2000) (see Figure 4.8). Similarly, Heine (2001) argues that in many East Asian cultures, the sense of self is bound up in knowing one's relationships and obligations to others; in this sense, the self is based on interdependence between the self and others. One shortcoming of categorising cultures as either 'individualistic' or 'collectivist' is that escalating globalisation means that boundaries between the views and values of different cultures are increasingly blurred (see, for example, Cha, 1994). For example, New Zealand combines the typically individualistic cultures of Western societies with the collectivist values of the Māori cultures. Similarly, in Australia, Western individualistic cultural values exist beside collectivist values such as those of Australian Indigenous cultures or Confucian-heritage cultures. These cultural groups influence one another as they interact.



Source: © David Hancock/Alamy

FIGURE 4.8 A sense of belonging to a cultural group stems from communal activities, shared values and common goals.

Another limitation of the individualist–collectivist dichotomy is that cultures comprise complex social and cultural subgroups. Nevertheless, the individualist–collectivist categorisation provides general principles that may help you to better understand the young people you work with.

UNDERSTANDING OTHERS

So far, we have learnt that the development of self-understanding is a complex process influenced by many factors, including those of a social and cultural nature. We now consider the interaction between self-understanding and our understanding of other people. In this section, moral development is explored along with emotional development, specifically our ability to understand other people because of these developmental processes.

MORAL DEVELOPMENT

morality
The fundamental questions of right and wrong, justice, fairness and basic human rights

As children's sense of self develops, they encounter situations that extend and challenge their thinking about what is 'moral'. **Morality** is concerned with fundamental questions of right and wrong, justice, fairness and basic human rights. Cultural values and norms have a strong bearing on how individuals think and act, so notions of 'morality' are mediated by sociocultural factors. Nevertheless, attitudes towards issues such as lying, stealing and murder are generally considered to be shared across cultures (Nucci, 2001). The study of moral development in educational psychology is particularly interested in how young people develop or learn a sense of right and wrong, and how they learn to reason about challenging social or moral issues.

Moral development as socialisation

Like other dimensions of development, moral development progresses gradually. There are several views about how this occurs. One approach argues that children develop morals as a result of gradual immersion and socialisation into the adult world (Leman, 2001). This view adopts the principles of social learning theory (see Chapter 5). Social learning theorists such as Bandura (1977, 2001) contend that we learn to behave in moral or immoral ways primarily by observing others, particularly parents, caregivers and significant others such as teachers and peers. The view that moral development is moulded by society's values has been supported by theorists who claimed that the quality of children's relationships with their parents greatly influences moral development (for example, Durkheim, 1925/1961; Freud, 1930/1963). Clearly, this view is limited by the fact that people do not always conform to social values and sometimes they deliberately violate cultural norms of behaviour, but these behaviours are not necessarily immoral. For example, people may choose to stand up against something they see as unjust, even though that practice or belief is rooted in social values.



Source: Matthew Duchesne, © Milk and Honey Photography, 2010.

FIGURE 4.9 We learn to behave morally, in part, by observing parents and significant others.

Moral development as moral reasoning

An alternative to the socialisation approach is the argument that children actively construct their own ways of understanding the world, including what is right and wrong, good and bad. This seems to be evident in Jake's comments about his friend Jonno's behaviour at the start of this chapter. Cognitive-developmental approaches emphasise moral reasoning rather than moral behaviour alone, yet they do not rule out the impact of social context. Moral reasoning involves analytical thinking about why we respect and follow 'moral rules' (Piaget, 1932). A moral rule is a generally accepted rule about human behaviour within a particular society. For example, 'You should not steal' is a moral rule in most Western communities (Langford, 1995), and Jake appears to be developing a reasoned moral stance on this issue.

Piaget and moral reasoning

Piaget proposed that cognitive development is connected to the individual's ability to reason morally. To test his theory, Piaget developed carefully constructed stories, or a **moral dilemma**, about issues such as clumsiness, stealing and lying that are relevant to the lives of children and adolescents. The stories were designed to provoke a judgement about the level of guilt or naughtiness of the young people in the story. Piaget's findings led him to describe two types of moral reasoning, which are closely aligned with cognitive development: heteronomous morality and autonomous morality.

moral dilemma
A moral problem requiring individual judgements and moral reasoning

Heteronomous morality is typical of younger children (aged four to 10 years). It focuses on following rules unswervingly and obeying authority figures such as parents, whose moral authority is supreme. Children who reason about moral issues using heteronomous morality do not consider the motives or intentions behind actions. Heteronomous morality is most typical of children; the ages given are only a guide, as some adults are thought to operate at this level of moral reasoning.

heteronomous morality
Moral decisions based on the rules of authority figures such as parents

The ability to reason about moral issues at a deeper level is known as **autonomous morality**, and is characterised by a capacity for appreciating the perspectives of others and the motives behind words and actions. The development of autonomous morality parallels the development of formal operations and abstract thought, which typically occurs at approximately 10 or 11 years old and continues through to adulthood. Jake seems to be right on the cusp of developing an autonomous sense of morality.

autonomous morality
Moral reasoning that appreciates the perspectives of others and the motives behind their words and actions

Piaget's theory was broadly correct about the change in moral reasoning over time, but, as illustrated by Kohlberg's expansion of the theory, the development of children's moral reasoning is more extensive than that envisaged in Piaget's two stages. In particular, young children are not quite as limited in moral understanding as the heteronomous stage would suggest.

Kohlberg's theory of moral development

Like Piaget, Kohlberg believed that moral reasoning was closely linked to cognitive development, and he used a methodology similar to Piaget's to collect his data (see Box 4.5). Kohlberg proposed a complex six-stage sequence of moral development taking place within three broad levels (see Table 4.5). Progress from one stage to the next comes about through a combination of cognitive development and socialisation. As we interact with others, learn to appreciate differing viewpoints and have our own views challenged, our mental processes are stimulated and we develop new ways of interpreting the world and making moral judgements.

BOX 4.5 ABOUT LAWRENCE KOHLBERG

Lawrence Kohlberg (1927–87) grew up in New York and attended Andover Academy, an academically demanding private high school in Massachusetts. He did not go straight to university but instead joined the Israeli army. In 1948, Kohlberg enrolled at the University of Chicago, where he scored so highly on admission tests that he only had to take a limited number of courses to earn his Bachelor's degree, which he completed in a year. He stayed on at Chicago for graduate work in psychology. At first he planned to become a clinical psychologist, but he soon became interested in Piaget's work and began interviewing children and adolescents on moral issues. Kohlberg taught at the University of Chicago from 1962 to 1968 and at Harvard University from 1968 until his death in 1987.

Kohlberg was an unassuming man. When he taught, he frequently went to class dressed in a flannel shirt and baggy pants – as though he had thought it was his day off. He usually began by asking questions in an off-the-cuff manner. In the first days of the university year, students did not always know what to make of him, but they soon realised they were in the presence of a true scholar – a man who had thought long and deeply about critical issues in philosophy and psychology. Unfortunately, Kohlberg suffered from a tropical disease and bouts of depression that caused him intense pain during the last 20 years of his life. At the age of 59, he walked into a river and drowned; it is believed he may have ended his own life.

Source: Adapted from Crain, William, *Theories of development: Concepts & applications*, 4e, © 2000, pp. 147–8. Adapted by permission of Pearson Education, Inc., Upper Saddle River, NJ.

Source: Getty Images/Lee Lockwood/Time & Life Pictures



FIGURE 4.10
Kohlberg believed that moral reasoning was closely linked to cognitive development.

TABLE 4.5 Kohlberg's stage theory

LEVEL I: PRECONVENTIONAL MORALITY	
Stage 1 Heteronomous morality	• Avoidance of breaking rules for fear of punishment • Obedience for obedience's sake
Stage 2 Individualism, instrumental purpose and exchange	• Acting in accordance with individual interests – fairness is an equal exchange based upon motivations of self-interest
LEVEL II: CONVENTIONAL MORALITY	
Stage 3 Mutual interpersonal expectations, relationships and interpersonal conformity	• Living up to what is expected of you • Mutual relations of trust and respect should be maintained provided they conform to your expected social role
Stage 4 Social system and conscience	• Rules are to be upheld except when they conflict with other social duties • Right is contributing to society and fulfilling social duties
LEVEL III: POSTCONVENTIONAL MORALITY	
Stage 5 Social contract or utility and individual rights	• Awareness of the social contract between individuals, but also of the different moral perspectives of others • Some individual rights, however, transcend the different perspectives of others and therefore should be upheld
Stage 6 Universal ethical principles	• Following self-chosen ethical principles • When such principles conflict with existing moral standards, these principles should be upheld regardless of majority opinion

Source: Adapted from *Psychology: Themes and variations* (with InfoTrac) 5th ed., p. 455, Figure 11.16, by Wayne Weiten. © 2001. Reprinted with permission of Wadsworth, a division of Cengage Learning.

Like Piaget, Kohlberg used a moral dilemma to explore the development of moral reasoning. The 'Heinz dilemma' (Box 4.6) formed the basis of much of Kohlberg's research on moral reasoning. Kohlberg presented this dilemma to his research participants, and took great interest in their response to the final question. Based on their responses, Kohlberg arrived at his six-stage model of moral reasoning.

CourseMateExpress
Online resources
Explore an example of moral development stages with the **Interactive Activity**.

BOX 4.6 RESEARCH LINKS

THE HEINZ DILEMMA

Kohlberg presented his research participants with dilemmas such as the following 'Heinz dilemma'. At the end of the dilemma, Kohlberg asked his participants to answer a seemingly simple question. However, he was not actually interested in their answer to this question, but in their *reasoning* and explanation for their answer.

In Europe, a woman was near death from a particular kind of cancer. There was one drug that doctors thought might save her – a form of radium that a pharmacist in the same town had recently discovered. The drug was expensive to produce, but the pharmacist was charging 10 times the cost of production – he paid $200 for the radium and charged $2000 for a small dose of the drug. The sick woman's husband, Heinz, went to everyone he knew to borrow the money, but he could only raise about $1000. He told the pharmacist that his wife was dying and asked him to sell the drug cheaper or let him pay later. But the pharmacist said: 'No, I discovered the drug and I'm going to make money from it'. Heinz became desperate and broke into the pharmacy to steal the drug for his wife.

Should Heinz have done that?

Source: Adapted from Kohlberg (1963, p. 19).

preconventional morality
Morality is seen as a set of rules handed down by adults

conventional morality
Being a good member of society and helping those close to you is a priority

postconventional morality
Individuals move beyond the conventional rules of their community to focus more broadly on what is best for society at large, and on ways of promoting justice in society

In Level I (**preconventional morality**), children do not yet see themselves as members of society, and understand morality as a set of rules handed down by adults. As children move from Stage 1 to Stage 2, they begin to see that there may be different views on a single issue. However, they are still self-focused and reason in terms of what will benefit them. In Level II (**conventional morality**), older children and adolescents start to see themselves as conventional members of society. In Stage 3, being a good person and helping those close to you, such as family and friends, is a priority. As the individual moves to Stage 4, the reasons for behaving morally revolve around obeying society's laws in order to maintain law and order.

In Level III (**postconventional morality**), the focus is on what is best for society and on ways of promoting justice. While in Level II the smooth functioning of society is paramount, in Level III people begin to ask 'How can we improve society?' and 'What is just and fair for all?'. In Stage 5, for example, individuals may argue that it is appropriate to break some laws if this means protecting the rights of all. At this highest stage it may be possible to suggest a range of responses to the Heinz dilemma, such as it is right to steal the drug because the value of human life is a right above all else, or, it was wrong to steal the drug because other people may need it too, and stealing it prevents everyone from benefiting from the drug. However, due to difficulties with scoring responses at this highest stage, Kohlberg eventually labelled it a 'theoretical' stage and collapsed stages 5 and 6 in his later analyses (Colby, Kohlberg & Kauffman, 1987).

Neo-Kohlbergians

Some theorists have rejected Kohlberg's view of morality, but neo-Kohlbergians contend that his theory is still valid, although some elements require modification. Recognising the limitations of a stage theory, Rest (1979, 1986) built on Kohlberg's work and proposed the Four-component Model for describing moral behaviour. Rest initially presented moral understanding as one of four interactive psychological processes, and later added a fifth process known as moral character:

- *moral judgement* – being able to judge the ethics of possible responses; to weigh up and judge the merits of different arguments and positions
- *moral sensitivity* – being sensitive to the emotions and interpretations of others
- *moral motivation* – the goals and drives of our moral decisions and behaviours; can we put others needs or perspectives before our own?
- *moral action* – once a moral decision has been made, implementing the decision with sensitivity; being able to communicate the decision to others and express reasons for actions
- *moral character* – having strength in your convictions; being courageous and persisting despite obstacles

Sources: Rest (1986); Bebeau, Rest and Narvaez (1999).

CourseMateExpress
Online resources
Go further: Read more about the Defining Issues Test on this text's website.

Rest emphasised that moral judgement is a process of deciding what is a moral thing to do in a moral dilemma. According to Rest and other neo-Kohlbergians, moral judgements reflect a person's underlying organisation of thought about matters of right and wrong. Rest and colleagues (Rest, 1986; Rest & Narvaez, 1994) developed an instrument – the Defining Issues Test (DIT) – that highlights the role of moral judgement in moral development (see also Rest, Thomas & Edwards, 1997). Neo-Kohlbergians like Rest have responded to the limitations of Kohlberg's theory by examining the role of factors such as age and education trends, cross-cultural issues and educational interventions in moral development.

Strengths and limitations of Kohlberg's theory

Kohlberg's theory provides a comprehensive guide for understanding how moral reasoning progresses, and represents one of the most coherent attempts to chart the development of moral reasoning over time. Kohlberg's theory places moral reasoning in a sociocultural context, emphasising that we are

influenced by and, in turn, influence those around us by our actions. However, his theory has several limitations.

MORAL REASONING VERSUS MORAL BEHAVIOUR

An important assumption of cognitive approaches is the belief that our reasoning or understanding is a driving force for our behaviour. Indeed, higher levels of moral reasoning are related to positive interactions with others (Schonert-Reichl, 1999; Walker, Hennig & Krettenhauer, 2000). However, there are many examples in everyday life in which people's capability to reason morally is not necessarily associated with their behaviour. Take the example of damage to someone else's property, such a scratch or dent in your car the last time you parked in a public car park. Did the perpetrator leave a note to explain the damage, or offer compensation? Perhaps they didn't. Most adults would probably believe it is wrong to damage someone else's property, but many adults may not uphold this behaviour themselves, such as in the example given above. As we will see below, some people have questioned the role of stages in defining the level of moral reasoning, with some evidence that people slip between stages as the circumstances dictate.

PROBLEMS WITH STAGES

We have learnt (see Chapter 3) that stage theories can be problematic, and a number of criticisms have been levelled at Kohlberg's theory in this regard. First, it must be stated that a wide range of longitudinal research shows that people *do* generally progress through the stages in the predicted sequence (for example, Colby et al., 1983; Rest, 1986). However, the stages are not self-contained: children may be predominantly in one stage, but may reason at a different stage depending on the situation. There is some evidence that real-life moral dilemmas result in slightly lower levels of reasoning, perhaps because the circumstances or the personal stakes are higher. For example, moral reasoning is lower in dilemmas that indicate the person may be punished or negatively affected in some way (Sobesky, 1983). Do you think this may explain the way adults resolve the 'car park dilemma' when owning up (or not!) to damaging someone else's property? Could their fear of 'punishment', or of having to pay for the damage, affect their level of moral reasoning?

CULTURAL CONSIDERATIONS

Another problem associated with the stage-based theory is the assumption that the stages are universal or applicable to all people. Kohlberg (1987) argued that his theory holds true across cultures, based on research in such countries as India, Taiwan, Kenya, Japan and Israel. These findings were supported by other researchers at the time (for example, Power, Higgins & Kohlberg, 1989; Snarey, 1985), many of whom were Kohlberg's contemporaries (see contradictory evidence below).

Recent research has considered in greater depth the elements of cultural difference in the way people reason and develop morally. This research has found that cultural variations do exist, and Kohlberg's theory has been criticised for failing to take account of the importance of cultural differences, social conventions and contexts on the development of moral reasoning (Miller & Bersoff, 1992). Nucci (2001) argues strongly that moral reasoning is connected to the social conventions and the sociocultural contexts in which individuals live. There is some evidence, for example, that people holding predominantly individualistic cultural values (such as those dominant in Australia and in the United Kingdom) interpret moral questions differently from people in typically collectivistic cultures (such as those of Japan and India) (Markus & Kitayama, 1991). The concern with any generalisation about moral reasoning in any culture is that these cultures are far from homogeneous, and the effects of increasing globalisation will no doubt spur further research in this area.

GENDER ROLES

An important limitation of Kohlberg's initial research was the fact that it was conducted exclusively with males aged 10 to 16 years who came from middle- and lower-class families in Chicago. Moreover, Kohlberg's moral dilemmas are predominantly male-oriented, such as Heinz's dilemma (see Box 4.6). One of Kohlberg's own PhD students, Carol Gilligan, raised concerns about the gender bias in Kohlberg's

research (Gilligan, 1982). Gilligan argued that girls reason in a different way (probably because they are socialised into the female gender role) and their moral reasoning is centred around an 'ethic of care' and concern for others. This level of reasoning is reflected at stages 3 and 4 of Kohlberg's model, which is seen as a lesser level of moral reasoning. However, later studies have shown that both males and females reason in similar ways about the Kohlbergian dilemmas (Jadack, Hyde, Moore & Keller, 1995; Walker, 1995), with some notable differences for females in certain areas, as will be discussed below (Garmon, Basinger, Gregg & Gibbs, 1996).

Despite these limitations, Kohlberg's theory has inspired ongoing research and debate in the field of moral development. Later research on moral development is an example of this.



THINK ABOUT

- Kohlberg argued for a connection between emotional development and moral reasoning. Can you explain some ways that emotion may be linked to moral reasoning?
- Should principles such as 'always tell the truth' or 'never cheat' be taught as absolute principles (that is, as being always the case), or as qualified principles (that is, as being sometimes the case)? Can you think of examples or contexts that might run counter to absolutist moral positions such as these? (Adapted from Leming, 2000.)

Further perspectives on moral development and values

There are ongoing debates about what is of value in moral terms, whether there is a universal core set of values that binds individuals across cultures, and whether or not educators play a role in moral development. We cannot examine all these questions here, but we encourage you to consider them carefully for yourself and in your class discussions.

Several other theories have been proposed, including Gilligan's ideas of female moral development.

Gilligan's theory of feminine moral reasoning

As outlined above, Gilligan (1982) raised significant concerns about Kohlberg's theory of moral development, noting that the primarily male orientation of Kohlberg's theory centres on concerns about justice, rules and rights as reasons for acting morally. Her research on women's morality found that women considered interpersonal relationships, connections between people, compassion and care for others as important reasons for behaving morally. Gilligan contended that, because males and females reason differently about moral dilemmas, females tend to score lower than males on Kohlberg's scoring system.

Gilligan's views have been challenged (Crain, 2000; Walker, 1984; see also Evans, Forney & Guido-DiBrito, 1998), but there is general acceptance that there are two different moral orientations – one focusing on justice and one motivated by care and compassion. Although studies show that the care orientation tends to be more apparent among women and girls (Garmon, Bassinger, Gregg & Gibbs, 1996), another approach is to realise that both the justice and the care-and-compassion orientations may exist in females and males. For example, Vikan, Camino and Biaggio (2005) found no relationship between gender and an ethic-of-care orientation. Gilligan (1982) herself acknowledged that, as people progress in their moral development, the two orientations become more closely connected and integrated in both sexes (see also Walker, DeVries & Trevethan, 1987).

Eisenberg's theory of prosocial moral reasoning

Prosocial moral reasoning is concerned with social dilemmas in which our thinking is in conflict with another person's needs, in situations where laws or rules don't apply (Carlo, 2006). Examples of prosocial reasoning include the development of beliefs about helping others, showing empathy and concern, or resolving conflicts. Like Kohlberg, Nancy Eisenberg (1986, 1989) also adopted a stage-based theory to explain prosocial moral reasoning. As with other stage-based theories we have studied (for example, Piaget

and Kohlberg), Eisenberg's model shows children moving through more egocentric or 'hedonistic' stages, to having a greater concern for others, and incorporation of more abstract views of dignity, rights and equality (Eisenberg, 1982). However, Eisenberg believed that people could move across stages depending on the context and demands of the situation, although her research has found that higher levels of reasoning are associated with age-based advances in thinking. A number of researchers have found strong links between high levels of prosocial moral reasoning and prosocial behaviour (Carlo, 2006). Emotional capacities, such as the ability to have empathy and sympathy, are also linked to prosocial behaviours that, in turn, are linked to the ability to inhibit aggression or antisocial behaviours, and to show greater community awareness and greater sensitivity to intergroup processes (Eisenberg, Eggum & Di Giunta, 2010).

There are also some suggestions that confirm Gilligan's thoughts about the care-and-concern orientation of girls and women. Research has found modest gender differences in prosocial moral reasoning (Eisenberg & Fabes, 1998), with a large-scale review of studies concluding that girls and women tend to score higher than men in levels of prosocial reasoning (Jaffe & Hyde, 2000). Prosocial reasoning is also considered very important in the emotional development of children, as we will see later in this chapter.

Bandura's theory of moral agency and disengagement

Employing his social-cognitive theory, Bandura strongly believes that moral agency is the linking concept between moral behaviour and moral reasoning (Bandura, 2002). Moral agency describes the use of self-regulatory processes to mediate the link between moral reasoning and moral behaviour. In this view, people are capable of monitoring their conduct and the situations in which certain behaviours occur, they are capable of self-assessing or evaluating their response against their own moral standards, and they may moderate their behaviour through feelings of guilt or acknowledging that their behaviour is wrong. Bandura is particularly interested in why people choose to ignore known moral standards and engage in moral behaviours that don't match these standards. He called this moral disengagement. This theory proposes that humans self-activate or self-regulate the application of these moral standards and, most critically, are also capable of deactivating or disengaging from these same moral standards. Bandura termed these 'psychological manoeuvres' in which a person could disengage these standards from reprehensible or inhumane conduct (Bandura, 2002, p. 102). Obvious examples of such reprehensible or inhumane conduct might be seen in catastrophic acts of human genocide, torture or other acts that run so counter to typical moral standards.

More recently, the theory of moral disengagement has been employed to examine a range of other puzzling inhumane acts such as engagement in political or religious extremism (Lieber, Efreom-Lieber & Rate, 2010), organisational unethical behaviour or corruption (Moore et al., 2012) and schoolyard bullying (Hymel, Rocke-Henderson & Bonanno, 2005). Moral disengagement is emerging as a novel way to view the disjuncture between moral reasoning and moral behaviour.

CourseMateExpress
Online resources
Watch a **video** interview with Albert Bandura that discusses moral disengagement.

Moral development in education

One of the other questions raised by the study of moral development concerns the role of school education in teaching students about moral behaviour. In recent years, a range of terms have been used – including 'values education' and 'character education' – to express this debate. Haydon (2004) argues that, just as we have responsibility for the quality of the physical environment in which we live, so we should collectively attend to the quality of the ethical environment by integrating values into education. However, he acknowledges that teachers might be understandably cautious of exactly what their role should be in promoting this notion of values and ethics. Haydon suggests that the notion of ethics and values in education need not be seen as very different from what teachers are already doing in their classrooms, in so far as they are concerned with maintaining a suitable ethical environment for their students. However, Haydon cautions that there may be greater concern about values education approaches that suggest a one-dimensional view, which might be promoted to all schools through a

common program. Rather, schools are quite pluralistic environments, in which a range of different viewpoints could be considered healthier (Haydon, 2004).

In the past decade, Australia has strongly promoted values education at a curriculum level. For example, in Western Australia, five core values have been identified as part of that state's curriculum framework (Curriculum Council, 1998). The minimum set of core values comprises those that are considered to be held by members of Australia's multicultural society, taking into account certain shared values that are distinctive to Aboriginal culture. The core values can be summarised as:

1 a pursuit of knowledge and a commitment to the achievement of potential
2 self-acceptance and respect of self
3 respect and concern for others and their rights
4 social and civic responsibility
5 environmental responsibility.

New South Wales has trialled a secular ethics curriculum for students in years 5 and 6, resulting in positive engagement from students and increased use of ethical principles in their responses to ethical problems (NSW Department of Education and Training, 2010). Core values are acknowledged in multiple curriculum frameworks around Australia and in New Zealand. For instance, in the New South Wales Geography syllabus for years 7 to 10, the aim of the course is to help students develop values in the form of a commitment to ecological sustainability, a just society, intercultural understanding and lifelong learning (NSW Board of Studies, 2000). In New Zealand, Māori values, including spirituality, are integrated into the national curriculum for secular schools. A study of Māori teachers (Fraser, 2004) highlighted their shared view that moral decisions often reflect spiritual beliefs and practices. Fraser argues that schooling has a moral obligation to reflect indigenous values if understanding, respect and cultural identity are to be maintained and fostered.

Webster (2007) and Noddings (2002) have also raised concerns about the promotion of generalised approaches to values and character education, identifying some practices as potentially 'indoctrinatory' and stifling students' ability to raise questions or debate the values being promoted. For example, Webster suggests that rather than children being expected to conform to a single, 'universal' set of values, it may be more relevant to foster the capacity of students to think critically and evaluate values.



THINK ABOUT

- What are your views about moral values in education? Do you agree that ethical or spiritual values should form part of the school curriculum?
- What kinds of values do you remember learning about at school? How will these affect your own teaching?

As an educator, it is impossible for you to stay out of the debate about moral and values education; as suggested by Haydon (2004), values and ethics are already promoted in the outcomes and aims we expect our students to develop. The challenge is to develop ways of enhancing your students' capacity for critical moral reflection and debate within the safety and support of your classroom (Nucci, 2001). Nel Noddings has implored educators to return to an overall ethic of caring in schools and classrooms, and the development of a shared vision of care and concern for others (Bergman, 2004). She has suggested that teachers have a role to play in modelling and demonstrating an ethos of care and respect by upholding these values in relationships with their students (Noddings, 1990). Indeed, research indicates that a classroom characterised by predictability, trust, emotional warmth and reciprocal respect is conducive to the development of the moral self (Arsenio & Lover, 1995). Some strategies to guide your practice are outlined in Box 4.7.



BOX 4.7 IMPLICATIONS FOR EDUCATORS

STRATEGIES FOR FOSTERING MORAL DEVELOPMENT AND VALUES

- Develop an attitude of respect for children and young people. This respect is expressed in your classroom organisation and management, in activities, and in your interactions with learners.
- Make time to learn about your students' interests, feelings, values and ideas.
- Expose learners to different viewpoints. Encourage class discussions about current news items. Give learners opportunities to think about moral problems.
- When discussing sensitive moral issues, let students know ahead of time what is appropriate behaviour. For example, all voices will be heard unless they are deliberately offensive and contravene basic human rights. Respect for each other both inside and outside the classroom is essential. Manage the classroom environment by using reasoning and positive emotions. Be proactive rather than reactive.
- Social experiences stimulate mental processes and help to promote development. Consider excursions or guest speakers to encourage social interactions and exposure to different viewpoints.
- Debates challenge students' positions on topics and further stimulate mental processes.
- Role-playing opportunities help learners imagine what it would be like to be someone else. As young people discuss issues and try to work out how to deal with their differences, they begin to come to terms with the concepts of fairness and justice.
- Develop cases, problems or scenarios that involve these values so that students can discuss them.
- Provide opportunities for students to discover how various cultural groups reason about moral issues.
- Every subject – even disciplines such as mathematics that may appear to lack obvious moral content – offers opportunities for helping students develop their skill in moral reasoning. Every group can become a learning community in which values of mutual respect, sensitivity to others' needs and cooperation are emphasised and discussed.

Source: Adapted from Crain, William, *Theories of Development: Concepts & Applications*, 4e, © 2000, pp. 147–8. Adapted by permission of Pearson Education, Inc., Upper Saddle River, NJ.

EMOTIONAL DEVELOPMENT

You may have noticed that each of the topics we have discussed so far contains some references to the emotional states of or consequences for people when they are engaging with developmental tasks such as self-perception, identity or moral reasoning. Increasingly, educational psychologists and researchers acknowledge that emotions are central to learning and teaching, and that an understanding of their role in the learner's experience is essential (Schutz & Lanehart, 2002). Emotional development plays a central role in our capacity to understand ourselves and others.

An **emotion** is a mental or physiological state associated with a wide variety of feelings, thoughts and behaviours. We usually experience emotions as a type of mental state that is closely connected to our actions and sense of wellbeing. It is well accepted that humans are born with a biological capacity for experiencing a range of **basic emotions**, and that emotions are also shaped by interaction with the social environment, including cultural and social forces (Fischer, Wang, Kennedy & Cheng, 1998; Menon, 2000; Panksepp, 2004). Recent theories of emotional development can be organised around functionalist and social constructivist perspectives.

The **functionalist perspective** maintains that emotion is a central force that directs, shapes and organises our behaviour (see Barrett & Campos, 1987; Fischer, Wang, Kennedy & Cheng, 1998; Lazarus, 1991). This perspective includes the study of emotion in relation to cognitive processing; in other words, emotion helps us make meaning of our world in ways that cold, hard, rational thinking cannot (Dalgleish & Bramham, 1999). Emotions such as fear can redirect our thinking to work out safer solutions to a problem; a certain level of anxiety can sometimes direct us to focus on a task, but just a little too much anxiety can tip us over the edge into poor cognitive processing (see Chapter 8).

emotion
A mental or physiological state associated with thoughts, feelings and behaviours

basic emotions
The emotions that babies are born with, such as happiness, sadness, anger and fear

functionalist perspective
An approach that views emotions as shaping and organising thoughts and behaviours



Source: Matthew Duchesne, © Milk and Honey Photography, 2006

FIGURE 4.11 This young child's emotions are clearly conveyed to his parents through facial expressions, body language and crying.

Functionalist perspectives also examine the role of emotion in shaping our social behaviour. For example, our ability to interpret and understand emotional expressions plays a critical role in our survival. By the time infants are three months of age, they and their mothers have developed a complex array of emotional signals to convey and respond to emotion, including the ability to convey 'stranger danger' and fear, along with warmth and security (Boccia & Campos, 1989) (see Figure 4.11). Another critical area of research in the functionalist approach concerns the interaction between emotion and health. For example, states of psychological stress can depress the body's immune system, leading to ill health and development of the common cold virus (Cohen, Tyrell & Smith, 1991). Emotional deprivation in the mother–child relationship has been associated with the child's failure to thrive and develop at an expected rate (Iwaniec, 2006).

The **social constructivist perspective** is largely reflected in the work of Carolyn Saarni and colleagues. This perspective incorporates elements of the functionalist perspective but also emphasises the role of the context in shaping our interpretation of situations. In this view, emotion allows an individual to maintain or change a relationship with their environment on a matter of importance to that person (Saarni, Mumme & Campos, 1998). Both the functionalist and social constructivist perspectives suggest that emotions also have strong ties to our social functioning and ability to cope with our world. Saarni (1999) describes this ability as **emotional competence**. Saarni's view of emotional competence incorporates both the functionalist and social constructivist approaches, and has great relevance to understanding the role of emotion in the lives of children and young people. Table 4.6 outlines the key skills of emotional competence described by Saarni (1999).

social constructivist perspective An approach that emphasises the role of the social context in shaping the development of emotional understanding

emotional competence The skills needed to negotiate the demands of the immediate social context

Each of the emotional competencies presented in Table 4.6 are interdependent – this means that skill or ability in one area is dependent on the development of skill in another area. For example, the development of a child's emotional vocabulary helps the child understand the emotions of other people because they can label and think about other's feelings with greater accuracy (Buckley, Storino & Saarni, 2003). The development of these competencies is closely connected to our relationships with other people. Parents, for example, play a key role in shaping the development of competence when they explain their own emotions to children and discuss why the emotion occurred. Buckley, Storino and Saarni (2003) also believe that schools play a central role in helping children to develop the skills of emotional competence, and this in turn will assist children in reaching their educational goals. The following section explores several features of emotional development that hold important implications for learning and relationships with others.

Emotional competencies and their development

The first of Saarni's (1999) emotional competencies requires *awareness of our emotional state*. The ability to be aware of one's emotional state is also referred to as the development of **self-conscious emotions** (Lewis, 1993b; Saarni, Mumme & Campos, 1998). Self-conscious emotions vary with age. They first appear between 18 and 24 months, when babies are capable of experiencing pride, shame and embarrassment. By about three years of age, children are able to experience emotions of envy and guilt

self-conscious emotions Higher-order emotions (such as pride and shame) that require advanced cognitive processes and a capacity to understand how the self might be harmed or enhanced

TABLE 4.6 Skills of emotional competence

SKILL	UNDERSTANDING REQUIRED
1 Awareness of our emotional state	It is possible to experience more than one emotion at a time; awareness that we might not be entirely conscious of our feelings
2 Ability to discern the emotions of other people	Ability to read situational and expressive cues, such as facial expressions, that hold a clear emotional meaning
3 Ability to use the vocabulary of emotion	Our culture and subcultures have a common language to describe emotion, and cultural scripts (schemes) that link emotion with social roles
4 Capacity to be empathic and sympathetic	To be involved in others' experiences by showing care and concern
5 Understanding that inner emotional feelings need not match outward emotional expressions	It is possible for the self and others to hide emotional feelings; awareness that our emotional expression can affect other people and ability to alter our presentation if necessary
6 Ability to cope with unpleasant and distressing emotions	To use self-regulation skills to soften or lessen the effect of our emotional states
7 Awareness that relationships are partly defined by immediate and honest emotional expressions	There is an expectation in mature, close relationships of the mutual sharing of genuine emotions
8 Emotional self-efficacy	To feel confident and satisfied with our emotional state and capable of achieving a balance in our emotional state.

Source: Adapted from Saarni (2000), pp. 77–8.

(Lewis, 1993a; Sroufe, 2000). In the early years, these emotions are evoked primarily through adults' influence, such as when adults' praise for a job well done evokes pride in a child. Alternatively, parents or caregivers punish children for lying, making them feel shame and guilt for being deceitful (Zahn-Waxler & Robinson, 1995). Later in life, as a sense of self develops, external agents are no longer necessary in order to arouse these emotions. We feel proud of our accomplishments or ashamed of our weaknesses, usually no matter what others think.

These are known as 'higher-order' emotions because they require higher-order cognitive processing such as metacognitive awareness (see Chapter 2) and because they depend on our capacity to reflect on our self. Self-conscious emotions are associated with our core values, such as the valuing of good academic results, or the valuing of others' opinions of our honesty or trustworthiness (Turner, Husman & Schallert, 2002). To experience self-conscious emotions, we require an awareness of our self and of the ways in which that self might be harmed or enhanced. Higher-order emotions develop with adults' encouragement. For example, we experience the emotion of pride when we feel positive about ourselves for doing a good job. Thus, if a teacher praises a student for doing well on a test, the student feels proud of his achievement. Conversely, that student may feel shame if he fails a test and his parents are disappointed or even angry. The student's sense of self is harmed and he feels negative about himself for his failure.

Being aware of our emotional state is a necessary precursor to our ability to *discern the emotions of others*. This form of emotional understanding is a cornerstone of our ability to understand and get along with others. Emotional understanding expands rapidly in early childhood when children take cues from the facial expressions of parents or caregivers to interpret situations. Relying on the emotional signals and cues of others is called **social referencing**, as infants look to caregivers and other adults for clues about their social world.

social referencing Taking cues from another person's emotional reaction to interpret a situation

It seems that the easiest facial expressions to interpret are positive ones, such as happiness, whereas negative emotions such as fear, anger or sadness are more difficult for children to interpret (Fabes, Eisenberg, Nyman & Michealieu, 1991; Gross & Bailiff, 1991). As children grow older, they are more able to incorporate additional information to help them make sense of the emotions of others. For example, older children are more able to infer or predict a person's likely emotional response based on knowledge of that person's previous response in a similar situation. Younger children tend to rely on current contextual information to judge a person's likely emotional response (Gnepp, 1989; Gnepp & Gould, 1985). This difference appears to be attributable to the abstract and higher-order thinking skill associated with being able to infer or predict an outcome by transferring information from one time point to another.

The skill of discerning emotions has important implications for children's relationships with peers. Children who are very good at discerning emotions are better accepted by their peers (Cassidy, Parke, Butkovsky & Braungart, 1992; Walden & Knieps, 1996). In contrast, children who are rejected by their peers sometimes misinterpret or misread the social cues conveyed in the emotional responses of those peers (Crick & Dodge, 1994). This is discussed in more detail in the next section of this chapter, in which we examine the development of relationships between children.

One of the most important emotional skills that connects us to others is the *capacity for empathy and sympathy*. Empathy is the ability to detect others' emotions, take their perspective and understand how they might be feeling, while sympathy is the capacity to feel for others (Saarni, Mumme & Campos, 1998; Zahn-Waxler & Radke-Yarrow, 1990). The ability to respond to the feelings of others with empathy and sympathy begins early in life. Zahn-Waxler, Radke-Yarrow, Wagner and Chapman (1992) investigated empathy in children from the ages of one to two years. At one year of age, children tried to pat, hug or touch a person showing distress; by 18 to 20 months of age, children added other gestures such as trying to give the distressed person a blanket and verbalising their concern: 'Are you OK?'; and by two years of age, children expressed even more empathy in shows of concern and a willingness to offer help.

perspective taking
The ability to imagine the self in another's position and to understand others' feelings

prosocial behaviour
Positive social behaviours, such as helpfulness, intended to benefit others

As children move through the school years, the capacity for perspective taking assists the development of empathy. **Perspective taking** is the ability to imagine oneself in another's position. Empathy and perspective-taking skills promote **prosocial behaviour**, which is an enduring tendency to think about the wellbeing and rights of others, to feel concern and empathy, and to voluntarily behave in ways that benefit others (Bierhoff, 2002; Eisenberg, Eggum & Di Giunta, 2010; Penner & Finkelstein, 1998). Selman (1976) believed that the core task of perspective taking was the child's ability to coordinate multiple points of view, but the child must also be *willing* to engage with another person's point of view (Selman & Shultz, 1990). Selman's research strategy is explained in Box 4.8.

Selman's five-stage model of perspective-taking skills illustrated development from preschool to adulthood. It shows that the capacity to understand others' feelings is facilitated by the ability to think abstractly (see Table 4.7).

Although children begin to show empathy quite early in life, Selman's research suggests that it is not until late childhood or early adolescence that children develop more sophisticated perspective-taking skills. This view suggests that young children tend to be more egocentric and have difficulty incorporating the viewpoints of others, while adolescents can move beyond individual concerns to consider the perspectives of a wider range of people. They become more concerned with whole groups of people and with larger issues such as poverty in the Third World, or the greenhouse effect and its impact on world population.

BOX 4.8 RESEARCH LINKS

SELMAN'S PERSPECTIVE-TAKING STAGES

Robert Selman interviewed young people and asked them to respond to stories that presented a social dilemma. The following is an extract from a story known as 'Holly's dilemma'. After reading the story, children respond to the questions.

Holly is an eight-year-old girl who likes to climb trees. She is the best tree climber in the neighbourhood. One day she falls off a branch and her father becomes upset and asks her not to climb trees anymore. Holly promises not to. Later, Holly meets up with her friend Sean, who is upset because his kitten is stuck up a tree. Something has to be done straight away or the kitten may fall. Holly is the only one who can climb trees well enough to reach the kitten, but she remembers her promise to her father.

- Should Holly climb the tree?
- Does Sean understand why Holly can't climb the tree?
- If Holly climbs the tree, what would her father think?
- Should Holly be punished if she climbs the tree?

Selman used the children's responses to come up with a five-stage model of perspective-taking ability (see Table 4.7). Before you look at this model, try the first activity listed below.

Source: Adapted from Selman and Byrne (1974).

ACTIVITIES

1 Take a moment to write down your thoughts about whether or not Holly should climb the tree, and whether or not she should be punished if she does.
2 As you read the next section, return to your answers and reflect on the multiple perspectives you included in coming up with your response.
3 Try this activity with a child much younger than yourself. How do their answers differ from your own? Can you identify their stage of perspective taking?

TABLE 4.7 Stages of perspective-taking ability

STAGE	APPROXIMATE AGE (YEARS)	DESCRIPTION	CHILD RESPONSE
Level 0 Undifferentiated	3–6	Limited understanding that the self and others can have different thoughts and feelings	Holly should climb the tree; her father will be happy because he also likes kittens.
Level 1 Social-informational	4–9	Understanding that people have different perspectives because they have different information	Holly's father will be angry if he sees Holly in a tree, but he doesn't know about the kitten. He will be OK if he sees that the kitten is stuck.
Level 2 Self-reflective	7–12	The ability to 'step into another person's shoes' and reflect on their own stance through the other person's eyes	Holly won't be punished because her father will understand why she climbed the tree and wanted to save the kitten.
Level 3 Third party	10–15	The ability to 'step outside' a two-person situation and imagine how another person (the third party) might view the situation	Holly should not be punished because although she knows she shouldn't climb trees, she also knows she should save the kitten. If she can get her father to see this, then she won't be punished.
Level 4 Societal	14 to adulthood	Understanding that the third-party perspective can be influenced by wider societal values	Holly should not be punished because the humane treatment of animals justifies her breaking her promise. Her father also appreciates this value.

Empathy and perspective taking are skills that are expected in many domains of schooling. For example, the capacity to work cooperatively with peers and to take part in debates and discussions requires children to accept that people have different opinions, or may be approaching a problem from another perspective. Clearly, younger children may face limitations in their capacity to engage in higher levels of empathic reasoning. As disciplinary studies advance, children are required to engage in more abstract perspective-taking tasks – in English, they may be asked to 'step into the shoes' of a character, or in History, they may be asked to take the perspective of a person in another time or place. As such, teachers must bear in mind the developmental nature of children's capacity for empathy and perspective-taking ability.

emotional self-regulation
Awareness of and ability to control or alter our emotional state as necessary

Finally, one of the overarching emotional competencies that tie together the effective performance of other emotional skills is our capacity to *cope with our emotions*, also known as **emotional self-regulation**. Regulation of emotion allows children to cope with their emotions by being able to exercise control over them. Good emotional regulation is also related to prosocial moral reasoning (Eisenberg, 1992; Eisenberg & Fabes, 1998), probably because the ability to control and direct emotions helps us to control and direct our thinking more generally. School poses many challenges to children's abilities to control their emotion, such as when they experience the disappointment of failing a test or not being selected for a team. The belief that we can control our emotions and handle stressful situations is associated with our capacity to cope with stressful life events (Frydenberg & Lewis, 2002). Adolescents recognise that positive emotions such as maintaining hope and happiness are an important part of coping (Andrews, Ainley & Frydenberg, 2004). It is not surprising, then, that the capacity for emotional regulation is widely associated with academic success and general success at school (Masten & Coatsworth, 1998). These important aspects of self-regulation are further explored in several other chapters throughout this book. In the following section, we consider the development of our understanding of relations with others.



THINK ABOUT

- Self-understanding is said to be connected to our ability to understand other people (empathy). Can you explain this connection from your own experience?
- What should we teach children about controlling their emotions? Can you identify any cultural 'scripts' or schemes that shape our views of when and how we should regulate our emotional behaviour?

UNDERSTANDING RELATIONS WITH OTHERS

The developing sense of self, and awareness of the thoughts and feelings of others, unfolds in parallel with our understanding of relationships with other people and between other people. In this section, we broadly consider the **social development** of the child, including the development of social competence, peer relationships and the complex issue of bullying. Unlike other areas we have studied, there is no single theory of development that attempts to explain this domain, simply because the area of social development is far too complex. Rather, a number of theorists have developed a broad range of ideas and knowledge about how we develop in the social world.

social development
The development of skills and understanding necessary for forming relationships and participating in the social context

THE DEVELOPMENT OF SOCIAL COMPETENCE

Social competence is a complex term that is made up of many different nuances describing the social, emotional and cognitive skills necessary for everyday life (Welsh & Bierman, 1998). Most theorists

agree that social competence cannot be defined by any single skill or ability, but rather is made up of multiple integrated factors, including the development of specific social skills, our standing and acceptance by others, the relationships we develop, and the functional outcomes we experience (Cavell, 1990; Rose-Krasnor, 1997).

Social skills

Social skills are the highly specific behaviours that must be taught, learnt and performed in order to carry out any social task, such as answering the telephone, greeting a friend, or saying please and thank you (Gresham, Sugai & Horner, 2001). The list of social skills required for everyday interactions is enormous, and many different attempts have been made to categorise and present lists of these skills (see Chapter 7 for further discussion). Caldarella and Merrell (1997) gathered together these various ideas of social skills and classified them into five broad areas, described in Table 4.8.

TABLE 4.8 A list of social skills

SKILL	DESCRIPTION
Peer relations	Complimenting others, offering help, inviting peers to play
Self-management	Controlling our temper, following rules, reaching a compromise in conflicts
Academic	Completing assigned work, listening to teacher directions, producing work of an appropriate standard
Compliance	Following directions, following rules, using free time appropriately
Assertion	Initiating conversations, acknowledging compliments, asking to join in play

The development of social skills varies with age and experience, and it is safe to say that these skills apply across the years of schooling in one form or another. For example, in the early years of school, academic skills might include listening to teacher directions, sitting quietly in a group or raising a hand before answering a question. As we progress through school, students learn other academic skills, such as completing independent homework tasks, managing a timetable, or working in a group effectively. The academic features of these social skills are further discussed in Chapters 7 and 14. In the following sections, you will see how social skills feature in children's play and peer interactions.

Social-skills training is commonly used as an approach to correct perceived deficiencies in children's social behaviours. Psychologists, and sometimes teachers, will measure a student's social skills by rating the child's ability in different types of social skills on a scale. These sorts of tests help diagnose a social skills problem and allow psychologists and teachers to work out a suitable plan for the child. Approaches to social skills training are widely used with learners with emotional and behavioural difficulties, intellectual disabilities, ADHD and many other conditions. It is beyond the scope of this chapter to explain and identify all the different approaches and strategies that have been used, and this information is readily available in other sources. However, because of the popularity of these approaches, it is important to identify some known concerns about them and explain some best-practice strategies. As detailed by Gresham, Sugai and Horner (2001), many social-skills training programs vary in their effectiveness, and some produce only weak results. Many of the problems associated with social-skills training and identified by Gresham and colleagues are summarised in Table 4.9, along with examples of better practice.

TABLE 4.9 Problems and practice implications in social-skills training

TRAINING PROBLEM	PRACTICE IMPLICATIONS
Misdiagnosis of social-skill problem	• Results in the teaching of unnecessary or incorrect strategies, and poor outcomes. • Carefully observe the social behaviour and record on an observation chart; use acceptable measurement tools, and only target the necessary skills.
Mismatch between the training program and the child's needs	• Results in poor outcomes. • Generalised 'off the shelf' packages may not be specific enough to target the child's specific needs. Locate or develop more specific strategies.
Poor training techniques such as adult modelling, instruction through prompting or reinforcement	• Combine strategies such as modelling, coaching and reinforcement. • Peer and self-models are more effective than adult models. • Video of the child performing skills is called self-modelling and may have stronger effects (Bellini & Akullian, 2007).
Generalisation problems: 'pull out' or withdrawal programs that take the child out of the classroom	• Social behaviour is based in specific contexts, so training should occur in naturalistic settings. • Practise informal interventions that use natural events to teach skills (called 'teachable moments') (see example discussed below).
Maintenance problems: programs are too short, with not enough intense practice; child reverts back to previous behaviour	• One-off approaches don't work or don't last long, so take a longer-term approach. • Plan for, assess, respond and follow up on social-skills problems right across the school year, in everyday contexts.
Competing behaviours: teaching is ineffective because of a failure to identify interfering or competing behaviours	• Arise from incorrect identification of the problem in the first place. • Competing or interfering behaviours such as depression or anxiety must also be addressed simultaneously.

Source: Adapted from Gresham, Sugai and Horner (2001).

Table 4.9 provides only a brief list of the factors teachers must be alert for when planning for social-skills training in their classrooms. The most significant of these problems are the failure of training programs to generalise, or for results to be maintained over time. Many tempting offers may flow into schools from various organisations that offer workshops or other strategies that claim to develop social skills, enhance self-esteem and produce a variety of other outcomes. Many of the programs or kits also come at a significant financial cost. Teachers should feel confident in their abilities to ask the right questions and check the credentials and likely effectiveness of these programs. Are the programs employing any sort of assessment to target the social skills needs of learners? Is the training realistic and 'natural' so the skills can be generalised to other settings, such as the classroom and playground? Is the program long term, with follow-up and repeated practices and assessments? Teachers should also acknowledge when they need help and advice, or when a child's competing behaviour problems seem more significant or harmful to their wellbeing. Response Ability is an Australian organisation devoted to promoting teacher understanding of the mental health and wellbeing of their students. A free resource called *Social and emotional wellbeing: A teacher's guide* is available on their website (www.responseability.org/__data/assets/pdf_file/0009/4878/Social-and-Emotional-Wellbeing-A-Teachers-Guide.pdf). This guide will help you identify when children's behaviours or social-skills problems seem to suggest competing mental health problems (see also Chapter 10). It is comforting to note that the most effective social-skills programs are likely to be those that occur in natural contexts, such

as the classroom, or even through the 'teachable moments' that arise in play situations, which we will address next.

Learning to play

For younger children, play is a context in which to explore their world with freedom and express a sense of their self. Generally, play has several key characteristics that are associated with a view that the purpose of play is for fun (Rubin, Fein & Vandenberg, 1983, pp. 698–9). It is:

- *intrinsically motivated* – it is enjoyed for its own sake, and brings satisfaction
- *voluntary* – children choose to play
- *valued as an end in itself* – it is fun, pleasurable and enjoyable without having specific goals
- *non-literal, or pretend* – there are certain elements of make-believe, particularly in symbolic play, where children experiment with new roles
- *active* – children actively engage physically and/or psychologically.

More recently, Lifter and Bloom (1998) have argued for a view of play that acknowledges play is for fun *and* for learning. According to this view, play serves an important interpretive function in which children learn about their world and extend their cognitive development. Such a view of play is reflected in other philosophies, including Vygotsky's (1978) view that play serves an adaptive purpose that stimulates cognitive growth, and Montessori's (1967) view that play is 'child's work', in the sense that in play children are acquiring new knowledge (Lifter, 2002).

Play has captured the interest of researchers for many years, and some have attempted to classify or describe stages of play development. Like other researchers of the time, Parten (1932) identified the emergence of different types of play as children grew older, and proposed a stage-based theory of play development. Howes and Matheson (1992) later refined this model of play and concluded that different forms of play do emerge in an order (described in Table 4.10), but that children are not bound to a strict developmental sequence in which one form of play replaces the other. Young children may be able to engage in cooperative play at younger ages than previously thought (Hughes, 2010), and as they grow older, children may continue to use multiple forms of play, including solitary activities.

TABLE 4.10 Types of play

TYPES OF PLAY	EXAMPLES
Solitary play: children play alone	Playing with blocks, water and sand, puzzles, computer and video games for one person, dolls and models (cars and planes). Children do not necessarily show an interest in or awareness of other children playing around them.
Parallel play: children play beside but not with other children	Bouncing a ball, playing with blocks or a doll in close proximity to other children, but not engaging with them. Children start to show more interest in the child playing beside them, but may not engage with the other child.
Cooperative play: children play in pairs or in groups	Playing soccer, hide and seek, building a tree house. Children recognise the advantages of playing with peers.
Pretend or imaginary play	Children assume roles or play with imaginary objects or people.
Solitary pretend play: imaginary play alone	Feeding dolls or teddy bears; pushing toy trains around a track while saying 'chuff chuff'.
Sociodramatic or cooperative pretend play: imaginary play	Assuming different roles such as 'mummies and daddies', 'teachers and students'; playing dress-ups, housekeeping; assuming fantasy roles and identities.

Over the years, researchers have used many terms to describe different types of play, including rough-and-tumble play (such as wrestling and mock fighting), constructive play (making things for fun), formal games (games and sports with designated rules) and pretend play (portraying imaginary roles) (Gray, 1991). Play and play-based interventions are believed to be critical for healthy brain development, particularly the development of 'executive function' discussed in chapters 2 and 3. The Australian Early Years Learning Framework adopts play-based learning as 'the best vehicle for young children's learning providing the most appropriate stimulus for brain development' (DEEWR, 2012). In the early childhood years, play forms a link and bond between children and caregivers, developing attachment and critical emotional understanding in concepts of reciprocity in gestures, smiling or turn taking (for more on emotional development, see the next section). As we learnt in Chapter 2, the critical period of brain development in infancy and early childhood is facilitated by positive experiences. Play allows children to explore the world, building neural pathways between new sensations and emotional feelings, forming rules and symbolic understanding as they work out how things 'work'. Pretend or imaginary play and child-initiated play are particularly linked to the development of self-regulation and symbolic representation, a major early cognitive development milestone (Bodrova & Leong, 2010).

As children develop through the primary years, and their cognitive and motor skills develop (see chapters 2 and 3), their play becomes increasingly sophisticated. Everyday games that children play such as 'Simon says …' or waiting one's turn in a game help develop those parts of the brain that help us control our impulses; as children gain in cognitive skills and develop interests in card games and board games, their working memory is called upon to remember rules and scores.



Source: © Pavel L Photo and Video/Shutterstock

FIGURE 4.12 Card games such as Snap, Memory or other matching games assist in the development of cognitive and social skills.

Vital social skills such as sharing and negotiation are also practised in the context of play. Play may enhance students' physical development in the sense that rough-and-tumble play allows children to test their physical strength and agility (Pellegrini & Smith, 1998). Organised forms of play, such as sport and physical activities, may be particularly important during the adolescent years, allowing a break from intellectual activities (Bjorklund & Brown, 1998) and providing a buffer from stress (Brown & Siegel, 1988). As children grow older, peers are present in almost all forms of play and free time. These peers play a critical role in helping children develop in all dimensions, but observation and supervision is important to ensure physical behaviours are mutual and enjoyed by all 'players', as indicated by reciprocated gestures and smiles on the face.

DEVELOPING RELATIONSHIPS WITH PEERS

Think about your own peer experiences over time. Do you remember your best friends at school? Why were some children able to make friends more easily than others? Why were some children rejected and disliked? Why were some more aggressive than others? The stories of Jake and Sarah clearly indicate that relationships with peers are very important in the lives of children. This section will explain why relationships with peers are a critical part of our lives from early childhood to adulthood.

Social interaction with peers forms a significant part of our lives from an early age. There are three main ways in which we engage socially with our peers as we develop and mature over time. These types of peer exchange are categorised according to the depth of interaction and relationship we have with our

peers, and have been called **interactions**, **relationships** and **groups** (Rubin, Bukowski & Parker, 1998). Table 4.11 outlines the characteristics of these peer exchanges.

interaction
A first-order (or superficial) social exchange between two or more individuals, with little emotional commitment

relationship
An exchange between two or more people, resulting from several interactions and taking on emotional significance

group
An exchange involving several interacting individuals who have formed a relationship and who have some degree of reciprocal influence over one another

TABLE 4.11 Characteristics of peer exchanges

TYPE OF PEER EXCHANGE	CHARACTERISTICS
Interaction	• Social exchange between two or more individuals.
Relationship	• A series of significant interactions between two individuals. • Characterised by stronger emotions and more frequent contact than interactions, exchange, and by a commitment to the exchange (Hinde, 1995). • Predominant emotions in relationships are affection, love, attachment and enmity. • Require a shared culture in terms of accepted patterns of communication and appropriate behaviour. • Friendship is a type of relationship. • Friendship is a mutually agreed upon, reciprocated relationship (Wentzel & Battle, 2001).
Group	• A collection of interacting individuals who have formed a relationship and who have some degree of reciprocal influence over one another. • Groups tend to be: > formed spontaneously, though they may be established formally, as in a class group at school > cohesive, in that there is unity among members, who usually have common interests > hierarchical, in that there is often a leader or subgroup of leaders > homogeneous in one or more observable characteristics such as sex, race, attitudes to school, clothing and socioeconomic status > characterised by distinctive group norms or patterns of behaviours and attitudes that distinguish group members from others.

Source: Adapted from Rubin, Bukowski and Parker (1998, pp. 633–44).

One of the most important advances in our understanding of peer relationships has been in understanding the role of peer acceptance in children's lives. **Peer acceptance** is a specific term that refers to the extent to which a child is liked or accepted by other members of the peer group (Asher, Parker & Walker, 1996). It can be influenced by group norms and preferences, as highlighted in the table above, and has important implications for the development and wellbeing of the child.

peer acceptance
The likeability and acceptance of a person by their peer group

Peer acceptance

The extent to which a child is liked or accepted by the peer group has important implications for their wellbeing and adjustment. To describe these outcomes, it is important to distinguish between children who are accepted and those who are not. To do this, researchers have used a special form of assessment known as **sociometric assessment** (see Box 4.9). This form of assessment allows researchers to identify different types of peer acceptance, including the categories of 'popular', 'rejected', 'neglected' and 'controversial' peer status. Each of these classifications has been associated with specific characteristics that may reflect the reasons why, and the outcomes of, peer acceptance and rejection (see Table 4.12).

sociometric assessment
The measurement of social networks and connections between people by assessing people's ratings of one another

BOX 4.9 RESEARCH LINKS

SOCIOMETRIC ASSESSMENT

Sociometric assessments have been used and refined for a number of years in the fields of sociology and developmental psychology (Asher & Dodge, 1986; Cole, Dodge & Copotelli, 1982; Moreno, 1951). The aim of these assessments is to provide a measure of a person's social standing or acceptance in a group of peers. In the field of developmental psychology, sociometric assessments usually ask each child in a classroom group to rate how much they like each peer on a scale ranging from 'like very much' to 'do not like at all'. Sometimes children are simply asked to list the names of their 'most liked' peers and their 'least liked' peers. Researchers can use these ratings to add up how many times a child is rated as 'most liked' or 'least liked' by their peers. These scores are used to determine the categories of 'popular', 'rejected', 'neglected' and 'controversial' peer status. Researchers have been very interested in the question of why some children are more accepted than others, and have searched for answers by examining the social skills and behaviours of children in different status categories (see Table 4.12).

While some of the skills and behaviours are quite well documented, it is important to note that many of these studies are correlational in nature and neither suggest causation nor that these associations always occur. An important example of this applies to the behaviour of aggression. Not all rejected children are aggressive, in the same manner it is known that not all 'popular' children always play nicely. Children who are *perceived* to be popular (but not sociometrically popular) are also reported by peers to be aggressive or stuck up (Parkhurst & Hopmeyer, 1998). Perceived-popular children are known to be different to sociometrically popular children and may in fact use aggression and manipulation as a means to maintain social dominance or group standing (Cilleson & Rose, 2005). It is important to distinguish between the types of measurement and definitions of rejection and popularity when reading studies in this field.

TABLE 4.12 Characteristics of sociometrically-defined peer status groups

STATUS	POSITIVE NOMINATIONS	NEGATIVE NOMINATIONS	AGGRESSION	PROSOCIAL SKILLS	ACADEMIC SKILLS
Popular	High	None (or few)	Low	High	Positive
Rejected	None (or few)	High	High*	Low	Poor*
Neglected	Few	Few	Low	Low	Positive
Controversial	High	High	High	High	Poor

* Note: Not all rejected children are aggressive. Researchers distinguish between children known as 'aggressive-rejected' and a smaller subset of rejected children known as 'passive-rejected', who do not display aggressive behaviours and may not show poor academic skills.

Source: Adapted from Newcomb, Bukowski and Pattee (1993); Parker and Asher (1987); Wentzel (1991); Wentzel and Asher (1995).

ACTIVITIES

1 Reflect on some of your answers to the questions posed at the beginning of this section. Can you remember children who were probably classified as 'popular' or 'rejected'?
2 Do you agree that these students reflected the characteristics described above?
3 Sociometric assessments often raise ethical concerns and are not approved for use in many classrooms. What type of ethical concerns do you think might arise from asking children to participate in this form of assessment?

As shown in Table 4.12, the peer status groups differ on a number of dimensions, and research is continuing to find out more about these differences. In some cases, the differences seem to be of little consequence. For example, children classified as 'neglected' are not so much disliked by peers as simply not noticed by peers – they receive few positive or negative nominations. Their prosocial skills are rated as low only because they do little to project themselves in a sociable manner – there may be nothing wrong with their other skills. For example, it is a positive sign that their academic skills are quite strong (Wentzel & Asher, 1995). In contrast, children classified as 'rejected' experience many more adjustment difficulties.

Peer rejection

The reality of the peer ratings shows that children who are rejected by their peers have almost no-one in their classroom who likes them. Aggressive behaviours may explain the rejection of some students, but some children are submissive in the face of rejection and some rejected children are quite withdrawn from the peer group, exacerbating their vulnerability to peer hostilities (Rubin, Bowker, McDonald & Menzer, 2013). However, other correlates of peer rejection mean that some children are simply disliked through no fault of their own (Hymel, Wagner & Butler, 1990). Non-behavioural reasons for peer rejection include:

- *physical appearance* – children hold different behavioural expectations of 'attractive' and 'unattractive' peers; they favour attractive peers over less attractive peers
- *obesity, illness and physical disability* – these are associated with lower play preferences and sometimes elicit less sympathy from peers
- *group and cultural norms* – children show a preference for peers who are similar to them; they may be influenced by home and family belief systems to prefer some children over others.

The consequences of peer rejection can be seen in a number of emotional and psychological domains. One of these is the emotional and psychological state referred to as **loneliness**. Loneliness is a cognitive and affective mental state arising from a loss or threat to our social connections (Rotenberg, 1999). It is a *feeling* state in that people with loneliness report a feeling of being lost or disconnected, and a sense of inadequate social relationships. Children who experience poor peer relations report high feelings of loneliness. While it is true that aggressive rejected children report higher levels of loneliness compared with average accepted children, those who are more submissive in their rejection experience higher levels of loneliness (Boivin, Poulin & Vitaro, 1994). Children who also experience victimisation, such as being picked on and teased, have some of the highest levels of loneliness (Kochenderfer & Ladd, 1996). Although many of us may report a feeling of loneliness from time to time, the emotional and psychological consequences of persistent and prolonged loneliness are very serious, and include depression, alcoholism and suicide among adults (Rotenberg, 1999). Children as young as those attending kindergarten can reliably report a sense of loneliness, and it is clear that they, too, experience the cognitive and affective feelings that are reported by older children and adults (Cassidy & Asher, 1992; Ladd, Kochenderfer & Coleman, 1996). If peer rejection remains stable or persistent over time, loneliness steadily increases, posing a clear risk to the health and wellbeing of these young people. Box 4.10 details a classroom intervention strategy that has been demonstrated to prevent and lessen feelings of rejection in school students.

loneliness
A cognitive and affective state of feeling disconnected and lacking in supportive relationships



BOX 4.10 CLASSROOM LINKS

REDUCING PEER REJECTION IN THE CLASSROOM

Researchers Mikami, Boucher and Humphries (2005) tested an intervention to reduce rejection in middle school students (children in years 6–8). Rather than using social-skills training of the individual rejected child (a common intervention strategy), the researchers targeted the *whole* classroom climate. Why? They argue that classroom climates, including the role of the teacher, can foster a view that 'not everyone is equal in this classroom'. This can arise from ability hierarchies in classrooms where student achievement or differences are on view. It can also arise from classroom norms for aggressive behaviour which can reflect the teacher's beliefs. For example, if a teacher does not prevent peer rejection it can become a classroom norm. An alternative approach is to break down these 'normative' or reputational beliefs about other children by fostering a socially accepting classroom with greater social acceptance and cooperation. This was the basis for the classroom intervention employed in their study.

Method

Teachers and students in 24 grades 6–8 classrooms participated in the study (N = approximately 624 students). Teachers formed heterogeneous groups of 4–5 students in each classroom, combining students of different ethnicities, social classes and friendship groups. They avoided putting close friends and sworn enemies together. A control group of students also completed regular classroom activities. Students completed self-report measures of peer acceptance, the proportion of students in their class whom they liked or disliked, and the proportion of peers who treated them with respect at school.

Intervention strategy

The student groups participated in non-academic collaborative games such as solving riddles, or building towers from spaghetti and marshmallows, for 45 minutes per week. They also completed cooperative learning tasks in regular classroom time to integrate the intervention into normal classroom life. These activities lasted for eight consecutive weeks. Teachers also held regular meetings to communicate and share ideas about encouraging respect and cooperation in classroom activities.

Findings

Before the intervention, students reported neutral or only slightly positive feelings about their peer relationships, and only 39 per cent of students felt that all or most peers respected them. After the intervention, the students in the intervention scored higher on the scale of peer relationships, suggesting an increase in positive feelings about their peer relations – 60 per cent of students reported that all or most peers respected them. In contrast, the control group of students had a slight decline in their perception of peer relationships during the same period. There was a statistically significant difference between the intervention and control groups.

Conclusions

The classroom intervention changed feelings of acceptance, with more children feeling accepted. Observational notes supported this, and the researchers observed one child with a history of extreme rejection by peers being included in team bonding activities.

Source: Adapted from Mikami, Boucher and Humphries (2005).



THINK ABOUT

- Regarding the above box, why do you think the researchers used heterogeneous groups?
- What was the importance of the *non-academic* collaborative games?
- What should teachers in these classrooms do to follow up or maintain these results?

Further adjustment difficulties are associated with children who are rejected because of aggressive tendencies. There is clear research evidence that many of these children do not understand their social world in quite the same way as typically developing children. This understanding of the social world is referred to as **social cognition**. Social-cognitive deficits are apparent in the way in which these children process information about social events (Crick & Dodge, 1994). For example, these children are much more likely to make an incorrect assumption that a peer is being hostile towards them, when in fact the peer has no such intention. This is known as a hostile attribution bias, in which hostile intent is assumed in ambiguous peer situations. As a consequence, the aggressive rejected child typically responds with aggression, which in turn further alienates the child or makes peers react with aggression. Crick and Dodge (1994) have shown that these incorrect judgements about peers are due to the way the child 'reads' or processes social information such as facial expressions and emotional signals. They may have internal scripts or schemes that lead them to react with hostility, and it is known that many of these children believe that aggression is the only viable response and also believe they are more likely to be effective if they use aggression (Rubin, Bowker, McDonald & Menzer, 2013).

social cognition
A cognitive capacity to think about and process social information

One of the most serious consequences of poor peer relationships is the risk of long-term adjustment difficulties. Longitudinal studies have found that a history of peer rejection and a lack of supportive friendships is associated with a risk of poor school performance, early school drop out, antisocial behaviour, criminality and poor relationships in adulthood (Bagwell, Schmidt, Newcomb & Bukowski, 2001; Parker & Asher, 1987; Parker, Rubin, Price & DeRosier, 1995).

Because poor peer relationships cause so many problems for children and adults, a great deal of research and intervention has been devoted to addressing peer rejection and aggressive behaviours. Approaches to social-skills training have shown moderate levels of success with this population, but it is worth bearing in mind the advice of the researchers we have studied in this chapter. First, we must be sure that these students are suffering a social-skills deficit (Gresham, Sugai & Horner, 2001). According to Hymel, Wagner and Butler (1990), children may be rejected for other reasons, such as their appearance. Mikami, Boucher and Humphries (2005) suggest that classroom factors can exacerbate or create 'normative' cultures of rejection, and it is these system-level factors that should be addressed.

If we are confident that the problem does lie in a social-skills deficit, it is important to identify the correct and specific skills to be targeted. For example, if the child does have social information processing deficits, interventions can be employed to address these problems. The *Making Choices* intervention (Smokowski et al., 2004) specifically trained aggressive and rejected students to use better strategies to solve social problems and establish positive social contact with their peers. This program was designed to be taught in regular classrooms and so did not suffer from the problems of withdrawing children from the regular classroom. The children in this study showed significant improvement in making social contact and thinking deeply about social problems; their level of aggression also declined significantly.

The intervention studies highlighted here show that well-targeted interventions can have great effect in everyday classroom contexts, changing the lives of aggressive and rejected children, and overall classroom climate too. Chapter 14 describes several approaches known to be effective in managing disruptive classroom behaviour. We now examine a much more positive outcome of peer relationships – the role of friendship.

Friendship

friendship
A close relationship between two people who mutually agree on the importance of this relationship

dyadic
Characterised by two elements, or two people, as in the case of friendship

The most positive form of peer relationship experienced by children is **friendship**. Friendship is a **dyadic** relationship that exists between two people who mutually agree that the relationship is unique and very special (Asher, Parker & Walker, 1996). Unlike sociometric forms of peer acceptance, friendship is not concerned with the views of the whole group of students. Rather, in assessing the presence of friendship in a child's life, only one basic criterion must be met – the friendship must be reciprocated. A friendship is said to be reciprocated when two children nominate each other as a best friend. This seemingly simple bond is distinguished from peer acceptance by the high-quality peer interaction and unique benefits of friendship. Friendship serves a very specific developmental function in our lives, and is usually associated with a range of highly positive academic and social outcomes for students (Bukowski, 2001) (see Table 4.13).

TABLE 4.13 The features and benefits of friendship

FEATURE	BENEFIT
Friendship and the self	A powerful source of self-esteem, as friends regard each other with equal respect and provide the trust to share one's thoughts and feelings
Friendship as a buffer	A powerful protector against stress, negative family environments, and bullying and harassment
Friendship and learning	The trust and security of friendships allow exploration of ideas in a context of friendly exchanges, challenge of ideas and problem solving
Friendship as development	Friends contribute to each other's development (in positive and negative ways) by bringing unique histories and expectations, including the will to do better in school or engage in troublesome behaviours

Friendship is regarded by developmental researchers as a unique developmental context (Newcomb, Bukowski & Bagwell, 1999). It is distinguished from other peer relationships by the unique emotional and psychological benefits of the relationship. Friendship is particularly characterised by a higher level of intimacy and a sense of reliability and loyalty (Erdley, Nangle, Newman & Carpenter, 2001). Intimacy is a term used to describe a particular form of trust and self-disclosure where people feel safe to share secrets and personal aspects of themselves. High-quality children's friendships are particularly known for their high expectations of absolute trust and loyalty.



Source: © Thomas Cockrem/Alamy

FIGURE 4.13 Closeness and intimacy between friends plays an important role in development.

Those children who have friends also tend to display prosocial behaviour more frequently than their classmates without friends (Wentzel & Caldwell, 1997). In a unique study, Wentzel and Erdley (1993) asked children in grades 6 and 7 to supply 'Advice for Making Friends'. Children provided lists of things you should do to make friends and things you should not do. Among the things children *should do* were being honest and trustworthy, telling the truth and keeping promises. These prosocial skills support the intimacy of friendships. Children also listed other expected prosocial behaviours, including being funny, giving social support, and being caring, kind and considerate. Proximity was also important to the children in that they suggested that friends should sit together, do activities together and be in the same group (see Figure 4.13).

Although some of these behaviours might also occur among peers, the familiarity within friendship means that these behaviours occur with greater frequency and at much higher quality. As such, peer acceptance and friendship should not be confused. For example, although being popular with peers is associated with lower levels of loneliness, friendship is a more powerful force in directly supporting the mental health and emotional wellbeing of young people (Nangle et al., 2003). Friendships make a unique contribution to protecting children from stress, literally buffering them and reducing the stress hormone, cortisol, in the face of negative experiences (Adams, Santo & Bukowski, 2011). Similarly, a variety of studies have shown that the presence of friendship appears to moderate the relationship between harsh parenting and home environments, with befriended children having fewer negative outcomes (Schwartz, Dodge, Pettit & Bates, 2000). Importantly, children with even one best friend are less likely to be bullied and feel less distressed when victimised (Hodges & Perry, 1999; Hodges, Boivin, Vitaro & Bukowski, 1999).

A number of researchers have suggested that children's friendships do not arrive at a point of intimacy and sophistication immediately, but rather these qualities develop over time. Links have been drawn between the increasing sophistication of cognitive and emotional processes, such as the development of empathy, perspective taking and abstract reasoning, and different stages of friendship.

CourseMateExpress

Online resources
Watch a **video** showing children discussing their understanding of 'what makes someone a good friend'.

William Damon (1977, 1983) proposed and found evidence for three levels of friendship that commence with a relatively concrete understanding of a friend as a 'handy playmate'. These stages become more sophisticated as children grow up:

- Level 1: Friendship as a 'handy playmate' (4–7 years)
- Level 2: Friendship as mutual trust and assistance (8–10 years)
- Level 3: Friendship as intimacy and loyalty (11–15 years +).

Researchers like Damon (1983), Selman (1981) and Bigelow and La Gaipa (1975) all conducted interviews with children or asked children to write stories about friendship. Each of these researchers concluded that children's concepts of friendships become increasingly sophisticated with age. Across these studies, descriptions of friends in the early years are related to the tangible and practical qualities of the relationships – Damon described this friendship as a 'handy playmate' and Selman as 'momentary friendships' governed by proximity and availability, such as being nearby or in the same preschool class. Each of these researchers neglected to investigate the perceptions of friendship of very young children, but this does not mean that friendships are less important to very young children or their parents (Yu, Ostrosky & Fowler, 2011). Young children are capable of reporting friendships, and these relationships are characterised by qualities such as coordinated play and warm, affectionate interactions (MacGuire & Dunn, 1997). By middle childhood, the perspectives of self and others become more coordinated, and Selman described greater cooperation between friends at this age. However, he described these relationships as 'fair weather' friendships, indicating that a fair degree of self-interest still prevailed and the friendships could break down easily if agreement or cooperation was not achieved. By adolescence, Damon's stages show a more abstract notion of friendship, characterised by intimacy (such as the sharing of emotions) and loyalty.

Regardless of child age or gender, friendships are important. One of the most important functions of a friendship is its protective quality. This is particularly salient in the case of bullying and victimisation, which we will now examine as a particularly problematic developmental context.



BOX 4.11 IMPLICATIONS FOR EDUCATORS

STRATEGIES FOR DEVELOPING AN AWARENESS OF PEER INTERACTIONS

- Be aware of children or adolescents who have no friends or who are rejected by peers (Eisenberg, 1998).
- Peer rejection in middle childhood is associated with depression and loneliness (Burks, Dodge & Price, 1995). It also places students at risk of poor academic achievement (Flook, Repetti & Ullman, 2005; Schwartz, Gorman, Nakamoto & Tobin, 2005).
- Look for the reasons behind poor behaviour or inattention. Rejected children may be more likely to experience behavioural problems, display aggression and attentional difficulties, and may report higher levels of substance abuse and more delinquent offences than their more popular or average peers (Rubin, Booth, Rose-Krasnor & Mills, 1995).
- Poor peer relationships are associated with wider mental health and adjustment problems such as loneliness, depression and withdrawal. Seek help and advice if you become concerned about the psychological or emotional wellbeing of any student.
- Look for opportunities to develop and practise social skills in the everyday classroom. Natural contexts provide powerful contexts for the development of children's relationship skills.



THINK ABOUT

- Can you distinguish between the benefits of peer acceptance and friendship?
- What role do you think peer acceptance and friendship play in the classroom?
- Why is it important for teachers to be aware of social relationships between students?

BULLYING AND HARASSMENT

bullying
Repeated verbal and/or non-verbal aggression by individuals or groups and directed towards particular victims who find it difficult to defend themselves

If friendship represents the most positive form of peer relationship in childhood, then bullying represents the most negative. **Bullying** is an abuse of power that takes the form of ongoing or repeated aggression involving a wide range of behaviours by individuals or groups, and is directed towards particular victims who find it difficult to defend themselves (Eisenberg, 1998; Olweus, 1999; Smith, Cowie, Olafsson & Liefooghe, 2002).

Bullying can take place in any situation that involves a power relationship. It is a particular problem in hierarchically organised institutions such as schools, but also in work environments such as offices, factories and the armed services. Bullying can occur in any school environment, regardless of the socioeconomic status of the school community. As discussed in Chapter 14, the ethos of the school culture may contribute to bullying in some schools. Chapter 14 provides an extended discussion of how to manage and respond to bullying and harassment in schools.

The problem of bullying in schools also crosses cultures and has been reported in diverse regions of the globe, including the United States (Espelage & Swearer, 2003), Scandinavia (Olweus, 1978) and elsewhere in Europe (Smith & Morita, 1999), Japan (Morita, 1996) and New Zealand (Lind & Maxwell, 1996; Sullivan, 1999). It is now recognised as an international problem for teachers and students in schools (Smith et al., 1999).

The types of behaviours classified as bullying are diverse and include direct and indirect forms of aggression such as physical assaults, verbal abuse, emotional and psychological abuse (such as implied threats, blackmail, anonymous messages), relational aggression (deliberate social exclusion,

spreading rumours, asking other students to hurt the person) and 'cyberbullying' – a term used to describe bullying by electronic mediums such as text messaging, posting videos online, and sending or circulating malicious emails (Crick et al., 2001; Kowalski & Limber, 2007; Rigby, 2007). The most common forms of bullying reported by Australian children are teasing, hurtful rumours or lies being told about the child (Cross et al., 2009; McGrath & Noble, 2006). A relatively high number of children report being bullied in covert ways (16 per cent), such as spreading rumours, blackmailing, threats or any behaviours teachers cannot see, while fewer (7–10 per cent) report experiencing cyberbullying (Cross et al., 2009).

We must take care, however, not to describe any single occurrence of these behaviours as bullying. From time to time, all students have disagreements, sometimes serious ones. Acts of violence or aggression may also occur. The term 'bullying', however, is reserved for the particularly harmful behaviour that is characterised by:

- persistent and repeated attacks against a target child …
- over an extended period of time (not just a one-off incident or temporary disagreement) …
- where there is an imbalance of power between the bully and the target child.

For this reason, it has also been defined as 'systematic abuse of power' (Rigby, 2002, cited by Smith, 2004b, p. 98).

There is a concern that the overuse or misuse of the word 'bullying' might detract from the seriousness with which people understand it. It is also a concern if acts of violence or harassment are simply dismissed as bullying, when in actual fact these can represent serious acts of aggression, sexual harassment or racial harassment, and may be serious criminal or antisocial behaviours that cannot be responded to in the same manner as bullying. Perhaps the worse consequence is the risk associated with mislabelling a child a 'bully'. In the current climate, there is a lot of concern about bullying in schools, and both bullies and victims can be stigmatised by labels (McGrath & Stanley, 2006).

It is also a 'myth' that bullying involves just a 'bully' and a 'victim'. Rather, Espelage and Swearer (2003) suggest that bullying behaviours fall on a bully–victim continuum, with some students falling into classic bully or victim roles, but other students being classified as 'bully/victims' who engage in both forms of behaviour. This continuum also includes bystanders who may contribute to a larger group mentality that reinforces bullying behaviours by supporting the aggressors, or doing nothing to intervene and stop them. In other words, bullying is not so much a dyadic problem (between a bully and a victim) as it is a group phenomenon. Studies have identified children taking various roles in bullying, including being ringleaders (organising and initiating bullying incidents), followers (those who join in once the bullying begins), reinforcers (passively watch and laugh or otherwise encourage the bullies), bystanders (dislike the bullying but are afraid to challenge it) and defenders (help the victim, get help or try to stop the bullies) (Olweus, 2000). Espelage and Swearer (2003, 2009) suggest that these roles are not stable over time and that children may slip between these roles at different times.



THINK ABOUT

- What kinds of bullying behaviours do you recall from your school experiences? Can you recall the effects of 'bystanders' or other peers on bullying?
- What are your views about the bully–victim continuum? Do you agree that children might fall into several types of bully, victim or bystander roles over time?
- How might this influence the way in which schools should address bullying?

Developmental trends in bullying behaviours

As many as one in four (27 per cent) Australian schoolchildren report being bullied every few weeks or more, with the highest rates of bullying reported by Year 5 students (32 per cent) and Year 8 students (29 per cent). Less than one in 10 (9 per cent) Australian children admit to being frequent bullies, with boys reporting the higher rate of 11 per cent and girls 7 per cent (Cross et al., 2009). This rate of bullying is similar to that reported in other countries. In Canada, Bentley and Li (1995) found that 21 per cent of 8- to 12-year-olds were bullied, while 12 per cent bullied other children. Very high rates of bullying have been reported in New Zealand (Lind & Maxwell, 1996; Sullivan, 1999), and bullying – together with truancy, suspensions and exclusions – has been identified as a factor associated with the poor achievement of at-risk students in that country (New Zealand Ministry of Education, 2001). Whitney and Smith (1993) reported that 27 per cent of primary school students in England and Wales claimed to have been bullied at least *sometimes*, and an additional 10 per cent have been bullied once a week or more often.

Australia was shocked by a report that Australian students may be in the 'worst class of bullies' (Jensen & Browne, 2008). This claim arose from the results of an international survey that primarily focused on students' achievement in Maths and Science, and assessed Year 4 students' perceptions of safety in school. A total of 36 countries were surveyed, with results showing Australia in the bottom five of all nations for students' reports of safety and antisocial behaviours at school. Some 26 per cent of Australian Year 4 students reported frequent experiences of any of five antisocial behaviours: being hurt by other students, having something stolen, being teased, being excluded or being forced to do something against their will. These figures can be seen in the TIMSS 2007 *International science report: Findings from IEA's Trends in International Mathematics and Science Study at the fourth and eighth grades* (Martin, Mullis & Foy, 2008).

Gender and age are strongly associated with reported incidents of bullying. It is important to be aware that aggressive behaviour emerges at a very young age, and increasingly, such behaviours are viewed as bullying even in very young children. Tremblay (2008) has identified that children reach the peak of their physical aggression in the preschool years, and that aggression steadily declines after this time and throughout adolescence. Although physical aggression tends to decline from early childhood onwards, the incidence of indirect forms of aggression, such as making a nasty comment behind someone's back (also known as relational aggression), increases from four to seven years of age (Tremblay, 2008). Recent Australian research has shown that early childhood teachers identify high levels of relationally aggressive behaviours in 20 per cent of three- to five-year-old children, and this behaviour peaks in the four-to-five-years age range (Swit & McMaugh, 2011).

The role of gender in bullying behaviours is both clear and ambiguous. It is very clear from numerous studies, across many countries and age groups, that boys are more physically aggressive than girls (Juvonen & Graham, 2014), and are involved more often than girls in bullying incidents, both as aggressors and victims (Smith & Morita, 1999). However, although it is common to assume that girls must be more involved in indirect or relational (social) forms of aggression, the evidence for this is much more equivocal. Some studies have found that girls are more likely to use and experience indirect or psychological forms of aggression (Björkqvist, Lagerspetz & Kaukiaöinen, 1992; Björkqvist & Osterman, 1999; Owens & McMullin, 1995), and that girls are more likely to use relational bullying (for example, Crick & Grotpeter, 1995). However, other studies report only weak or inconsistent links to gender (Swearer, 2008). In fact, Swearer, Turner, Givens and Pollack (2008) have shown that boys also experience group exclusion and relational aggression, and it is just as detrimental for these boys as it is for girls.

Two large meta-analyses confirm that although girls use more relational rather than physical forms of aggression, there is no difference between boys' and girls' *likelihood* of using relationally aggressive or

exclusionary tactics (Juvonen & Graham, 2014). Archer and Coyne (2005) go so far as to suggest that by the middle years of high school, physical forms of aggression become less socially acceptable and are likely replaced by relational forms of aggression for both boys and girls. Australian studies support these conclusions. Hayward and Fletcher (2003) found no gender differences in relationally aggressive behaviours in adolescent populations. Swit and McMaugh (2011) found no gender differences in early childhood populations. Some researchers have suggested that where gender differences are observed, it may reflect biased reporting in teacher or parent observations, because there is a stereotyped expectation that girls should be more involved in such behaviours (Ostrov, Crick & Keating, 2005).

There are various ideas about why bullying occurs and why it appears to decline over time, including a desire for social dominance, inflated self-views and social cognitive biases (Juvonen & Graham, 2014). Some have also tried to implicate a lack of social skills in bullies (Espelage & Swearer, 2003). There is clear evidence that some bullies have a cold and calculating desire to prove their social dominance and desire admiration from peers (Juvonen & Graham, 2014; Salmivalli, Kaukiainen & Voeten, 2005). Adler and Adler (1995) provide a detailed account of the strategies employed by popular group leaders to maintain their leadership status or power in the group. These include strategies of coercion, manipulation and severe forms of relational aggression, such as reputational decimation of a victim, and threatening group members not to associate with a child. As such, some forms of bullying and aggression are associated with a desire to maintain status or gain a prominent position in the social group.

Some theories have suggested that the child's attitude and beliefs about aggression contribute to bullying behaviours. As suggested earlier in this chapter, there is quite strong evidence to suggest that aggressive children do have social cognitive biases that make them more prone to view peers with aggressive intent (Crick & Dodge, 1994). They may also receive positive social feedback from peers who laugh at or encourage bullying behaviours (Salmivalli, Lappalainen & Lagerspetz, 1998; Salmivalli, 2010). This social feedback may further reinforce maladaptive aggressive schemes or scripts.

In a similar view, it has also been suggested that bullies may be low in particular social-cognitive skills such as empathy. In some ways, it makes sense to suggest that bullies may be low in empathy, because surely it would be difficult to bully a person if one could understand how the victim was feeling. However, as argued by Espelage and Swearer (2003), much bullying behaviour is deliberately planned with the express intention of hurting others, or in the case of relational bullying, with the intention of destroying the child's social relationships. These planned behaviours suggest that children who bully may have sufficient social understanding to recognise the impact of their behaviour. Sutton, Smith and Swettenham (1999) also reject the social-skills-deficit model and suggest instead that bullies may have quite a sophisticated understanding of others' thoughts and feelings, but that they misuse this understanding to their own advantage, often in manipulative and harmful ways.

Many studies have in fact shown that bullies can hold inflated self-views (Cunningham, Cunningham, Ratcliffe & Vaillancourt, 2010; Johnson & Lewis, 1999). Those seeking power or social dominance tend to feel powerful and effective, and those with maladaptive hostile schemes feel buoyed when aggression works. Juvonen and colleagues (Juvonen & Graham, 2014; Juvonen, Graham & Schuster, 2003) have noted that peer-reported bullies have less depression, anxiety or loneliness that typically adjusted children.

Today, views about the development of bullying are not limited to theories of aggression or social-cognitive beliefs. Rather, it is widely acknowledged that a range of factors contribute to bullying, including the social environment in which children develop these negative relationships (Rigby, 2007). As discussed in Chapter 14, school culture has been implicated in the development of attitudes towards bullying, while our understanding of peer acceptance and rejection indicates that wider peer cultures may lead to the victimisation of some children more so than others.

BOX 4.12 RESEARCH LINKS

BULLYING IN SCHOOLS AND THE USE OF CONFLICT-RESOLUTION STRATEGIES

Owens, Daly and Slee (2005) used questionnaires to explore the experiences of 13- to 15-year-old Australian adolescents in victimisation and conflict resolution. Students were asked to estimate how often they had been a victim of the listed behaviours during the past year:

- *direct physical aggression* – being hit, kicked, tripped, pushed, shoved, and having things taken
- *direct verbal aggression* – being yelled at, called names, insulted (about clothing or appearance), teased and threatened
- *indirect aggression* – having bad or false things said or written about you behind your back, being left out or excluded from the group, receiving nasty *anonymous* electronic messages from other students (mobile phone or email), having your secrets told to others, receiving prank telephone calls, being ignored or being the object of 'daggers' or dirty looks.

Students were also asked to report the types of conflict-resolution strategies they had used, with choices listed, including:

- *compromise* – try to reason, listen and understand, work out a compromise, and smooth things over
- *obliging* – put other person's needs first, apologise, and give in to what the other person wants
- *avoidance* – walk away and discuss later, clam up and hold feelings in, get cool and distant or give cold shoulder, and try to avoid talking about it
- *overt anger* – get angry and yell, hurt other person's feelings, get sarcastic, get angry and walk away, make the other person feel bad, and stay angry a long time.

The results show that:

- boys reported higher levels of physical and verbal victimisation; girls reported higher levels of indirect aggression
- contrary to previous research, levels of physical aggression did not decline with age, and indirect and verbal aggression peaked in Year 9
- across the age groups, girls reported using higher levels of compromise and avoidance conflict-resolution strategies; boys and girls were equally likely to respond with anger across the age groups
- children who were most victimised tended to use more anger and avoidance conflict-resolution strategies
- in general, older students were more able to use compromising strategies than younger students.

These results suggest that social-cognitive maturity does allow older victims to reach compromise more readily to solve aggressive conflicts, but the results do not suggest that older students are any better at controlling their anger when faced with these conflict situations. However, older students were just as likely as younger students to get angry. Highly victimised students were even more likely to report anger and avoidance strategies.

These findings left the researchers with a 'Which came first, the chicken or the egg?' type of research question: Are victims of bullying more likely to be vulnerable to bullying because they lack the social skills to reach a compromise, or does the experience of victimisation so erode and deflate their confidence that anger and avoidance are the only strategies they are capable of using?

THINK ABOUT

- Reflect on the 'chicken or the egg' scenario, suggested above. What type of processes do you think might explain why the most victimised children do not use compromise strategies?

Developmental effects of bullying

In understanding the effects of bullying, it is clear that bullying is harmful. Research illustrates that the consequences of being victimised are extensive. Zubrick et al. (1997) found that students who are bullied are more likely to have poor academic performance, high rates of absenteeism, low self-esteem, depression, anxiety, insecurity and significant mental health problems, when compared with students who are not bullied (see also Forero, McLellan, Rissel & Bauman, 1999; Perry, Perry & Kennedy, 1992; Rigby, 1994; Slee, 1995a, 1995b). Nishina, Juvonen and Witkow (2005) found that persistent victims were more depressed, anxious and lonely. Research has also found a link between bullying and physical health. Children classified as victims and aggressors had more visits to school health nurses and more frequent health complaints, including illness, injury and somatic complaints (Vernberg, Nelson, Fonargy & Twemlow, 2011). However, it is important to note that not all children react to victimisation in the same way. Some students report not feeling that worried about bullying, but their worry increases the more they are victimised (Rigby & Slee, 1999). Boys in this study were more likely to report that bullying made them angry, while girls reported that it tended to make them sad.

Victimisation may happen because children are simply caught in the wrong place at the wrong time or are 'easy targets', and it is important not to draw quick conclusions about why children are victimised. In particular, children who are less preferred by the peer group for non-behavioural reasons such as physical appearance, obesity, disability or sexual orientation are much more likely to be bullied (Juvonen & Graham, 2014). It is clear that peers can choose almost any characteristic to target a child and thus victimisation occurs to a wide range of children.

At a very generalised level, research has identified that victims of bullying tend to be rejected and isolated from their peer groups, and have poor-quality friendships, low numbers of friends and low peer acceptance (possibly as a result of reciprocal interactions between peer-acceptance variables and being bullied), together with low physical strength, low school enjoyment and poor social skills (Card, 2003; Olweus, 1993). However, it is also becomingly increasing clear that such personal characteristics do not necessarily *cause* bullying, but instead there may be a *reciprocal* or cyclical interaction between internal factors (such as depression and anxiety) and victimisation. For example, a large meta-analysis has compared the evidence for such problems acting as an antecedent or a consequence of victimisation. The results show that evidence is strong for both pathways – internal problems are just as likely to arise from victimisation as to exist before victimisation in some children (see Juvonen & Graham, 2014).

It is clear that children who are befriended are much less likely to experience bullying, and classroom encouragement of acceptance and tolerance reduces rejection (for example, Mikami, Boucher & Humphries, 2005). As such, these social factors provide us with a good indication of elements that protect victims and reduce the likelihood of victimisation occurring. Although social-skills deficits may not explain why children are bullies or victimised, it seems that the 'victims' of bullying may be more or less protected by the range of social skills they can employ to respond to bullying. For example, conflict-resolution skills seem to be important in the child's ability to manage bullying, as explained in Box 4.12 (see page 176).

In Chapter 14 we will continue to explore strategies for addressing bullying in schools, many of which focus on enhancing conflict-resolution skills and accepting personal responsibility for one's actions. While it is clear that bullying is a well-recognised international problem, it is also clear that many students remain reticent to tell their teachers or parents about bullying incidents. Some students have little faith in any positive outcome from teacher actions (Bauman & Del Rio, 2006).

CourseMateExpress
Online resources
Go further: More about the impact of bullying on victims can be found on this text's CourseMate Express website.

CONCLUDING COMMENTS

This chapter has illustrated important connections between how young people develop an understanding of their self, an understanding of others, and an understanding of relationships with other people. Like other dimensions of development, the skills gained through self-understanding and moral and emotional development remain with children and adolescents throughout adulthood. To ensure healthy development in these areas, young people need to be supported as they come to terms with who they are, how they fit into their sociocultural context, and how to deal with complex social and moral issues. Young people also need to be active agents rather than passive listeners when grappling with moral issues and social dilemmas. These dilemmas present themselves in everyday contexts, not least of all in those of peer relationships and bullying. The challenge for educators is to provide opportunities for learners to become independent thinkers who are self-aware, critically reflective and conscious of their role in the broader social and cultural contexts in which they live.

CHAPTER REVIEW

- Self-concept, self-esteem and self-efficacy are internal beliefs about who we are, characteristics that make us unique and our ability or competencies in different areas.
- Erikson's theory of identity proposes that our sense of self develops over time and is connected to cognitive development.
- Moral development explains how we reason and make ethical choices and decisions in our lives, and is also related to our cognitive development.
- Emotional development refers to our ability to function and understand our social world. We develop an increasing range of emotional competencies over time.
- Social development refers to our gradual understanding of and ability to maintain relationships with others.
- Positive peer experiences are central to self and other understanding, and are protective factors in children's lives. These include peer acceptance and friendships.
- Negative peer experiences may bring about low self-perceptions and mental health and social problems. These include loneliness, peer rejection and bullying.

ONLINE STUDY RESOURCES

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COURSEMATE EXPRESS

Visit http://login.cengagebrain.com and use the access code that comes with this book for 12 months' access to the student resources for this text.

The CourseMate Express website contains a range of resources and study tools for this chapter, including:

- a **self-check quiz**
- **crosswords**, **flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.



SEARCH ME! EDUCATION

Explore Search me! education for articles relevant to this chapter. Fast and convenient, Search me! education is updated daily and provides you with 24-hour access to full-text articles from hundreds of scholarly and popular journals, ebooks and newspapers, including *The Australian* and *The New York Times*. Log in to Search me! through http://login.cengagebrain.com and use the search terms listed in the 'Education databases' section (page 180) as a starting point.

QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1 Define and explain the concept of a multidimensional self-concept.
2 What is self-efficacy? Comment on the role of self-efficacy in learning.
3 Outline Erikson's concept of a 'crisis' in the development of identity.
4 Define 'emotion' and explain the concept of emotional competence.
5 Identify links between self and emotional and social development in peer experiences.
6 Explain the importance of peer acceptance and friendship in the lives of children and adolescents.

KEY TERMS

autonomous morality
basic emotions
bullying
collectivistic culture
conventional morality
dyadic
emotion
emotional competence
emotional self-regulation
friendship
functionalist perspective
group
heteronomous morality
human agency
identity
identity achievement
identity diffusion
identity foreclosure
individualistic culture
interaction
loneliness
moral dilemma
morality
moratorium
peer acceptance
perspective taking
postconventional morality
preconventional morality
prosocial behaviour
psychoanalytic approach
psychosocial crisis
psychosocial development
relationship
self
self-concept
self-conscious emotions
self-efficacy
self-esteem
social cognition
social constructivist perspective
social development
social referencing
sociometric assessment

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'SOCIAL, EMOTIONAL AND MORAL DEVELOPMENT' AND MATERIAL IN OTHER CHAPTERS

- Complete the following table with milestones of development occurring in each developmental period.

	PHYSICAL	LANGUAGE	COGNITIVE	SOCIAL/ EMOTIONAL
Early childhood				
Middle childhood				
Adolescence				

- Compare development across the physical, cognitive, social and emotional domains. What changes happen together? How does development in one domain affect development in another?

FURTHER RESEARCH

RECOMMENDED READING

Bandura, A. (2011). Social cognitive theory. In P. A. M. van Lange, A. W. Kruglanski & E. T. Higgins (Eds). *Handbook of social psychological theories* (pp. 349–73). London: Sage.

Eisenberg, N. (Ed.) (1998). *Handbook of child psychology: Vol. 3: Social, emotional and personality development* (5th ed.). New York: Wiley.

Erikson, E. H. (1997). *The life cycle completed: Extended version*. New York: WW Norton & Co.

Kohlberg, L. (1984). *Essays in moral development. Volume II: The psychology of moral development*. San Francisco: Harper & Row.

Nucci, L. & Narvaez, D. (2008). *Handbook on moral and character education*. Oxford, UK: Routledge.

Purdie, N., Tripcony, P., Boulton-Lewis, G., Fanshawe, J. & Gunstone, A. (2000). *Positive self-identity for Indigenous students and its relationship to school outcomes*. Canberra: Commonwealth of Australia.

Rubin, K. H., Bukowski, W. M. & Laursen, B. (2008). *Handbook of peer interactions, relationships, and groups*. New York: Guilford Press.

White, R. & Wyn, J. (2011). *Youth and society: Exploring the social dynamics of youth experience*. Sydney: Oxford University Press.

RECOMMENDED WEBSITES

Bullying information for teachers: www.bullyingnoway.com.au

Mental health and student wellbeing: www.mindmatters.edu.au

Mental health information for educators: www.responseability.org

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

- bullying
- emotional competence
- emotional development
- friendship
- identity development
- moral development AND children
- self-concept
- self-efficacy
- self-esteem
- social development.

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

THE LEARNER DEVELOPING OVER TIME

This table summarises the developmental milestones in the broad stages of early childhood, middle childhood and adolescence as discussed in Module I. Note that while we discuss development in separate domains, in reality these domains overlap and mutually influence one another, as we've seen throughout the module. Return to the module text to trace

STAGE	PHYSICAL AND BRAIN DEVELOPMENT	LANGUAGE DEVELOPMENT	COGNITIVE DEVELOPMENT
Infancy	Walking around 1 year of age. Very rapid growth of the brain and neuron proliferation, leading to the creation of many more synapses than eventually needed.	Prelinguistic communication. First words around 1 year of age.	Object permanence around 9 months of age. Sensory-motor thinking. Children's thinking dominated by their sensory and motor experiences.
Early childhood	Development of gross and fine motor skills. Rapid growth and development of the brain continues, particularly in areas of the brain that are associated with executive functions skills of following rules and directions.	Errors in use of vocab, such as overgeneralisation, overextension and underextension, reflect processing of language rules. Emergent literacy.	Symbolic thought. Preoperational thinking. Appearance dominates perceptions and understanding. Egocentric thinking. Limited ability to take others' perspective, or to coordinate two perspectives.
Middle childhood	Increases in flexibility and eye-hand and foot-hand coordination. Continued growth of the cerebral cortex and improved myelination and connections across the brain.	Complex grammar develops, with large increase in vocabulary. Metalinguistic awareness develops, with focus on language rules, and language play. Literacy development.	Concrete operational thinking. Children able to think logically about concrete objects. Can take another person's perspective and coordinate two perspectives.
Adolescence	Coordination of movement comes with more complex linking networks in the brain. Puberty brings rapid increases in height and weight, along with development of sex organs. Brain development continues into early adulthood and critical periods of growth occur in the pre-frontal cortex.	Mastery of complex grammatical and vocab forms. Use of figurative speech and multiple meanings. Increases in metalinguistic awareness.	Formal operational thinking – children can think in the abstract, and beyond themselves and their experiences.



how developments in one domain support or prompt those in another. For example, why in adolescence do we see formal operational thinking in the cognitive domain, coordination of movement in the physical domain and use of abstract language such as metaphors in the language domain? What other links can you find in adolescent development? What role does school play in ushering in changes in middle childhood and adolescence?

	SOCIAL DEVELOPMENT	EMOTIONAL DEVELOPMENT	MORAL DEVELOPMENT
	Infant self-concept tied to primary caregiver. Separate self around 15 months of age, followed by a growing ability to coordinate behaviour with that of a partner. Erikson's trust vs mistrust stage.	Reliant on caregiver to regulate emotion. By 3 months of age, can interpret emotional cues from caregiver. Self-conscious emotions such as shame and guilt don't appear until there is a separate sense of self and initially occur in response to the influence of adults.	Reliant on caregiver to determine what is right or wrong.
	Self-concept tends to be concrete, based on appearance and favourite activity. Self-esteem is high but unrealistic (and resistant to modification by experience). Play is increasingly interactive. Friendships develop with those who spend time together. Erikson's autonomy vs shame and doubt, and initiative vs guilt stages.	Children determine an individual's emotional response from the current context. Limited understanding that self and others have different thoughts and feelings. Empathy and prosocial behaviour occur, in terms of what the child would like in that situation.	Tend to act in self-interest.
	Self-concept is a mix of concrete and abstract descriptions. Tends to be absolute ('I am clever. I'm good at sport'). Comparison with peers influences self-esteem, which becomes more realistic. Friendships more exclusive, with loyalty, trust valued, though similarity is important. Increased sophistication in play; play involving rules. Erikson's industry vs inferiority stage.	Can predict emotional responses of others based on past experience. Understands that others have different perspectives, at first in terms of different information, and later being able to take the other's perspective to view their own actions. Emotions managed through action.	Concerned with rules, and obeying authority. Concern for others prompts prosocial moral reasoning and behaviour.
	Abstract, complex descriptions of self are added to concrete ('I am *usually* kind; *Sometimes* I ...; when I am *with my friends* I ...'). Self-consciousness and drop in self-esteem at the start of adolescence. Friendships more stable, enduring, decreasingly reliant on superficial similarities. Intimacy and self-disclosure valued. Organised play. Erikson's identity vs role confusion stage.	Ability to observe a situation as a third party, considering their own and other's feelings from this external perspective. Emotion managed through thought. Adolescent egocentrism (focus on self and own needs).	Developing ability to reason about higher principles to judge what is right or wrong independent of rules. Awareness of people's motives as well as actions. Dignity, rights and equality are important.

Module

II

THE LEARNING PROCESS

MODULE CONTENTS

Chapter 5 Behavioural views of learning

Chapter 6 Cognitive explanations of learning

Chapter 7 Humanist approaches to learning



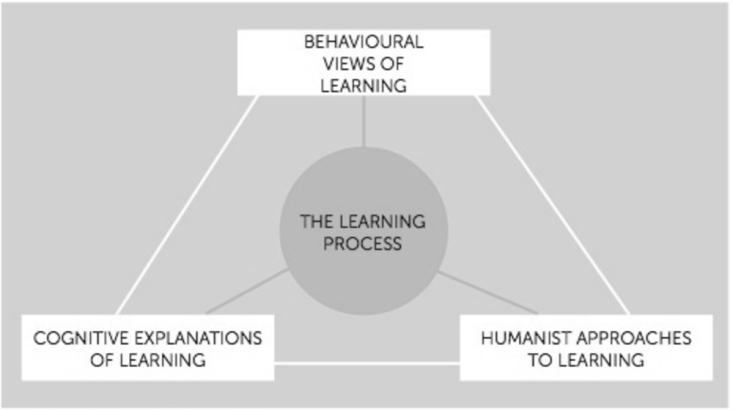

FIGURE MI Module II concept map.

Core question: How can theories of learning enhance the understanding of learning and teaching?

As children develop, they learn. Changes that come about through learning can relate to such things as knowledge, skills, beliefs, attitudes, habits and feelings. Such changes are enduring. They can result from instruction or be an unintended outcome of experience.

This module focuses on ways of understanding the learning process. It explores different theoretical explanations of how we learn, and the implications these explanations have for teachers in how they view their role, relate to learners, arrange their classrooms, deliver content and assess students' work.

Chapter 5 presents behavioural explanations of learning, which are concerned with learners' observable behaviours, and where the quality and extent of learning is measured by what learners can show or do to demonstrate what they have learnt. Chapter 6 explores cognitive and constructivist explanations of learning, which draw attention to the learner as an active participant in learning and as a constructor of meaning, and which view learning as a collaborative partnership in which social interaction is particularly important. Chapter 7 discusses humanist approaches to learning, which draw attention to personal, social and qualitative aspects, and which are concerned with the whole learner and with developing learners' full human potential.

Each chapter of this module encourages you to consider different theories of learning and what these can teach you about the roles of the learner and the teacher in the classroom and in learning. Teachers often enhance their effectiveness by being eclectic – that is, by using elements of different theories to achieve the best possible results for their students. You may wish to keep this in mind as you study this module and consider your developing philosophy of learning and teaching.

Chapter 5

BEHAVIOURAL VIEWS OF LEARNING

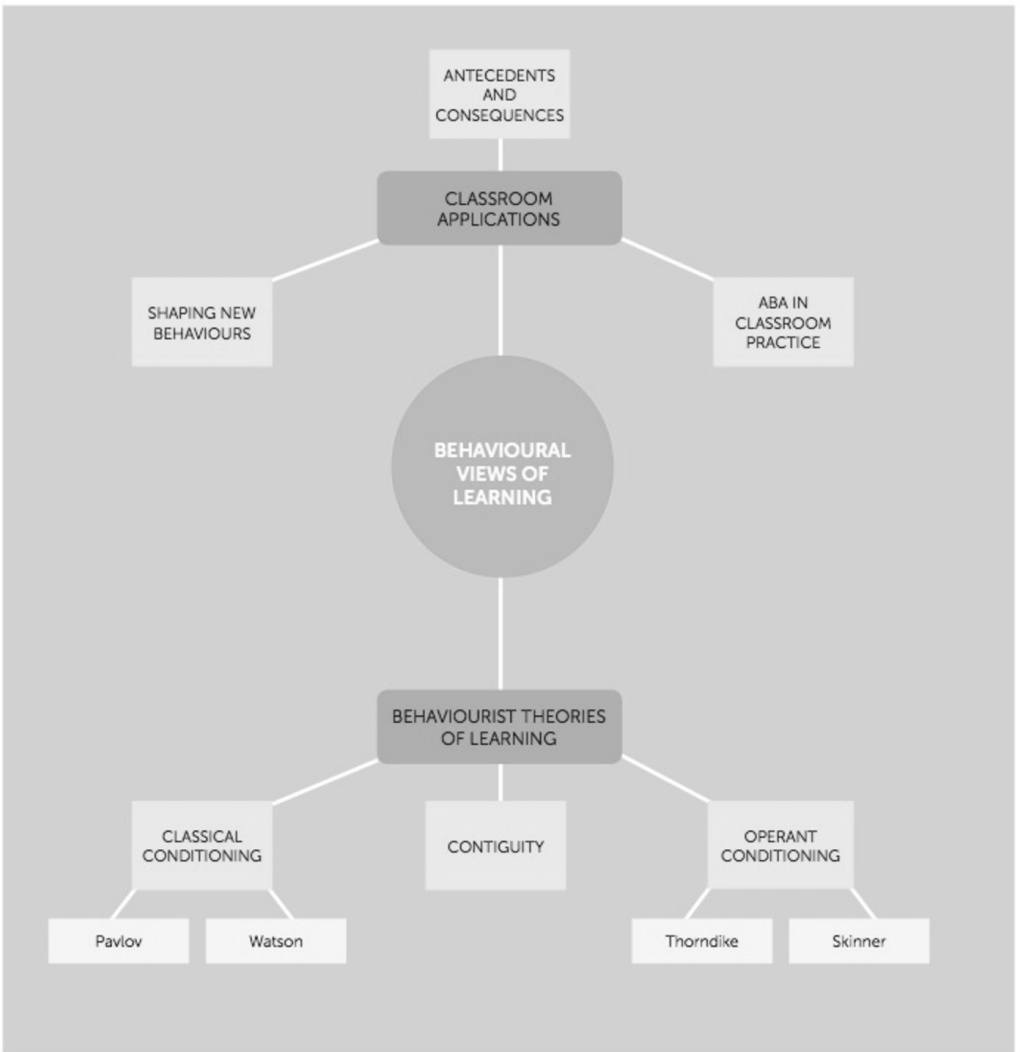

FIGURE 5.1 Chapter 5 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- What are the main characteristics that distinguish classical conditioning from operant conditioning?
- Can you describe the principles of positive and negative reinforcement and give an example of their use in everyday life?
- Why are poker machines so effective in holding players' attention?
- How can a teacher use antecedent–behaviour–consequence (A–B–C) information to manage behaviour?

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INTRODUCTION

Tom and Sam have been working on the same assessment tasks in class but gain different marks. Sam is rewarded for his assignment with an extra sticker on the achievement chart that is displayed behind the teacher's desk. Tom did reasonably well on the task considering his learning difficulty, but he did not receive any sticker or special comment from the teacher. The teacher in this classroom also takes stickers off the chart for misbehaviour and Tom has lost quite a few stickers. Sam feels pretty pleased with himself and talks about how long his line of stickers is. Tom feels pretty ambivalent and couldn't really care less about the stickers. He never gets any anyway!

Teachers can reward students with stickers or points for academic achievement or good deeds, but teachers can also punish students (sometimes with the removal of stickers or privileges). Students respond to these reward or punishment systems in different ways. No doubt some learn the warm feeling of pride as a result of their reward, and some might try to avoid the actions that lead to the unpleasant feeling of punishment, but what type of learning is occurring for these students? Does it teach students in this class anything about improving the quality of their assignments? Do students learn to change their behaviours? Some students such as Tom simply avoid trying or avoid getting caught. How might students like Tom and Sam respond to future classroom experiences if they are constantly rewarded or punished in these ways?

BEHAVIOURAL EXPLANATIONS OF LEARNING

The strategy of rewarding students for **behaviour** or removing something from them for misbehaviour is a classic behavioural approach to managing student behaviour, but also for the encouragement of learning. Essentially, **behaviourism** views learning as a 'cause and effect' mechanism, in which external factors lead to a response. Over time, behaviourists believe this response becomes a learnt behaviour. For example, when Sam was rewarded for success in the classroom, behaviourists would say that this increases the likelihood that the behaviours leading to this success will be repeated, and they refer to this as **learning**. In this behaviourist approach, learning is said to occur when observable and permanent (or relatively permanent) changes in behaviour result from the influence of external factors such as instruction and experience.

behaviour
Actions that are observable and measurable

behaviourism
Explanations of learning concerned with the effect of external events on behaviour

learning
Permanent or relatively permanent changes in individuals that result from instruction or experience

Behavioural approaches stand in contrast to the work of the cognitive theorists you read about in Chapter 3 and the approaches that will be described in Chapter 6. The main difference between these theories is the behaviourists' concern with measureable and observable changes in behaviour. They are much less concerned with unseen factors such as the cognition, emotions or personal belief systems of learners (Arthur-Kelly, Lyons, Butterfield & Gordon, 2006). In contrast to theories of cognitive development that you read about in Chapter 3, learning and behaviour are *not* believed to be the outcome of maturation, or cognitive development (for example, Piaget's theory), or any other processes internal to the person. Rather, behaviourism is concerned with the effect of external events, such as reward or punishment, on behaviour.

Some aspects of behavioural principles and their application in specific situations are controversial, and this view of 'learning' has become strongly critiqued over time. These principles result from a strong history of research and experimentation (often with animals) which we explore first in this chapter. Many features of the behavioural approaches to learning, which have resulted from this research, do provide educators with very powerful tools to use as part of instruction. These approaches are explored in the second part of this chapter, along with a considered discussion of the careful and ethical use of behavioural strategies in the classroom setting.

CONTIGUITY

As explained above, the 'cause and effect' mechanism of learning is a basic principle of behaviourist theory. Cause and effect occurs because people associate or make a connection between a certain event and the outcome they experience. The behaviourists referred to these associations as **contiguity**, and to the cause and effect as **stimulus (S)** (something that affects the senses) and **response (R)** (a reaction to a stimulus). At the most basic level, this occurs through our senses, such as our sense of smell. For example, do you associate the smell of salt in the air with the ocean? If you have learnt this association, the smell of salty air might trigger thoughts of summer holidays at the beach. Similarly, learning to recite the alphabet or to count to 10 involves building associations: saying 'a, b, c, d' or '1, 2, 3' triggers even quite young children to recite the next letters or numbers in these sequences. Contiguity assumes that whenever two events or sensations occur at the same time, and frequently enough, then an association will develop – meaning that in the future, only one of the events or sensations is needed for the other to also be remembered.

contiguity
The association of two events that are always closely paired, or that repeatedly occur at about the same time

stimulus (S)
An environmental condition or event that activates the senses

response (R)
An observable reaction to a known (or unknown) stimulus

Contiguity is a simple theoretical principle that can be used to help learners develop associations between specific stimuli (objects, events, sensations) that often occur at about the same time or that are closely paired in terms of similarity and contrast. Examples include learning the alphabet and learning to associate concepts such as 'hot–cold', 'good–bad' and 'big–little'. Instances of applied contiguity in learning include the use of drill and practice or rhyme to teach simple facts such as the spelling of irregular words (for example, 'i before e except after c') or number facts (for example, '5 × 5 = 25'). The principles of contiguity are also used to help children to remember the details of their name, address and telephone number.

Tabula rasa

The principle of contiguity can be traced back to the Greek philosopher Aristotle (384–322 BCE). He described the mind of an infant as a blank slate, or what the English philosopher John Locke (1632–1704) called a *tabula rasa* (Latin for 'scraped tablet'): 'I imagine the minds of children are as easily turned, this way or that way, as water itself' (cited by Gay, 1964, p. 20). According to this 'associationist' view of learning, the newborn baby knows nothing but has the potential to learn from experience as a result of an innate ability to perceive sensations and to build associations among them. Particular sensations are remembered if they are associated in memory as a result of contiguity (that is, they occur in the same time and place), similarity (they are alike) or contrast (they are dissimilar, or opposites). However, although associationism's principles of contiguity can be used to explain simple learning that

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Go further: Read about Locke's concept of tabula rasa on this text's website.

involves stimulus–response (S–R) linkages, most learning cannot be adequately understood in such terms, and more complex explanations are needed. These behaviourist explanations gradually emerged, over time, as a result of more systematic study of the learning process in children and animals.

CLASSICAL CONDITIONING

PAVLOV'S APPROACH

Probably the most important contribution to our understanding of stimulus-responses processes in learning was made by the Russian physiologist Ivan Petrovich Pavlov (see Box 5.1). His work identified a process known as **classical conditioning**, discovered during his study of digestion and the production of saliva in dogs. Pavlov (1928) was attempting to study the relationship between a dog being fed and the dog's salivation and digestion when he encountered an unexpected development in his laboratory.

classical conditioning The association of an automatic response with a new stimulus

BOX 5.1 ABOUT IVAN PETROVICH PAVLOV

Ivan Petrovich Pavlov (1849–1936) was born in Ryazan, a rural village in central Russia. His father was the village priest and the family hoped the boy would follow his father into the priesthood. Pavlov attended the church school, and later the seminary in Ryazan. However, after reading translations of the scientific work of Charles Darwin and others, he left the seminary and enrolled at the University of St Petersburg, where he studied chemistry and physiology, gaining a doctorate in 1879. In 1883, he completed medical studies at the Imperial Medical Academy. His early research was concerned with the physiology of the heart and the nervous system (Nobel e-Museum, 2003).

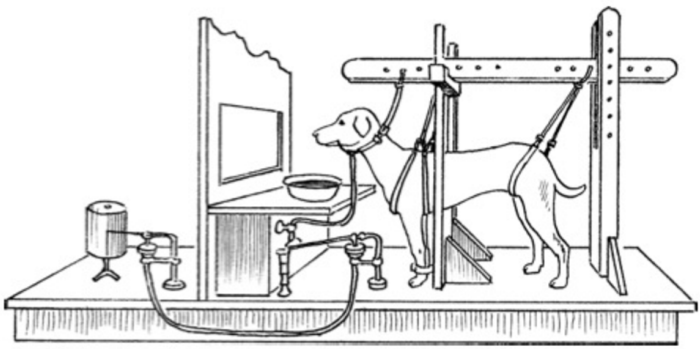
Pavlov is best known for his studies of the digestive system in dogs, exploring as he did the relationship between salivation and digestion. As a result of his research into the relationship between the brain and the body's physiological processes, he identified a set of basic principles concerning the brain's role in relation to the overall functioning of the organism. Pavlov was awarded the Nobel Prize for Physiology and Medicine in 1904.



FIGURE 5.2 Pavlov (at right) contributed to our understanding of classical conditioning through his studies of salivation and digestion in dogs.

Pavlov's laboratory studies were concerned with the relationship between salivation and the digestive process. Salivation triggers digestion in the stomach, and if salivation does not occur, then digestion does not begin. Pavlov argued that salivation is not innate, but rather is a 'conditioned' (or learnt) response (as opposed to an innate or involuntary response like blinking) that originates in the brain's cerebral cortex and that is governed by the central nervous system (Nobel e-Museum, 2003).

This research employed Pavlov's surgical skills, which he used to create permanent openings in the body of the animal that could be used to directly observe processes such as digestion (Nobel e-Museum, 2003). For the purposes of Pavlov's study of digestion, a small operation was performed on the outside of the dog's cheek to alter the flow of saliva to an opening (or fistula). A glass funnel was attached to the opening to collect the flowing saliva and the dog was taught to stand quietly on a table while loosely harnessed (see Figure 5.3). Pavlov noticed that the dog began to salivate when it was about to be fed, before it had seen or smelt the food. He also noticed that whenever the assistant who regularly fed the dog came into the room, the dog began to salivate as though it had been given food. Intrigued by this unexpected development, Pavlov changed the focus of his study from digestion to the process by which a dog salivated at the sight or sound of the person who fed him, rather than solely at the sight or smell of food (Hilgard & Marquis, 1961).



Source: Yerkes and Morgulis (1909), reproduced in Hilgard and Marquis (1961, Figure 3.1)

FIGURE 5.3 Pavlov's arrangement for the study of salivary conditioning.

neutral stimulus (NS)
An event or happening that has no effect on an organism

unconditioned stimulus (US)
An object, event or happening in the physical environment that causes spontaneous activity in an organism

unconditioned response (UR)
An action triggered spontaneously by a stimulus

conditioning
The establishment of a new association between a stimulus and a response

Pavlov devised a study to examine the way in which the dog learnt to salivate at a sound rather than at food. He applied the following procedures, and used the following terms to describe the stimulus-response process.

1 Neutral stimulus and unconditioned response

First, a tuning fork was sounded for seven to eight seconds before a small amount of food was moved close to the dog's mouth. At this stage, the sound of the tuning fork was a **neutral stimulus (NS)** – that is, a stimulus that does not excite or provoke activity – and the dog did not respond to it. There was no salivation. However, the dog salivated copiously while eating the food, the food being an **unconditioned stimulus (US)** or natural, unlearnt, primary stimulus that elicited the uncontrollable response of salivation in the dog. In this case, the dog's salivating was an automatic or **unconditioned response (UR)**; that is, no prior training or **conditioning** was needed to elicit salivation from the dog in response to food.



FIGURE 5.4 Steps in conditioning a dog to salivate at the sound of a bell.

2 Conditioned stimulus and conditioned response

Pavlov then sounded the tuning fork just *before* food was presented to the dog. His aim was to train or 'condition' the dog to salivate to the sound of the tuning fork. Initially, salivation occurred after the tuning fork had been sounded for 18 seconds, but on later tests, salivation occurred within just one to two seconds. The previously neutral sound of the tuning fork had become a **conditioned stimulus (CS)**. The dog now salivated, or gave a learnt or **conditioned response (CR)**, to the sound of the tuning fork (see Figure 5.4).

3 Discrimination, generalisation and extinction

Subsequently, Pavlov taught the dog to respond to one specific tone from the tuning fork while ignoring other tones. This taught the

dog stimulus **discrimination** by learning to only respond to one specific sound. Pavlov was then able to 'generalise' the learnt responses by teaching the dog to respond to a range of different sounds, not just a single tone of the tuning fork. Finally, he 'extinguished' the learnt behaviour after he repeatedly presented the conditioned stimulus (the sound of the tuning fork) ***without*** producing the food. Here, the learnt or conditioned response (salivation) gradually disappeared as the association between the two events (sound and food) weakened and disappeared.

conditioned stimulus (CS)
A previously neutral stimulus that elicits a conditioned response after pairing with an unconditioned stimulus

conditioned response (CR)
A response evoked by a conditioned stimulus

discrimination
Learning that it is appropriate to respond to some stimuli but not to others

Pavlov's influence

Pavlov's research into classical conditioning had a tremendous impact on ideas about learning. In particular, his use of precise observation and measurement, derived from his work as a physiologist, established an invaluable framework for future research into human learning and behaviour. His work attracted the interest of American psychologists, who adopted Pavlov's terminology as well as his research strategy (Hilgard & Marquis, 1961).

WATSON AND BEHAVIOURISM

Pavlov's behavioural principles were developed further by John B. Watson (1878–1958), an American psychologist who introduced the term 'behaviourism' into US psychology. Like Pavlov, Watson worked with animals. He believed that behaviour could be explained not in terms of instincts and other inherited mental characteristics, but rather in terms of S–R associations and, in particular, conditioned reflexes and responses. He argued that it was not necessary to study thoughts, feelings, intentions or meanings – which was common practice at the time – in order to understand behaviour.

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Online resources
Go further: Read about unconditioned responses in early behavioural research on this text's website.

According to Watson's view of early development (1913, 1919, 1925), infants are born with innate reflexes and emotional reactions such as fear, love and anger. As they develop, other S–R associations are formed. In this way, the newborn infant's limited range of innate responses is gradually extended and expanded as a result of experience.

Little Albert and the rat

Watson is best known for an experiment in which he and Rosalie Rayner used Pavlov's classical conditioning principles to induce fear in 'Little Albert', who was a healthy infant about nine months old (Watson & Rayner, 1920).

When first shown a white rat, Albert reached out to touch it. At this stage, the rat was a neutral stimulus (NS), but as Albert again tried to touch it, Watson and Rayner made a loud sound (US) behind Albert's head by striking a hammer on a steel bar. As expected, Albert began to cry (UR). After a number of trials in which the loud sound was made each time Albert reached out to touch the rat, even just the appearance of the rat (CS) caused poor Albert to cry (CR). He had been conditioned (or had learnt) to fear the rat. Subsequently, Albert's fear extended or 'generalised' spontaneously to objects that resembled the rat, such as a white rabbit, cotton wool and a Father Christmas mask.

A few years later, classical conditioning was used to extinguish fear in a young boy called Peter, who was fearful of white rabbits (Jones, 1924). In this study, Peter was seated in a highchair and given food he liked. While he was eating, someone brought a white rabbit in a small cage as close as possible to Peter without distracting him. This process was repeated, with the white rabbit (CS) always presented at the same time as Peter's favourite food (US), until Peter's fear response (CR) decreased.

It is not known if Little Albert's conditioned fears decreased or remained with him for some time after the experiment. Albert left the experiment after a short period of time so there is some chance his conditioned fear may have remained.

STRENGTHS AND LIMITATIONS OF CLASSICAL CONDITIONING

Strengths

Pavlov's studies of classical conditioning had an impact on research methodology, both in terms of the value placed on precise observation and measurement, and the use of a number of experiments to explore one topic with great precision.

At a more practical level, therapists and others often use classical conditioning principles to reduce fearful or irrational behaviour in children and adults. Many irrational fears and phobias are formed as a result of the pairing of neutral stimuli with stimuli that trigger an involuntary response (such as pleasure, anxiety or panic). For example, throwing a child who cannot swim into deep water on the assumption that this will make the child learn to swim is likely to result in the child developing a fear of water. Therapists often use procedures derived from classical conditioning to help us overcome such problems (Alberto & Troutman, 2013).

Limitations

Classical conditioning is largely limited to explaining those behaviours associated with automatic responses or reflex actions such as fear, sweating when anxious, or salivating like Pavlov's dog. Not all behaviours are like these automated responses, however. Rather, some actions and responses are initiated or controlled by the person, or the person has conscious intent that is not under the direct or immediate control of an external stimulus. It is not possible to trigger such actions in the way Pavlov triggered salivation in his dog.

Sometimes it is difficult to find responses that can provide a starting point for instruction, such as when a child is mute at the time when speech should be emerging. As a result, formal instructional procedures based on classical conditioning principles are not often used, although classical conditioning can come about inadvertently, and many irrational fears and phobias, as well as negative or inhibiting responses to daily experiences, are formed in this way.

Quite apart from these inherent limitations, experimentation with children such as that done with Little Albert would not be possible today. The ethical notion of 'harm' in research is concerned with any practices that might cause unnecessary levels of physical harm or psychological and emotional distress to a research participant. It is very unlikely that such research would be allowed today, or even considered necessary. Albert would need serious behavioural treatment for his learnt fear response to be extinguished, and one would hope that the treatment would be successful.

The implications of classical conditioning for teaching practice are explored in Box 5.2.



BOX 5.2 IMPLICATIONS FOR EDUCATORS

CLASSICAL CONDITIONING IN CLASSROOMS

Instances of classical conditioning in classrooms and in daily life are easy to find. It involves a previously neutral stimulus leading to a conditioned or learnt response. For example, the common fear of dentists can easily be explained in terms of Watson and Rayner's 1920 study with Little Albert. Going to the dentist was once an unconditioned stimulus but now produces a conditioned anxious or fearful response. For some people, even the strong smell of disinfectants or fluoride toothpastes can trigger these memories of visits to the dentist. Examples of classical conditioning in schools and classrooms include:

- feelings of embarrassment or extreme anxiety associated with classes taught by teachers who use shaming and ridicule to make students conform, leading to continuing negative feelings about the subject matter taught by these teachers or about schools in general, and to avoidance of further study

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- using children's natural or existing behaviours to train a response to certain stimuli. For example, the tendency of children to stop and look when they hear a loud or unusual sound is exploited in order to teach students to respond immediately to a call for attention. This can be done by pairing the call to attention with a sound such as a bell or a gong. In the classroom or playground, the teacher might initially use a clap of the hands or a whistle to signal she is about to speak, or give an instruction; over time, the clap of the hands or whistle can be phased out as the teacher's voice alone captures the students' attention.

THINK ABOUT

- Do you feel nervous or uncertain about any areas of learning? For example, does spelling or long division create butterflies in your stomach?
- Can you think about any experiences from school that you associate with these tasks that might explain your negative feelings?
- If a child felt anxious about attempting these tasks at school, could the teacher use classical conditioning to change this response?

OPERANT CONDITIONING

Answers to some of the problems identified in the use of classical conditioning (such as the need to find an automatic response as a starting point for instruction) were provided by the discovery of 'operant conditioning', which is concerned not with unintentional or automatic responses to environmental stimuli, but with behaviour that is conscious, intentional or voluntary.



Source: KPG_Payless/Shutterstock

FIGURE 5.5 School students are trained to respond to the sound of a school bell ringing.

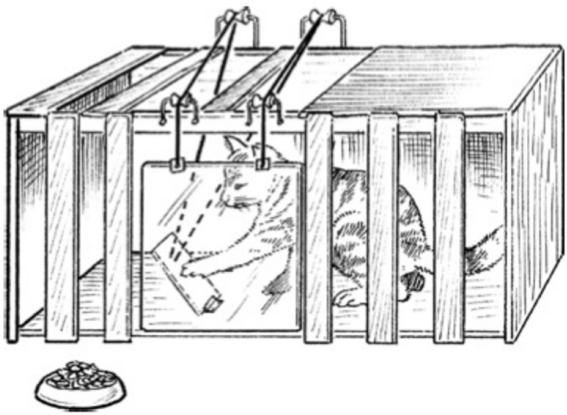
A toddler will look for a toy in a play box out of curiosity or boredom, a dog will sniff around a tree to find out if other dogs have passed by recently, and a kookaburra will swoop down to catch a lizard because of hunger. All of these behaviours are initially spontaneous, initiated by the child or animal, rather than in response to an external stimuli. A model explaining the occurrence of these types of behaviour was first identified in the theory of learning proposed by E. L. Thorndike (1874–1949), an influential psychologist, and by B. F. Skinner (1904–90). Their contributions to theories of learning were concerned with the field of *operant* (or instrumental) *conditioning*. This theory proposes that the learner's behaviour is instrumental in triggering a sequence of events that leads to a positive or negative outcome, and to learning. The term 'operant' refers to individuals being autonomous and free to 'operate' in their own way on the environment. **Operant conditioning** refers to the use of positive and negative consequences to strengthen or weaken behaviour.

operant conditioning
The use of positive and negative consequences to strengthen or weaken voluntary behaviour

THORNDIKE, TRIAL-AND-ERROR LEARNING AND THE LAW OF EFFECT

Thorndike's (1911, 1931) main contribution to the development of behaviourism was his work on the effect of rewards on behaviour. His explanation of learning as involving the formation (or 'stamping in') of associations or connections between stimulus and response came to be known as **associationism**.

associationism
An explanation of learning as the formation of connections between stimuli and responses



Source: Thorndike (1909), reproduced in Hilgard and Marquis (1961)

FIGURE 5.6 The cat has to find a way to escape from the puzzle box in order to reach the food.

Cats and the puzzle box

In a series of now-famous studies, Thorndike (1911) trained cats to escape from a 'puzzle box' to obtain food. The box used in the studies had vertical slats so that once the cat was in the box, it could see but not reach food that had been placed outside (see Figure 5.6). To open the door of the box and reach the food, the cat had to perform an action such as pressing a latch or pulling a cord. If a hungry cat was put into a puzzle box, it became very active – clawing, scratching and moving around the box in its eagerness to get to the food. During this random activity, the cat would accidentally trigger the door to open and was immediately rewarded with the food. If the cat was put into the box again, it would again begin to claw, scratch and push, but this time its movements would be concentrated in the area from where the latch had previously been released. After more trials, during which the cat would direct its activity towards the latch mechanism, other actions would gradually drop out as the correct act was learnt or 'stamped in'. By this stage, the cat would perform the correct action as soon as it was put into the box.

trial-and-error learning
An explanation of learning that states that when an individual is placed in a problem-solving situation, the correct response will be learnt through being reinforced

Thorndike described this process as trial, error and accidental success (Thorndike, 1898), and called the cat's actions **trial-and-error learning**. He explained the processes involved in terms of the **law of effect**; that is, responses that have a satisfying outcome (such as when the cat reached the food) are likely to strengthen and be repeated, whereas those that are followed by discomfort or annoyance are likely to weaken or not be repeated. Over time, the terms 'satisfaction' and 'annoyance' were replaced by words such as 'reward', 'reinforcement' and 'punishment'. Thorndike also expressed his belief that the connections between actions and new outcomes are strengthened the more often they are repeated, which is known as the **law of exercise**.

law of effect
Responses that have a satisfying outcome are likely to be strengthened and repeated

law of exercise
Connections between actions and new consequences are strengthened the more they are repeated

Thorndike showed that the trial-and-error actions resulting in the delivery of a reward need not be associated just with mechanical acts such as stepping on a latch or nudging a lever. For example, he taught a cat to lick itself in order to get food. The key factor is that the action results in receipt of the reward. An everyday example of the law of effect is a dog putting out a paw to 'shake hands'. This trick has been taught through the law of effect, by giving the dog a reward such as food or a pat every time it carries out the action. If the trick is practised often, the law of exercise is also being applied. Can you think of other everyday examples of this type of learning?

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Go further: See more about trial-and-error learning in the classroom on this text's website.

SKINNER AND OPERANT CONDITIONING

From the 1930s and, more particularly, from the 1950s to the 1970s, Skinner (1938, 1948, 1957, 1968, 1971) was, and remains, the most famous name in the field of operant conditioning, and has been a major influence in the fields of education and psychology. His main interest was in the relationship between behaviour and its consequences.

operants
Voluntary actions, usually goal-directed

Skinner acknowledged the principles of classical conditioning demonstrated by Pavlov and Watson. However, he argued that these principles were incomplete and did not account for the much larger number of behaviours that individuals initiate spontaneously. He called these self-initiated behaviours **operants** because they involved actions that are produced or emitted voluntarily by the individual as an

operator in the environment. Operant behaviours were contrasted with **respondents**, these being elicited or reflex reactions produced when an individual responds (often involuntarily) to recognised stimuli in the environment. Skinner believed that many of these voluntary responses could be conditioned and reinforced.

respondents
Elicited or reflex reactions to a specific stimulus

BOX 5.3 ABOUT B. F. SKINNER

Burrhus Frederick Skinner (1904–90) was born in Susquehanna, a small Pennsylvanian railroad town close to the New York state border. The family lived in a comfortable two-storey wooden house with a yard that was 'strewn with debris, the garden overgrown' (Bjork, 1993, p. 3), a paradise for an enterprising boy with a vivid imagination and an interest in construction. From an early age, Skinner enjoyed making gadgets from junk lying around the yard. For example, after frequent scolding by his mother for forgetting to hang up his pyjamas, Skinner built a device involving a hook, nails and a string that led to the bedroom door with a sign 'Hang up your pyjamas'. When the pyjamas were on the hook, the sign lifted out of sight. When they were off the hook, the sign came down as a reminder to put them away (Bjork, 1993, p. 13).

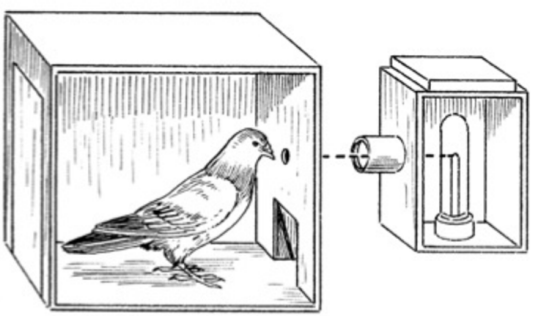
At school and at college, Skinner was interested in literature and biology, and considered becoming a poet and novelist. However, he became interested in psychology after reading books by Pavlov and Watson. He enrolled at the psychology department at Harvard University, gaining a PhD in psychology in 1931. In 1948, he returned to Harvard to work in the psychology department, remaining professionally active until his death in 1990 (Skinner Foundation, 2002).

Skinner is remembered for three specific initiatives: one involving pigeons he attempted to train as navigator-bombardiers during the Second World War; a thermostatically controlled, enclosed 'baby box' he designed for his second daughter, and which he tried to commercialise without success; and 'teaching machines' that gave immediate feedback and reduced the time wasted by students who worked more quickly than their peers.



Source: National Library of Medicine.

FIGURE 5.7 Skinner's work on the principles of operant conditioning and the relationship between behaviour and its consequences had a major impact on learning and teaching in classrooms.



Source: Hilgard and Marquis (1961). Illustration by Bunji Tagawa, reproduced with permission.

FIGURE 5.8 A typical Skinner experiment. The pecking of a key by a pigeon in the 'Skinner box' is reinforced by a flashing light.

The early research of Skinner (see Box 5.3) was mainly concerned with white rats. Skinner devised an ingenious method for studying these rats. A rat would be placed in a cage-like box. The box could be opened with a device, such as a lever, that the rat could operate to obtain food. Later, having observed some pigeons flying, and noting their excellent vision and ability to manoeuvre, Skinner began to use

pigeons in his studies, again placing them in boxes that were totally under his control (see Figure 5.8). These boxes became known as 'Skinner boxes'. As described in Box 5.3, Skinner even created a special box or crib for his own daughter. The crib had a controlled and comfortable environment that suited the cold climate and allowed for the 'safe' depositing of the child, freeing the mother from constant observation of the child. This led to significant criticism of his attempts to apply his 'Skinner boxes' to humans, but rumours that Skinner 'raised his daughter in a Skinner box' are not accurate reports of his intentions in designing a warm crib for his daughter.

Skinner's experimentation with animals was extensive and led to a strong belief that his results were applicable to all animal species (including humans), and to an insistence that learning could only be demonstrated when observable change occurred after reinforcement. Skinner's experiments certainly supported this view. He successfully trained pigeons (mainly) to perform various 'antics' such as playing the piano, dancing together and even redirecting guided missiles, simply by repeatedly reinforcing their responses (see Figure 5.8). Skinner had successfully shown that a pattern of action very quickly emerges in response to the feedback, or **reinforcement**, received. As we will read in the next section, this view of reinforcement was rapidly transferred to the human learning and classroom contexts.

reinforcement
Increasing or strengthening the likelihood of a behaviour recurring through use of contingent feedback

STRENGTHS AND LIMITATIONS OF OPERANT CONDITIONING

Strengths

As shown in the next section, the work of Skinner in particular has had an enormous influence on classroom practices. As stated by Alberto and Troutman (2013), few people in Skinner's era could possibly have imagined the amount of research and application his studies would generate. The ultimate strengths (and limitations) of the operant conditioning approaches are reviewed at the end of the next section, where we examine the school- and classroom-based applications of these principles. In particular, some of Skinner's principles first tested with animals have emerged as concepts that could be applied to humans, such as the importance of reinforcement.

Limitations

A main and enduring criticism of behaviourism in general, and of Skinner's principles in particular, is a concern for the dehumanisation of the human condition. This refers to a concern that deliberate attempts to modify another person's behaviour with extrinsic factors might undermine or deny the human their own personal agency or free will. A further concern about behaviourism relates to the denial of the role of cognition or innate human dispositions in influencing learning.

Specifically, some of Skinner's principles have been soundly critiqued and have not stood up to rigorous testing. For example, Tolman and Honzik (1930) provided a challenge to Skinner's belief that cognition had to be discounted as a factor in learning because it could not be observed, and to his belief in the fundamental role of reinforcement in conditioning learning. Their research with rats showed an idea of 'latent' learning that did *not* occur as a result of reinforcement – rather, rats wandering in mazes by themselves seemed to form a 'cognitive map' of the maze just as successfully as those rats who were reinforced for learning to get out of the maze. This view of a cognitive map extends the earlier idea of cognitive schemes that you were introduced to in Chapter 3, and later research showed that humans certainly do form mental representations of their world. Other researchers challenged Skinner's view that his results would be maintained across all species. Although this was certainly true for many species, including humans, some research with other animals such as racoons showed that these animals had such strong, instinctual and innate behaviours that they could not be as effectively conditioned as Skinner proposed (for example, Breland & Breland, 1961). Cognitive approaches to learning have also

adopted rigorous scientific methods and have proposed that other factors also influence learning, such as the unique cognitive processes of the individual, motivational factors or unique and innate personal characteristics, as are explored in other chapters in this text.

CLASSROOM APPLICATIONS OF BEHAVIOURIST VIEWS

The application of the principles of operant conditioning to instructional contexts has been quite extensive and well researched; as noted by Arthur-Kelly, Lyons, Butterfield and Gordon (2006), this approach has also led to frequent debate and controversy. In this section, we explore the basic principles of behaviourist research that have been applied to foster learning as well as to manage student behaviour. One particular application of the principles of operant conditioning can be found in **applied behaviour analysis (ABA)**. This refers to the use of behavioural learning principles to change behaviour in settings such as classrooms and play areas (Alberto & Troutman, 2013; Schloss & Smith, 1998). The primary focus is on behaviour that is observable (for example, academic, communicative, social, motor, vocational and self-help behaviour) and quantifiable. The goal is to change behaviour that is socially important (not trivial) (Baer, Wolf & Risley, 1968). For this reason, one of the most common applications of behaviour analysis is to the management of challenging behaviours often associated with severe and disabling conditions such as autism spectrum disorders, where repetitive difficult behaviours can be difficult to treat. The case study of nine-year-old Michael in Box 5.5 (see page 208) is an example of the use of ABA principles for a child with typical development but difficulties in basic learning skills. This case study reflects the key principles of applied behaviour analysis and the legacy of the observational research methods described in earlier sections. Applied behaviour analysis is characterised by:

applied behaviour analysis (ABA)
The use of behavioural principles to change behaviour

- careful observation and identification of the target behaviours; initial periods of observation and assessment are necessary to pinpoint the precise nature of the problem
- clearly stated objectives for the targeted behavioural change, taking account of the data gathered in the observation and assessment period
- a carefully sequenced instructional plan that directly addresses the target behaviours; the teaching program is then tailored to the student's specific learning needs
- rewarding of the learner with a carefully devised reinforcement schedule when a current objective is reached
- continual monitoring of progress, measurement of change and adjustment to the program if necessary.

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Online resources
Go further: Learn about the key steps of applied behaviour analysis on this text's website.

Applied behaviour analysis methods are precise and complex and require specific training in the method before application in the classroom. Therefore, in this section we explore basic principles and elements of this approach, including classroom applications of monitoring and observing children's behaviour, and use of consequences that increase desired behaviours and decrease undesirable behaviours. Further training in the method would be required before attempting to apply an applied behaviour analysis approach in any learning condition.

ANTECEDENTS AND CONSEQUENCES OF BEHAVIOUR

One of most enduring legacies of the behaviourist emphasis on observable behaviour has been in the observation and analysis of behaviour, with a particular concern for the causes and consequences arising from behaviour. In accordance with behaviourist theory, 'behaviour' is defined as the actions

or activities of a living organism that are observable and measurable. Such activities do not occur in isolation but are part of an ongoing string of actions, reactions, responses and initiations. For example, if we return to the example of Tom and Sam, from the introduction to this chapter, we could take a moment to step into their classroom and observe any of their actions or behaviours. If we observed very carefully, we might notice that Tom and Sam's behaviours are embedded in an extraordinarily complex array of ongoing events. Their actions or behaviour may involve other people (their teacher, their peers) or the classroom setting (desk, chair, books, pencils). These may also involve all of the child's previous experiences that we may not be able to observe (Sam had a good breakfast at home, Tom was picked on during the trip to school on the bus, or Tom's previous negative reaction to missing out on a sticker on the achievement chart). In addition, these may involve expectations and thoughts about what will happen next; we may not be able to observe these internal processes, but our observation may allow us to detect emotional displays, or gestures, for example (Does Sam feel excited by the prospect of gaining another achievement sticker? Will you see Tom being bullied by the same people in the classroom?). It is impossible to isolate a single behaviour or action of Sam and Tom from all the events and influences that have preceded it and that will follow it. So, in any attempt to study a single action (such as a rat pressing a lever or Tom screwing up his work and throwing it in the bin), it is important to take account of what precedes this action ('antecedents') and what follows it ('consequences').

Behaviourists believe that all voluntary (intentional) behaviour is controlled by antecedents and consequences. Both types of information are important in understanding the actions of humans and other animals. In ABA, the connection between these factors is represented by the symbolic **antecedent–behaviour–consequence (A–B–C)**. A–B–C has become an analytical strategy used by teachers to specify the exact nature of problem behaviour and any contextual factors that may be contributing to its occurrence. Reflecting the behaviourists' emphasis on careful observation and 'scientific' recording, the analysis involves the teacher or other observer recording the behaviour of a particular 'target' child in terms of the events that immediately precede the behaviour and that follow it.

antecedent–behaviour–consequence (A–B–C)
Behaviour represented as an ongoing chain of activity involving events that immediately precede the behaviour and that follow it

When a child makes a rude sign to another child, who reacts by hitting and spitting, it is the initial actions of the child making the sign that trigger the behaviour of the other child. The **antecedents** of behaviour, or the conditions that precede particular actions, contribute to the action's occurrence. **Consequences** are conditions or events that immediately follow actions and that can *increase* the likelihood of a specific behaviour recurring. Consequences can also *decrease* the likelihood of recurrence, such as when you rebuke a child for walking on a clean floor with muddy feet. Sometimes a consequence has no effect on the behaviour it follows – that is, it is neutral in its impact on the behaviour – such as when a child ignores a reprimand. (See Table 5.1 in Box 5.4 for an example of an A–B–C record of a disruptive classroom situation.)

antecedent
An event that precedes a behaviour

consequence
An event that follows a behaviour

APPLYING THE A-B-C METHOD

The teacher is concerned and rather annoyed that Tom seems to be frequently involved in minor classroom arguments and fights. To find the antecedents of his involvement in a fight, and to achieve planned instructional outcomes, his teacher needs to watch what is happening before these fights erupt (see Box 5.4). The teacher also needs to understand the effect of the consequences that immediately follow these disturbances. This will help the teacher to learn how to decrease undesirable behaviour (in Tom's case, arguing or fighting with peers) and increase the rate of occurrence of more appropriate activity. Obviously, it is impossible to predict when a fight or argument may occur, therefore the A-B-C method may require multiple observations at different times to capture examples of the target

behaviour. The information that Tom's teacher needs from observation of the boy's disruptive classroom behaviour includes:

- *antecedents* – When and where does the disruption occur? What happens immediately before? What is the child doing and who is with the child?
- *behaviour* – What does the child do, when does the child do it and what is usually happening when the behaviour occurs? (Describe the behaviour in precise terms so that another person can reliably observe and record its occurrence.)
- *consequences* – What happens immediately following the behaviour? What is the function of the behaviour and what are the outcomes (positive and negative) for the child?



BOX 5.4 CLASSROOM LINKS

AN A–B–C SITUATION

Tom's classroom teacher has prepared a recording sheet to monitor his behaviour. The teacher wants to pinpoint specific behaviours in Tom that need to be changed, as well as any classroom events that may be contributing to the problem. A teacher's assistant has observed Tom and made the following recordings on the recording sheet:

TABLE 5.1 A–B–C record of a disruptive classroom situation

TIME	ANTECEDENTS	BEHAVIOUR (TARGET CHILD)	CONSEQUENCES
9.16	*1 Teacher: 'Get out your workbooks and get ready to write answers to these problems'.*	Tom (T) did not listen to teacher. Continued to talk to child next to him	Teacher repeated the instruction to T
	2	T walked over to pencil sharpener, bumped another child's desk – all the books fell to the ground	Child hit T
	3 Child hit T	T hit child back and swore at him	Teacher: 'Stop that, Tom! Or you'll have to leave the room'.
	4	T and child continued to fight	Other child now crying
	5 Teacher: 'Tom, I said stop it immediately. Go to your own desk'.	T went to pencil sharpener	Teacher: 'I'm nearly ready to start now. Just waiting for Tom'.
9.25	*6*	T sharpen[ed] 3 pencils	T: 'Hurry up, T'.
	7	T return[ed] to desk, trie[d] to find workbook	
9.30	*8 Teacher: 'Are you ready?'*	T: 'No, I can't find my book'.	

Source: Adapted from Martin (1987, p. 164).

ACTIVITIES

1 Can you identify the precise nature of the inappropriate actions that annoyed Tom's teacher, and the A-B-Cs associated with these actions?
2 What changes could Tom's teacher make to reduce Tom's inappropriate actions?
3 What appropriate behaviour could be encouraged? How might this be done?

baseline
Level of a specific behaviour prior to intervention

Having identified the behaviour, its antecedents and consequences, the teacher then collects **baseline** data (information collected on at least three occasions to identify the existing level of a behaviour as a basis for measuring changes in behaviour after intervention). Baseline data can describe behaviour in terms of *rate* (frequency of occurrence), *duration* (how long the behaviour lasts) and *latency* (length of time delay between antecedent event and occurrence of behaviour). A management program is then planned and implemented. This will involve consideration of:

- *antecedents* – What should be changed in the classroom environment? (For example, curriculum that is more interesting and at the child's developmental level; consistent application of classroom rules that include consequences for both appropriate and inappropriate behaviour)
- *behaviour* – What behaviours can the child learn that replace the problem behaviour?
- *consequences* – What can be done to block the reinforcing consequences of the problem behaviour and encourage (or reinforce) appropriate behaviour?

Other factors that Tom's teacher needs to consider include events that occur in the classroom on the way to school or in some other setting, and that are linked to the problem behaviour. These might include Tom's learning difficulty, his previous reactions to the achievement chart, or bullying or harassment on the school bus. A management program can include better communication with Tom and his parents and help in managing situations in the classroom or playground that might contribute to his problems at school, responding to his learning difficulties and attending to any other problems he may be experiencing (see more about behaviourist approaches to classroom-management strategies in Chapter 14).

UNDERSTANDING CONSEQUENCES

Consequences are anything that follows a behaviour that serves to reinforce the behaviour or stop or decrease it. In the case of the A-B-C chart, the consequences were the events that followed the child's behaviours. Some of these consequences occurred spontaneously, such as the other child's reaction to Tom that reinforced Tom's aggressive response and led to more fighting. Similarly, you may remember a child who was a 'class clown' and whose behaviour was probably reinforced when peers laughed at him or her. While these consequences and reinforcements occur naturally in everyday behaviours, behaviourists were specifically interested in manipulating and employing deliberate consequences to reinforce or shape behaviour. Documentaries made on the topic of behaviourism often include short segments from Skinner's studies with rats and pigeons (see, for example, Zimbardo, 1987). Typically, such segments show a rat turning a wheel or pressing a bar, or a pigeon pecking an illuminated disc, pulling a string or turning circles in order to receive a reward of food pellets. The behaviour of these animals was deliberately manipulated by the use of a reinforcer (or reward) that ensured the actions would be repeated. However, in some studies, aversive (undesirable) rewards such as a loud noise were given, and these had the effect of reducing or eliminating the target actions. In thinking about operant conditioning, a distinction needs to be made between these two types of consequences: **reinforcers**, which act to strengthen a behaviour or increase the likelihood of its being repeated, and **aversives**, which have the opposite effect in that they weaken a behaviour or reduce the likelihood of it recurring.

reinforcer
Any event that strengthens the behaviour it follows

aversive
A contingently applied stimulus that the recipient finds undesirable and which reduces the behaviour it follows

Reinforcement

A student studies hard for a test and gets a good mark. A swimmer wins a race and receives a cheer from the watching crowd. Both the student and the swimmer have been 'reinforced' for their efforts, and this will (in theory) motivate them to try harder next time. A reinforcer is any consequence that has the effect of maintaining a specific behaviour, or increasing the rate at which the behaviour occurs and the probability that it will occur again. The consequence may take the form of cheers from a crowd, good marks or even a hug, or a desirable activity such as a push on a swing for a young child. Whether it be a spontaneous reinforcer such as a cheer, or a deliberate reinforcer such as giving a prize, the main point is that reinforcement maintains or increases the behaviour that it follows. It also needs to have **contingency**, meaning that it is given only when a particular identified behaviour occurs, such as good marks on a test or the fastest time in a race. Reinforcement must occur *immediately* after the identified behaviour occurs, or be clearly linked to the target behaviour, since any delay or uncertainty may result in the wrong behaviour being reinforced (see Alberto & Troutman, 2013).

contingency
Reinforcement that is only given when the target behaviour is produced

When a specific behaviour, such as finishing a page of sums, is immediately followed by the delivery of a desirable consequence, such as an achievement sticker or a smile, then **positive reinforcement** has occurred. Reinforcement has the effect of increasing the frequency of the behaviour it follows, and most reinforcement delivered by teachers is positive, in that it involves contingent presentation of a rewarding object or activity immediately following the target behaviour. Examples of common reinforcers that usually have a positive effect on behaviour include praise, showing happiness or delight, and monetary rewards.

positive reinforcement
Increasing the likelihood of a behaviour occurring by contingent presentation of a reward immediately following it

In some situations, the frequency of target behaviour is increased by the contingent removal or withdrawal of an aversive (negative) consequence. Take, for example, the statement: 'If you finish piano practice you will not have to take out the garbage'. Here, the individual is rewarded for desirable behaviour by being allowed to escape from an unwanted experience or task. This process is called **negative reinforcement**.

Although teachers mainly use positive reinforcement, in some situations, negative reinforcement may be appropriate. For example, a teacher might allow students who finish their work on time to escape the task of cleaning up the classroom after a messy art activity.

negative reinforcement
Increasing the likelihood of a behaviour being repeated by contingently removing an aversive object or activity

Selecting reinforcers

Not all reinforcers mean the same thing to all people. What one person finds reinforcing may be quite off-putting to another person. A warm smile or a thumbs-up sign may be positively reinforcing for many children. However, physical gestures or touch, such as a pat on the back, may not be acceptable for some cultural groups and may be negatively reinforcing for such children, and for those who do not like to be touched. It is important to remember that objects and actions usually considered to be positive or negative reinforcers may not function in the expected way for particular individuals. So when designing a program that includes positive and negative reinforcers, it is essential to check that the reinforcers used have the required effect on the person for whom they are selected. In the CourseMate Express website you can view a video of an applied behaviour practitioner who discusses the role of individual child reinforcers in her program. As she explains, it is possible to select reinforcements that are suitable for each child, rather than assuming, for example, that all children are reinforced by an achievement sticker chart.

CourseMateExpress
Online resources
Watch a **video** entitled 'An ABA practitioner discusses reinforcement'.



Source: Matthew Duchesne, © Milk and Honey Photography 2010.

FIGURE 5.9 What strategy could the teacher use to reinforce the students taking part in this activity? Think of examples for both those who have worked well and those who were not so engaged in the lesson. Could the teacher use A–B–C observations to help diagnose any problems in the group setting?

Primary and secondary reinforcers

The reinforcers used to reward behaviour can be of two types: primary and secondary. **Primary reinforcers** include naturally occurring or 'unconditioned' (unlearnt) stimuli that are innately rewarding for the individual. They are usually associated with the satisfaction of basic needs such as those identified by Maslow (1970) (see Chapter 7); for example, food, drink and comfortable environment are classed as primary reinforcers. Typically, primary reinforcers might include small, edible items such as lollies or preferred food items. However, primary reinforcers are not overly effective in interventions because they reach a **satiation** point very rapidly. This refers to the fact that primary reinforcers lose their effectiveness quite quickly and hence any intervention that depends on such forms of reinforcement may be very limited in effectiveness (Sturmey, 2008). While these types of reinforcers can be very effective in establishing new behaviours rapidly, it is not advisable to use primary reinforcers such as food in classrooms for obvious health and safety reasons. **Secondary reinforcers** are 'conditioned' (learnt) rewards, such as a smile, praise, good grades and applause. In classroom interventions, secondary reinforcers can be preferred activities or games that the child enjoys. In order to be learnt, secondary reinforcers must apply the principals of contiguity and contingency very carefully. The reinforcer must be contiguous or close in timing with the behaviour to be reinforced. An association or contingency between the stimulus and the behaviour must also be learnt, with frequent pairing of the two.

primary reinforcer
An unconditioned (unlearnt) stimulus that is innately rewarding

satiation
A stimulus that originally functioned as a reinforcer no longer functions as a reinforcer

secondary reinforcer
A conditioned (learnt) stimulus that functions as a reward

The Premack principle

Everyone will be familiar with 'Grandma's rule'; for example, 'First eat your vegetables and then you can have your dessert'. In Grandma's terms, this means 'Do what I want and then you can do what you want'. Based upon the research of psychologist professor David Premack (1965), the key principle here is that activities individuals enjoy, and do often, can be used contingently as positive reinforcers for activities that do not occur often and that are less enjoyable. In other words, things that individuals enjoy doing can be used to reinforce the completion of a less enjoyable activity. Otherwise known as the **Premack principle**, Grandma's rule is a very useful strategy for increasing the performance frequency of undesirable, dull or difficult tasks. We may apply this principle to ourselves as adults when we use little 'bribes' to force ourselves to study even when we find it boring: 'I can watch an episode of my favourite TV show when I finish studying this chapter'.

Premack principle (Grandma's rule)
Any behaviour that is enjoyed and that occurs often can be used to reinforce behaviours that are not enjoyed and that do not occur often

REINFORCEMENT SCHEDULES

One of the decisions that must be made when planning a behavioural program concerns the selection of a **reinforcement schedule** (see Table 5.2). For example, when you first introduce a new task for a student to acquire, it may be appropriate to reinforce the target behaviour every time it occurs. However, extensive behavioural research in the field of operant conditioning has shown that specific schedules of reinforcement are very important to the learning process and can determine the rate at which people learn. It seems that different types of learning and different learning situations require different schedules of reinforcement; research has demonstrated the effects of different schedules.

reinforcement schedule
The frequency with which reinforcement is delivered

TABLE 5.2 Types of reinforcement schedules

TYPE OF REINFORCEMENT SCHEDULE	COMMENT	EXAMPLES
Fixed ratio or a set number of behaviours to occur before reinforcement is given	In the early stages of establishing a new behaviour or learning something new, it may be necessary to reward every correct action, with the rate of reinforcement being gradually reduced as the behaviour becomes established.	• 'John will get a smiley stamp every time he puts up his hand to answer a question.' • 'Mary must get five sums correct before she can play on the mat.'
Fixed interval or reinforcement after a set period of time	This type of reinforcement schedule leads to short bursts of activity just before the expected reinforcement takes place.	• 'Awards for a tidy room will be given at the beginning of each week.'
Variable ratio or an unpredictable number of behaviours to occur before reinforcement is given	This type of reinforcement is associated with high rates of the target behaviour.	• A lottery or a poker machine where the player has no idea when the next payout will occur. • Random checks by the teacher on students' work.
Variable interval or an unpredictable time interval between reinforcements	As with variable-ratio reinforcement, variable-interval reinforcement leads to a high rate of appropriate behaviour. This behaviour is also resistant to extinction.	• Random checks of drivers' licences. • Random correction of homework assignments.

Continuous reinforcement

When you are working with very young children, continuous reinforcement is useful, particularly in the early stages of teaching a new skill. The problem with continuous reinforcement is satiation, when the reinforcer being used loses its appeal as a motivator. For this reason, alternative schedules, or different reinforcers, need to be used in order to maintain the momentum of learning.

Intermittent reinforcement

Once a new behaviour has been established, it is usually appropriate to systematically reduce the rate at which rewards are given, using a schedule that involves 'intermittent reinforcement'. Some, but not all, correct responses are now reinforced. This is useful when an individual is at risk of satiation, or is losing interest in a particular reward, such as food. It is also useful in maintaining a behaviour and ensuring that learning has actually occurred independent of the reinforcer.

Intermittent reinforcement can take two forms. **Ratio schedules** refer to when a reward is given in a predetermined ratio to the number of responses. The ratio used can be 'fixed' (preset), such as with a reward for every fourth response; or 'variable' (changeable), such as with a reward for correct responses at an average rate of one in four. **Interval schedules** refer to when a reward is delivered after a predetermined period of time, such as every 60 seconds. Interval schedules can also be fixed or variable. In thinking about the relative effectiveness of these different ways of giving reinforcement, it is useful to remember the power of poker machines, with their variable-interval reinforcement schedule, in holding the attention of some punters. As anyone who has observed the actions of a person who is addicted to gambling will know, a variable reinforcement schedule has a very powerful effect on the behaviour that it reinforces. Such behaviour is very difficult to extinguish.

ratio schedules
When a reward is given in a predetermined ratio to the number of responses

interval schedules
When a reward is given after a set period of time

EXTINCTION AND PUNISHMENT

Classroom applications of operant conditioning principles and ABA are also concerned with modifying and decreasing less desirable behaviours. However, too often, teachers seek to decrease unwanted behaviours by punishing the student (Alberto & Troutman, 2013). Operant conditioning also offers a means to change behaviour through the use of extinction and differential reinforcement schedules, and, as a last resort, punishment.

Extinction

extinction
Reduction and cessation of a response following the withdrawal of reinforcement

Extinction refers to the gradual weakening and elimination of a behaviour when the reinforcer (either positive or negative) is removed. A classic example of extinction employed in everyday classrooms is the use of planned ignoring of undesirable behaviours. This is usually done by ignoring a behaviour that the teacher would normally and inadvertently reinforce by responding to it. Common classroom behaviours such as talking out of turn or being off-task often earn a teacher or peer response that inadvertently reinforces the student. For example, earning the attention of the teacher or status among peers can be a reinforcer for some students, although unintended by the teacher. Planned ignoring removes any form of reinforcement, positive or negative, for such behaviours. However, the use of planned ignoring as a single extinction strategy can be difficult to carry out in real-life classroom situations. This is because the problematic behaviour usually goes through a period or increasing or getting worse before it is extinguished. This temporary increase in unwanted behaviour can lead teachers to believe that planned ignoring is not effective and can also create classroom-management problems.

To resolve this problem, extinction almost always occurs as a part of wider program of reinforcement in the classroom using a simple reinforcement schedule known as differential reinforcement (Landrum & Kauffman, 2006). At a very simple level, this involves applying a reinforcer for a desired response and withholding reinforcement when desirable responses are not forthcoming. As such, in the application of planned ignoring, the teacher would have to be sure to show positive reinforcing responses to students 'doing the right thing' while also ignoring off-task or calling-out behaviours. As with all rules of contingency, it would be especially important to immediately reinforce positive behaviours as soon as they are noticed. This is also known as the 'fair pair rule', in which the teacher strives to ensure that at the same time as they apply a punishment to reduce a behaviour, they seek out another behaviour that can be rewarded and increased. This is otherwise known as the teacherly skill of 'catching them while they are being good!'. Further applications of differential reinforcement in the case of severe undesirable behaviours associated with disabling conditions are explained in Alberto and Troutman (2013).

Punishment

punishment
Weakening or reducing behaviour through contingent use of aversive objects or events

As with the term 'reinforcement', most people have some idea of what the word 'punishment' means. However, this word also needs to be understood within the context of behavioural theory. **Punishment** functions as an unpleasant or negative experience that individuals will strive to avoid or remove. The most important aspect of this definition concerns the effect of punishment on the likely recurrence of the behaviour that it follows. The main effect of punishment is to weaken (and eventually eliminate) a behaviour by presenting an aversive object or event immediately after the behaviour occurs. Punishment involves establishing a contingency that has the effect of decreasing the likelihood of a target behaviour recurring. Consequences that have the effect of reducing the occurrence of a behaviour or eliminating it altogether are referred to as 'punishers'. However, as will be discussed, punishment as a teaching strategy has been strongly criticised and is largely seen as ineffective. Skinner himself wrote about the use of punishment, believing that while positive reinforcement changed behaviour with lasting

results, punishment might only change or reduce a behaviour superficially without actually teaching the individual any skills to avoid the behaviour or action that is undesirable (Skinner, 1965).

Like reinforcement, punishment can take the form of giving something, in this case an unpleasant or aversive stimulus, such as a reprimand or a ticket for exceeding the speed limit. Alternatively, punishment can also involve taking away something pleasant, such as when points are lost in a contest or privileges are withdrawn (for example, the loss of a driving licence if a person is caught speeding repeatedly). Punishers also parallel reinforcers, in that they are either primary (that is, unconditioned – unlearnt or innate) or secondary (that is, conditioned – learnt). The feel of a very hot kettle to a child who touches it could be classed as an unconditioned punishment, in that the heat of the kettle acts as a punisher to the child even if the child has never before touched something hot. The child does not need to have had a prior experience of touching a hot kettle in order to experience the sensation of touching one as unpleasant or painful. The effect of the experience is that the child learns (is conditioned) to avoid touching hot kettles – and hopefully other hot objects – in the future.

As mentioned, the use of punishment in which the student is presented with an aversive stimulus is strongly criticised. Punishments, as explained above, are based on the idea that a contingent application of an aversive stimuli will decrease the unwanted behaviour. Aversive stimuli range from very harsh stimuli that could cause pain or discomfort, such as a smack or use of corporal punishment, to milder but still discomforting stimuli such as verbal scolding, reprimanding or yelling at the student (Landrum & Kauffman, 2006). Historically, aversives have been used in the treatment of persons with disabilities for whom it was believed that no other measures would be effective or 'get through' to the person's limited understanding. This type of use of strong aversives, such as corporal punishment, is now abolished or strongly discouraged in many regions of the world, including schools in Australia and especially in the treatment of persons with disabilities. Today, the use of aversives is generally considered only as a last resort in responding to severe behaviour problems that have failed to respond to all other treatment options, and which could be potentially dangerous or debilitating to the person.

Apart from the dehumanising impact of aversive modes of punishment, there are strong reasons why aversive punishments are no longer advocated in many systems of schooling today (Landrum & Kauffman, 2006):

- These punishments do not reduce the unwanted behaviour in the long term. Short-term and instantaneous effects may be observable, but the behaviour the aversive was applied to does not generally decrease.
- Aversive punishments generally do not include any teaching strategy that allows the child or student to learn a more appropriate behaviour.
- Strong aversives or signs of aggression (such as yelling) can provoke retaliation from the student, and may inadvertently 'teach' the student to conceal behaviours or not to perform them when the teacher is looking.

Another form of punishment involves **response cost**, or the removal of privileges. It is viewed as a more preferable approach when punishment is deemed necessary (Landrum & Kauffman, 2006). The removal of points or stickers from reward charts, as described in the example at the beginning of this chapter, is a typical example of a response-cost punishment. In this sort of punishment, some type of previous reinforcement or earned reward is removed. Other examples include the withdrawal of some earned free time if the student misbehaves in class or fails to complete work. Response cost is often used in association with a **token economy** (where students can earn points or tokens, such as stickers, as rewards for good behaviour) and a **contingency contract** (where students sign a contract to indicate that they understand and agree with an intervention).

response cost
Removal of privileges or something pleasant as a punishment

token economy
Behavioural system using tokens to reward desirable behaviour

contingency contract
Students sign a contract to indicate that they understand and agree with an intervention plan

For example, in a procedure designed to reduce disruptive behaviour by a pair of eight-year-old girls in a regular classroom, the whole class was told that everyone could receive reinforcers if they abided by new classroom rules:

1 Do what the teacher asks.
2 Raise your hand when you wish to speak.
3 Do not make noises during class.
4 Remain in your seat during class.
5 Look only at the teacher or your work during class.

Students whose behaviour conformed to the new rules were rewarded with a token, and three tokens could be redeemed for a 'mystery motivator' (for example, an arts-and-craft kit or a class lunch on the school premises). After agreeing to the new arrangements and signing the contingency contract, non-compliance within five seconds to a repeated request to comply with the class rules resulted in the student losing the opportunity to win a token (De Martini-Skully et al., 2000, p. 152).

The intervention using a token economy, response cost and contingency contracts was effective in reducing the disruptive behaviour of the 8-year-olds, and was relatively 'teacher-friendly' for those involved in its implementation. However, as with any intervention designed to change student behaviour, teachers must be very careful in using response cost procedures:

- The 'punishment must fit the crime' or the cost must be commensurate with the misbehaviour (Landrum & Kauffman, 2006). For example, if a child generally works well all day and only has one misbehaviour, they should not lose *all* of the points earned that day.
- The teacher must think carefully about providing a number of opportunities for students to earn points in the first place. Ample evidence shows that teachers are more likely to ignore positive behaviours and only attend to negative behaviours, especially in students with difficult behaviours, so a change in teacher behaviour may be needed to make this sort of program effective.
- Token economies should be faded over time. This refers to a process of gradually reducing the child's dependency on tokens as a form of reinforcement. This can be achieved by varying the reinforcement schedule to intermittent or random, and encouraging other naturalistic reinforcers such as a smile or self-monitoring.
- This type of procedure should *not* be used with students who fail to perform or complete tasks on time because of a disability or skill deficit. This would constitute a form of discrimination because it fails to account for the person's condition affecting their behaviour, and it creates a very un-level 'playing field' because some students would find it very hard to earn points in the first place.

Although the behavioural change techniques discussed here are supported by considerable research, it is important to consider some general concerns that have been raised about the use of reinforcement, punishment and token economies. A chief concern relates to the idea that the use of tokens and reinforcement weakens the intrinsic desire of the child to learn, and increases dependency on an outside agent to foster learning (for example, Deci & Ryan, 2000; Kohn, 1993). However, behaviourists strongly refute such claims that intrinsic desire to learn is decreased by the use of reinforcers or rewards (see Alberto & Troutman, 2013). As you will see in Chapters 6, 7 and 8, there are other views about how learning occurs and motivation develops. This controversy is more extensively discussed under the topic of motivation and engagement in Chapter 8. As noted above, punishment and aversive treatments also raise a concern that they may not change the actual behaviour, and may lead to resentment, hostility or worse behaviours (Burden, 1995; Lewis, Romi, Xing & Katz, 2005). These concepts are discussed further in Chapter 14 when we examine punishment in relation to classroom management. It is therefore very important for teachers to distinguish between the behaviourist's meaning of negative reinforcement and punishment.

Distinguishing between negative reinforcement and punishment

People are generally familiar with the word 'reinforcement' and understand its meaning when it is used in a positive way. However, there is usually much more confusion about the meaning of the concept of 'negative reinforcement' and how to distinguish it from punishment. It is important to remember the theoretical distinction: negative reinforcement *increases* usually desirable behaviour while punishment *decreases* usually unwanted behaviour. It is incorrect for a teacher to claim that he or she used negative reinforcement to stop a behaviour. Table 5.3 gives some examples of positive and negative reinforcement, and punishment being used to increase or decrease behaviour.

TABLE 5.3 Types of reinforcement and punishment

ACTION	AIM	
	Reinforcement (that is, to increase behaviour)	**Punishment** (that is, to decrease behaviour)
Give something	Positive reinforcement; for example, 'You've finished all your class work, now you can have some computer time!'	Punishment; for example, 'You haven't stopped talking all class, so I'm giving you one demerit point'.
Take something away	Negative reinforcement; for example, 'If you finish your homework, you don't have to wash the dishes'.	Punishment; for example, 'You haven't finished what I asked you to do, so you can't play football this week'.



THINK ABOUT

A group of teacher education students have prepared a slide presentation for their classmates on the topic of 'Reinforcement'. On the first slide they define positive and negative reinforcement with the following two dot points:

- An example of positive reinforcement is when the teacher gives a prize for the best essay.
- An example of negative reinforcement is when a student walks into class late and the teacher sends them to school office, saying they can't come into the classroom.

1 Can you identify the error in the students' presentation above?
2 Can you identify any problems in the assumptions the students might have made in their choice of 'reinforcers'?

TEACHING NEW BEHAVIOURS

The applications of behaviourism in the classroom discussed so far include techniques that apply many of the principles learnt in laboratory research. Early behaviourists such as Pavlov and Watson, in their studies of dogs salivating and infants being scared by white rats, were concerned with controlling or conditioning actions and innate or involuntary responses to stimuli. Later behaviourists – such as Thorndike with his trial-and-error studies of cats escaping from boxes, and Skinner in his work with rats and pigeons spontaneously acting to obtain food – focused on behaviours that were already in animals' repertoires and that were exhibited with high frequency. But what about teaching a completely new skill to an individual – a skill that involves the individual producing totally unfamiliar actions? If you have to wait until an action is produced spontaneously, new learning may never occur. When teaching a new behaviour involving actions that are unfamiliar to a student, the techniques known as 'shaping', 'chaining', 'cueing', 'prompting', 'modelling' and 'task analysis' are tools for helping the student learn. Box 5.5 explains an approach to teaching students to use cursive handwriting. As you read this example, think about the behavioural strategies being applied, as described in this section.

BOX 5.5 CASE STUDY

SHAPING APPROPRIATE BEHAVIOUR

Michael, aged nine years, was of average intelligence and in Year 4. He had difficulties with basic skills, particularly in handwriting. Michael had participated in the usual instruction in modified cursive writing, but he still preferred to print.

The support teacher began a program to help Michael and several other children to reach the level of handwriting appropriate for their grade level. Initially, the teacher assessed Michael's handwriting using samples from his class workbooks and a handwriting test. This showed that Michael could form manuscript letters correctly, but had problems in spacing the letters (for example, a-mongst) and was confused about positioning capital letters on or below the line. Fluency was also a problem because he took so long to decide where to start some letters that he forgot what he was trying to write.

The modified program developed by the support teacher highlighted similarities between letter shapes by grouping similar letters (for example, 'i', 'u' and 'w') and pointing out consistencies and differences between the letters. Children listened to audiotaped instructions describing the steps required to form the letters on a worksheet. They then used a plastic overlay to assess their own writing by identifying differences between the correct model of the letter on the overlay and their own letters. Further practice focused on shaping the parts of a letter that were incorrectly formed. The children were not required to practise letters they could write correctly. The objectives of the program were to:

- help the student internalise the learning process by listening to tapes that 'talk through' the steps to form a letter
- emphasise similarities between letters and reduce the amount of learning by grouping them in a teaching unit
- enable students to evaluate the correctness of their handwriting by using a plastic overlay
- enable students to self-correct problems found and reward themselves when a letter was correctly formed
- reinforce correct letter formation immediately and reduce unnecessary practice
- concentrate on mastering one task at a time before moving on to more complex material
- monitor maintenance and generalisation of new handwriting skills to other bookwork as each learning task is completed.

Michael's writing program comprised four phases:

1 *completing a worksheet* while listening to audiotaped instructions
2 *marking the worksheet* himself using a model printed on a plastic overlay (if the mark was less than 8/10, he had to redo the worksheet)
3 if still not forming a letter correctly after three days, *doing further practice* such as wiping models of the letter off the blackboard using a brush and water while 'talking through' the actions described on the tape
4 *completing further worksheets* until three correctly formed letters were produced; reward included a merit certificate for students who completed the most sets of letters by the end of the week.

After considerable practice, Michael reached a fluency rate appropriate for his grade level. By this time, Michael was using modified cursive in his workbooks. He still preferred to print when he was writing quickly or drafting his creative writing stories. He could only use the specific letter shapes he had been taught so far.

After three months, Michael was writing correctly in all his workbooks and only needed extra practice when he encountered a problem. His fluency in handwriting had increased to an acceptable rate for his grade level and he was much less anxious about writing tasks in the classroom.

Source: Adapted from Caka, Cooper and Bochner (1989, pp. 130–2).

ACTIVITIES

1 Identify the behavioural techniques used in Michael's handwriting program.
2 In what other areas of the curriculum would these techniques be effective?
3 Are there learning behaviours for which you don't think you could apply this approach?

SHAPING, CHAINING, CUEING, PROMPTING AND MODELLING NEW BEHAVIOURS

Shaping involves the reinforcement of gradual actions or behaviours that approximate or are similar to the desired or target behaviour. To shape a new behaviour, you look for an instance of a behaviour that approximates, or has features in common with, the behaviour you want to teach. Over time, you can selectively reinforce the actions that approximate your goal so that these gradually take the form of the final target behaviour. When a mother responds to a baby's 'm–m–m' by saying 'Mum' and smiling, she is shaping what she sees as the baby's first attempts to communicate with the 'm' sound. Similarly, when trying to teach a child to dive into a swimming pool, you can begin by getting the child to roll into the water from a sitting position at the edge of the pool. Then you begin to selectively reinforce those parts of the rolling action that form the first step in learning to dive, such as tucking the head between outstretched arms and gradually moving to a standing position before eventually 'diving' into the water. Over time and with practice, the child will learn to dive into the swimming pool.

shaping
Reinforcement of gradual approximations of the target behaviour

Chaining occurs when a 'chain' of behaviours is created, with each behaviour in the chain functioning both as a reinforcer for the preceding act and as a stimulus for the next. Actions in the chain can be taught in any sequence; for example, beginning in the middle of the chain and working backwards to the beginning of the task ('backward chaining'), or working forwards to the completion of the task ('forward chaining').

chaining
When one action functions both as a reinforcer for the previous action and as a stimulus for the next

Cueing, prompting and modelling are additional forms of stimulus that increase the likelihood of a target response occurring. **Cueing** occurs when a specific stimulus is used as a 'cue' to elicit a desired response. For example, when asking a child to recall a word in a poem, the teacher can provide a cue by saying the preceding line of the poem. **Prompting** occurs when an additional stimulus (or hint) is used to assist the child in discriminating the relevant features of the stimulus; for example, a teacher can prompt the child's recall of a word by saying 'It is an a–' (with mouth wide open and shaped to say 'a' for 'apple') so as to help the child remember the correct word. **Modelling** is a form of prompting that involves demonstrating a desired response for a learner to imitate. For example, a teacher can model the word 'apple' while touching the picture of an apple and encouraging the child to imitate the model. As discussed in Chapter 4, modelling is also an important technique for demonstrating more complex behaviours such as social skills. Cues, prompts and models are removed through **fading**, or the gradual removal of prompts as the learner becomes more able to complete the task without help. In social skills training, for example, it is hoped that the child can learn to exhibit appropriate social behaviours without the need for cueing or prompting.

cueing
Using a specific stimulus to elicit a desired response

prompting
Providing an additional stimulus to elicit a desired response

modelling
A form of prompting that involves demonstrating a desired response for someone to imitate

fading
The gradual removal of prompts or reinforcers

TASK ANALYSIS

In order to teach a new skill, a teacher must have a clear understanding of all of the steps or sequences involved in that skill. **Task analysis** entails breaking a task down into a sequence of more manageable steps, and can be used to help students acquire a new skill. When linked together, the steps form a sequence that becomes a more complex behaviour. For example, the task of learning to write your own name involves the following steps: holding a pencil correctly, using a pencil to make a mark on paper, drawing shapes of characters similar to a model, drawing character shapes without a model, and writing characters of the correct shape and size to form a word.

task analysis
Breaking a task into a series of manageable steps to assist learning

Scope-and-sequence charts associated with curriculum areas (such as early literacy and numeracy) are examples of task analysis drawn from the educational field. Steps in a sequence, such as that for the attainment of early numeracy, can be used in the initial stages of instruction to assess what students know and do not know (see the discussion of diagnostic assessment in Chapter 13). Each of the steps can be broken down further – or task-analysed – to make a set of more manageable steps for students who are having difficulty learning tasks at a particular level.

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Online resources
Explore an example of a task analysis activity with the **Interactive Activity** on this text's website.

MAINTENANCE AND GENERALISATION OF BEHAVIOUR

Once a skill has been learnt, issues such as 'maintenance' and 'generalisation' need to be considered to ensure that what has been learnt is not forgotten, and that newly acquired skills are used outside the context in which they were taught. As discussed in Chapter 4, social-skills training programs, many of which are based on behavioural training methods, often suffer from problems of maintenance and generalisation of the new social skills.

When teaching an individual a new skill or behaviour, one of the teacher's most important goals is to ensure that learning outcomes are maintained, or continue, long after instruction has ceased. With much new learning, **maintenance** is assured after instruction stops because the newly learnt skill is incorporated into a more complex set of skills that are in regular use. Examples of skills that are incorporated in this way are the subskills that contribute to early reading or numeracy, such as learning to identify the letters in your name and learning to count to 10. However, skills or behaviours that are not embedded into more complex hierarchies may extinguish over time if reinforcement is withdrawn. For example, learning how to make a bird using origami will be forgotten if this new skill is not practised for a long while. Intermittent 'maintenance checks' are sometimes included in a unit of instruction as a way of ensuring that the skills learnt in the unit are durable and not lost through lack of practice and attention.

maintenance
The continued performance of a learnt action after instruction has ceased

Generalisation refers to the process whereby individuals learn to respond to stimuli that are similar to but not the same as those that triggered the original response. For example, a newly acquired skill or behaviour learnt in one context and with one teacher has been generalised if it is reproduced in another setting and with different people. However, a fundamental criticism of behavioural approaches concerns the failure of researchers to demonstrate that treatment effects generalise to other settings. As noted by Landrum and Kauffman (2006), prominent researchers in ABA, teachers can have success in fostering behavioural change in one classroom setting, 'but there is no guarantee that effects will generalise across time (maintenance), or to other settings or responses' (p. 59). In designing an instructional program based on behaviourist principles, provision must be made to ensure that both maintenance and generalisation occur. Such provision may involve checks of previously mastered material to ensure that skills have been maintained, and allowing for newly acquired behaviours to be practised in (that is, generalised to) different settings and with different people, and ensuring skills can be maintained after prompts or reinforcements have been faded (see Chapter 4 for a discussion of generalisation in social-skills training).

generalisation
Learning to respond to stimuli that are similar to but not the same as those that previously triggered a response

APPLIED BEHAVIOUR ANALYSIS IN CLASSROOM PRACTICE

The principles of operant conditioning have found wide application in the specific use of ABA and in general everyday classroom practice. Most recent reports on the use of ABA principles describe interventions involving small numbers of children with behaviour problems, intellectual disability, and developmental disabilities such as autism spectrum disorder or ADHD (see, for example, Kerr, Mulhern & McDowell, 2000; Remington, 1998). Implementation of a program based on ABA principles is intensive for both student and teacher, involving one-to-one instruction with continual monitoring of progress coupled with the need to adapt existing materials or prepare new resources (such as practice exercises and worksheets or probes for checking on progress) to accommodate the specific difficulties (including pace of change and areas of difficulty) encountered by individual students at each point in a learning sequence. This level of intensity is evident in the case study of Michael identified in Box 5.5 (see page 208). Although there are many reports attesting to the effectiveness of ABA, it is important to also acknowledge the concerns about this instructional approach. As shown in the following examples,

there are positive and negative reports, often concerning the strength or quality of the research evidence, or the perspective of 'learning' itself.

Teaching programs based on ABA principles include:

- *precision teaching* – a data-based method of instruction involving direct daily assessment of learning. Each learning task is broken down into a set of manageable steps (that is, task-analysed), and a set number of examples of the task that has just been taught (referred to as 'probes') is used during daily instruction to check learning at each step. Learning is precisely recorded on specialised charts at set intervals (for example, number of correct responses per minute). Precision teaching has been shown to be particularly effective in teaching academic skills (Fuchs & Fuchs, 1986). Nonetheless, a consistent criticism of this approach has been that it lacks rigorous research and evaluation of its effectiveness, despite being in use for several decades (Winzer & Mazurek, 2000)
- *mastery learning* – a method of instruction that allows for all students, both fast and slow, to reach 'mastery' or a predetermined level in an instructional sequence before moving on to the next learning task. Research on the effectiveness of this method varies from strongly positive to cautious. For example, Stallings and Stipek (1986) wrote that the method was overly narrow, focusing on a small range of educational outcomes with rigid, 'mechanistic' instruction. Slavin (1987) was less than positive, stating that although the students performed well on the educators' self-designed achievement tests, they did not necessarily perform better on standardised tests of achievement
- *direct instruction* – a teaching method that is based on explicit teaching and testing of skills considered essential for mastery in a subject area. Learning objectives are clearly defined and carefully sequenced, with the teacher actively controlling each lesson in a highly organised and formal manner. As discussed in Chapter 3, the effectiveness of this teacher-led and controlled form of instruction is contested between researchers, with some debate about whether solely teacher-directed instruction is really necessary or sufficient (see Box 3.8 on page 106). However, there is little doubt that evidence does support the effectiveness of direct instruction for teaching specific types of skills.

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Online resources
Watch a **video** of a secondary school teacher discussing a behavioural approach to classroom management in her school.

In addition to concerns about the approach or effectiveness of some methods, serious ethical concerns have been raised by groups supporting the rights of persons with disabilities. The use of behavioural methods are associated with a history of aversive and punitive treatments, in which people with disabilities have been physically hurt as a form of aversive therapy. These practices are largely banned in most parts of the world, but the concern that the approach is cruel, dehumanising and seeks to 'control' and 'shape' human behaviour remains. As stated in Alberto and Troutman (2013), there is a strong need for teachers to consider the ethical grounds of any intervention, behavioural or not, before embarking on the intervention. The consent of children and their carers to participate in behavioural change programs is essential. Alberto and Troutman (2013) also caution strongly against the overly simplistic use of these behavioural techniques. It is too easy for a teacher to use reinforcement inappropriately, and as a result cheapen and weaken the effectiveness of reinforcement. Arthur-Kelly, Lyons, Butterfield and Gordon (2006) suggest that teachers should always remember to apply the 'fair pair' rule when seeking to decrease an unwanted behaviour in our classrooms. Every behaviour we seek to decrease should be replaced by a positive behaviour that we wish to encourage. This avoids the tendency of teachers to focus on negative and coercive



Source: Matthew Duchesne, © Milk and Honey Photography, 2010.

FIGURE 5.10 What are the critical aspects of programs based on the principles of ABA that help some children to learn more effectively? Which children are likely to benefit from such a program? What difficulties may be encountered in providing this type of help?

strategies. Chapter 14 contains a more extensive discussion of ethical and philosophical concerns about classroom management and behavioural approaches.

In summary, the main features of operant conditioning and ABA, as it is used in classrooms, include:

- observing and identifying behaviours that we seek to change using procedures such as A–B–C observational recordings
- developing and implementing an intervention plan using reinforcement strategies to increase or decrease behaviours
- monitoring and measuring the results of interventions and teaching programs.

STRENGTHS AND LIMITATIONS OF BEHAVIOURAL APPROACHES TO LEARNING

Strengths

The main strengths of behavioural approaches to learning are that they provide educators with effective strategies that can be used quite easily to teach new skills and behaviours quickly and efficiently, particularly to young children and to students with intellectual disabilities and behaviour problems. Such strategies are especially useful for teaching action sequences that need to be performed at an automatic level, such as tying shoelaces, cleaning teeth or even the mechanical aspects of driving a car. These methods are also effective for managing the many forms of undesirable behaviour, often minor in nature, that disrupt most classrooms at some time during the day. Teachers using behavioural methods to manage such behaviour can respond to student disruptions quickly, consistently and without emotional involvement.

Limitations

A major criticism of behavioural approaches is that they neglect the contribution of cognition, or cognitive skills, to the learning process. This is particularly relevant for more complex forms of behaviour, such as problem solving, for which other approaches may be more appropriate (see Chapters 6, 7 and 8). Additional problems that have been identified include concerns about the impact of long-term dependence on extrinsic rather than intrinsic forms of reinforcement (see Kohn, 1993), and ethical issues concerning the use of some types of punishment and aversive techniques (see Alberto & Troutman, 2013; Schloss & Smith, 1998).

Box 5.6 discusses the classroom implications of operant conditioning and ABA.



BOX 5.6 IMPLICATIONS FOR EDUCATORS

OPERANT CONDITIONING AND ABA IN THE CLASSROOM

If you observe a classroom (or any situation involving groups of children being supervised by an adult), you will see many examples of the principles of operant conditioning and ABA procedures occurring without (or with limited) deliberate planning by the teacher or supervising adult. For example, depending on the students' age and the subject matter being taught, you should see:

- the impact of antecedents and consequences on particular students' behaviour
- instances of both positive and negative reinforcement, as well as forms of punishment that involve giving something unpleasant or taking away something pleasant
- use of a 'fair pair' (or strengthening one behaviour while at the same time reducing another) to ensure students have good as well as bad experiences in a classroom
- evidence of techniques such as shaping, chaining, cueing, prompting, modelling and task analysis being used to elicit and support learning; there may also be examples of 'Grandma's rule' being used.

CONCLUDING COMMENTS

This chapter has presented a complex and sometimes challenging perspective of 'learning' that is based on the belief that external factors rather than internal processes lead to learning. Although there have been some criticisms of behavioural theories and the methods of teaching derived from them, behavioural approaches have found widespread use in classrooms today. This is probably because techniques of reinforcement are relatively easy to use, are effective in teaching new skills and behaviours quickly, and can be implemented with a variety of learners in a range of contexts. The basic principles of ABA can be learnt through courses for teachers, parents and others who work with children and adults. Indeed, behavioural principles are used in everyday settings by people who may be unaware of the underlying learning principles. Tom and Sam were no doubt 'shaped' and influenced by their teacher's instructional strategies, but even this fictional example highlights some of the cautions and sensitivities needed when using what may seem to be everyday systems of rewards or token economies in our classrooms. Unfortunately, the injudicious use of reinforcement and aversive punishments has also found its way into contemporary classrooms. As with other approaches to learning and teaching, when correctly implemented, behavioural methods provide a powerful pedagogical tool for educators, but this tool must be used responsibly.

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Online resources
Take a moment to consider your personal philosophy. You may wish to use the **Develop your Philosophy** tool on this text's website.

CHAPTER REVIEW

- Behavioural explanations of learning focus on learners' behaviour, observable actions or activity.
- Contiguity, or a close association in meaning or time between two events or sensations, can lead to learning so that the occurrence of one event triggers recall of the associated event.
- Classical conditioning (Pavlov) is concerned with learning that is produced when involuntary or automatic responses are triggered by specific stimuli in the environment.
- Operant conditioning is concerned with actions that an organism initiates, and includes trial-and-error learning, the law of effect and the law of practice (Thorndike), and the learning that occurs when behaviours are rewarded or reinforced (Skinner).
- Applied behaviour analysis (ABA) refers to the application of behavioural principles in the classroom, with clear specification of the target behaviour and goals, development and implementation of an intervention plan, and monitoring of results with changes implemented as required.

ONLINE STUDY RESOURCES

COURSEMATE EXPRESS

Visit http://login.cengagebrain.com and use the access code that comes with this book for 12 months' access to the student resources for this text.

The CourseMate Express website contains a range of resources and study tools for this chapter, including:

- a **self-check quiz**
- **crosswords**, **flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.

SEARCH ME! EDUCATION

Explore Search me! education for articles relevant to this chapter. Fast and convenient, Search me! education is updated daily and provides you with 24-hour access to full-text articles from hundreds of scholarly and popular journals, ebooks and newspapers, including *The Australian* and *The New York Times*. Log in to Search me! through http://login.cengagebrain.com and use the search terms listed in the 'Education databases' section (page 215) as a starting point.

QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1 Describe two behaviours that change over time and that can be called examples of learning. Describe two other behaviours that also change over time but that are not instances of learning.
2 Give an example from your own experience of learning as a result of contiguity.
3 Can you think of any fears or anxieties you have learnt as a result of unplanned classical conditioning?
4 In what circumstances would using ABA procedures be most appropriate? Describe a situation you have encountered in which such strategies would have been useful.
5 Think about your personal philosophy of teaching. Does it contain elements that you would describe as a 'behaviourist' philosophy? If so, what are they and have you accounted for the ethical use of these principles?

KEY TERMS

antecedent
antecedent–behaviour–consequence (A–B–C)
applied behaviour analysis (ABA)
associationism
aversive
baseline
behaviour
behaviourism
chaining
classical conditioning
conditioned response (CR)
conditioned stimulus (CS)
conditioning
consequence
contiguity
contingency
contingency contract
cueing
discrimination
extinction
fading
generalisation
interval schedule
law of effect
law of exercise
learning
maintenance
modelling
negative reinforcement
neutral stimulus (NS)
operant conditioning
operants
positive reinforcement
Premack principle (Grandma's rule)
primary reinforcer
prompting
punishment
ratio schedule
reinforcement
reinforcement schedule
reinforcer
respondents
response (R)
response cost
satiation
secondary reinforcer
shaping
stimulus (S)
task analysis
token economy
trial-and-error learning
unconditioned response (UR)
unconditioned stimulus (US)

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'BEHAVIOURAL VIEWS OF LEARNING' AND MATERIAL IN OTHER CHAPTERS

- How would you integrate knowledge of child development with knowledge of behavioural views of learning? Is development irrelevant under this approach? (See Chapters 2, 3 and 4.)
- Consider how behavioural and cognitive views of learning differ. Can both be used in the classroom? (See Chapter 6.)

FURTHER RESEARCH

RECOMMENDED READING

Akin-Little, A., Little, S. G., Bray, M. A. & Kehle, T. J. (2009). *Behavioral interventions in schools: Evidence-based positive strategies*. Washington, DC: American Psychological Association.

Alberto, P. A. & Troutman, A. C. (2013). *Applied behaviour analysis for teachers* (6th ed.). Upper Saddle River, NJ: Prentice-Hall International.

Heward, W. L., Heron, T. E., Neef, N. A., Peterson, S. M., Sainato, D. M., Cartledge, G., Gardner III, R., Peterson, L. D., Hersh, S. B. & Dardig, J. C. (Eds). (2005). *Focus on behavior analysis in education: Achievements, challenges, and opportunities*. Upper Saddle River, NJ: Merrill/Prentice Hall.

Zirpoli, T. J. (2005). *Behaviour management: Applications for teachers* (4th ed.). Upper Saddle River, NJ: Merrill/Prentice Hall.

RECOMMENDED WEBSITES

Association for Behavior Analysis International: www.abainternational.org

Council for Children with Behaviour Disorders: www.ccbd.net

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

- applied behaviour analysis
- behaviorism OR behaviourism
- classical conditioning
- contingency contract
- direct instruction
- mastery learning
- operant conditioning
- precision teaching
- reinforcement
- task analysis
- token economy.

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

Chapter 6

COGNITIVE EXPLANATIONS OF LEARNING

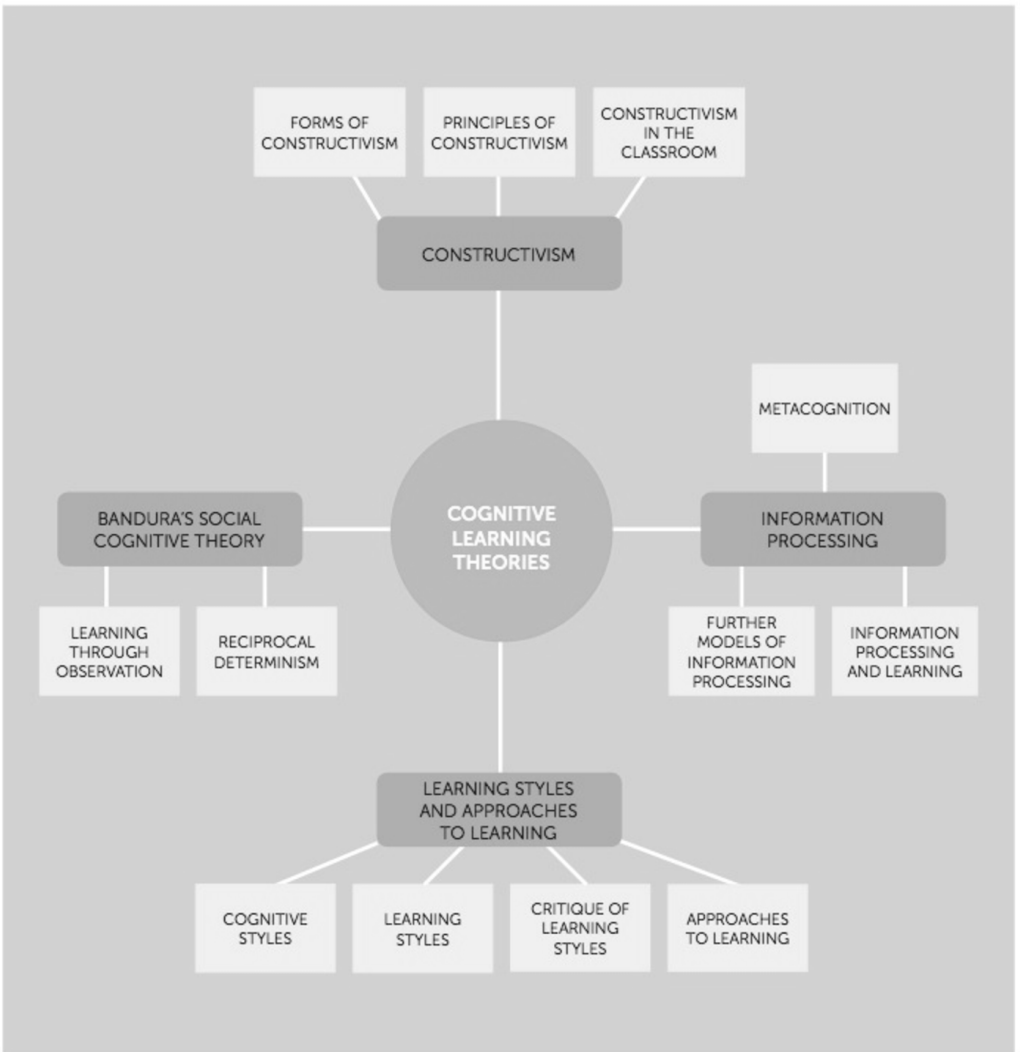

FIGURE 6.1 Chapter 6 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- What are the key principles of cognitive learning theory? How do they differ from those of the behavioural approach?
- What are the four key principles of constructivism? How would you put these into practice in the classroom?
- How does information processing influence learning?
- What is the role of metacognition in learning and memory?
- What kinds of cognitive styles are there? How do they affect learning?

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INTRODUCTION

Memet is writing out his nine times table. He suddenly notices something and starts to furiously write lists of numbers, which he then checks on a calculator. He shows this to his classmates sitting at his table and they all start talking excitedly. Looking up, he calls to his teacher to tell her what he has found, and another classmate also asks her whether it is true of other times tables as well; she thinks she has found another pattern. What was Memet thinking about, and how did that affect his learning? How did Memet's discovery influence his peer's learning? What classroom conditions were necessary for Memet and peers to learn in this way? (You might like to write out the nine times table as a list and see if you can see what Memet saw, and why he got excited. The CourseMate Express website also has an explanation.)

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Online resources
Explore an example of 'Observing, thinking and questioning: the nine times table' with the **Interactive Activity** on this text's website.

This chapter focuses on cognitive approaches to learning. Cognitive explanations focus on internal mental processes, and tend to view learners as active constructors of their own learning. The emphasis is on how learners like Memet make meaning and remember what they learn. In Chapter 5, we looked at learning from a behavioural point of view, focusing on learners' observable behaviours and their responses to external stimuli. In this chapter, we shift our focus from external processes to internal mental processes in order to examine what happens in the mind when we learn.

COGNITIVE LEARNING THEORIES

Cognitive learning theories focus on internal mental processes and their role in learning. At the heart of cognitive theories of learning is the simple proposition that knowledge is 'constructed by the learner and is informed and influenced by the learner's previous experiences' (O'Donnell, 2012). This approach evolved in the 1950s and 1960s, when two different views of learning started to emerge. As explained in Chapter 5, the behaviourist view of learning proposed that learning occurred through stimulus and response. When the learner's response was reinforced or conditioned by external factors, learning was said to have occurred. Internal mental processes were ignored by this approach. In the same era, another group of psychologists and researchers developed a cognitive view of learning that was based on the idea that humans process information in meaningful ways. This processing leads to the development of cognitive structures (also called schemas), and learning occurs when these structures are built or modified.

cognitive learning theories
Concerned with internal mental processes and how learners manipulate information during learning

Broadly, this view of learning came to be called constructivism, but within this theory was a particular approach known as information processing theory. These theorists liken the act of building

these cognitive structures to a series of mental computations through which we process information. For example, the now common view that we take in information through our senses, and then code it, store it in memory and later retrieve it for use, is the foundation of this approach. This view of learning can be considered the dominant cognitive view of learning today, with a rapidly expanding body of research.

By the 1970s, further changes began to emerge in the way learning was being theorised. Albert Bandura, himself emerging from a behaviourist tradition, conducted a series of experiments in which he explicitly sought to prove that the behaviourist principles of trial-and-error learning (often reinforced by external factors) were not the only or necessary conditions of learning. Bandura demonstrated that children didn't require arduous trial-and-error learning procedures in order to learn, but could learn vicariously simply by observing and modelling the actions of others. They could in fact choose to follow these behaviours and regulate their own behaviours in accordance with what they had learned. This finding introduced a critical cognitive element in the study of human behaviour. Bandura's theories rapidly developed and have become one of the most influential social cognitive theories of learning today. In this historical time line, you can see the gradual evolution of cognitive theories of learning.

This chapter looks at three main explanations of learning from the cognitive perspective: the constructivist approach, which includes both individualistic views of learning and also the role of social interaction in shaping learning; the information-processing explanation of how we learn, which focuses on mental processing of information; and the social cognitive explanation of learning, which helps explain the role of the individual operating within their social context to influence learning and behaviour. Finally, this chapter also explores the somewhat confusing and rather diverse body of theories that propose cognitive or learning styles, in an attempt to explain the different ways individuals might approach learning.

CONSTRUCTIVISM

Like all cognitive approaches, constructivism is fundamentally underpinned by the idea that meaning is constructed by the learner. However, from this simple proposition springs many different definitions and forms of constructivism that include the following stances. Constructivists believe that that the thinker is both mentally and physically active in the construction of knowledge, and therefore capable of self-regulating the learning process. Some forms of constructivism also propose that the sociocultural context in which knowledge construction occurs provides the thinker with invaluable resources, support and direction (Hogan & Tudge, 1999; O'Donnell, 2012).

Constructivists also hold a developmental perspective of learning, arguing that young children learn by developing increasingly complex cognitive structures, or schema, and that they add new information to progressively build these schema (Byrnes, 1996; Yager & Lutz, 1994). As learners interact with their environment, they link new information from current experiences to previous knowledge, and so construct new understandings and knowledge. An important part of the constructivist philosophy is that learning is supported by social interaction with peers and adults as the learner develops. It is an approach to learning that owes much to the earlier work of Piaget and Vygotsky (see Chapter 3) and to such philosophers as John Dewey, Thomas Kuhn and Karl Marx.

FORMS OF CONSTRUCTIVISM

Constructivism takes several forms that indicate slightly different emphases on the process by which learning occurs and knowledge is constructed. Two of these are 'psychological constructivism' and 'social constructivism' (Palincsar, 1998; Phillips, 2000). Although they share a focus on individuals constructing their own learning, each has a different emphasis: one on the individual, the other on the social context (see Figure 6.2).




Sources: © David Hancock/Alamy; © Jeff Morgan Education/Alamy

FIGURE 6.2 Do students mainly construct understandings on their own, or as a result of their interactions with others?

Psychological constructivism is concerned with individual learners and how they construct their knowledge, beliefs and identity during the learning process. Piaget's theory of cognitive development, with its emphasis on the individual's progression through a series of stages, forms the foundation for psychological constructivism. Like Piaget, psychological (or individual) constructivists acknowledge the importance of the social environment, but see the role of the individual learner in constructing the learning environment as central. In this view, Memet's individual construction of the nine times table would be viewed in terms of his own unique formation of knowledge, and the reshaping of his scheme of numbers that recognises patterns in numbers. The role of the teacher or adult in supporting this development would also be considered in terms of strategies that might build on and prompt Memet's schematic development.

psychological constructivism
Focuses on individual learners and how they construct their own knowledge, beliefs and identity

Social constructivism draws heavily on Vygotsky's belief that social processes are integral to learning. This approach rejects the view that the locus of knowledge lies solely within the individual. Rather, the social constructivist view is that social interaction shapes cognitive development and is an essential component of the learning process (Cobb & Yackel, 1996; Prawat, 1996). As seen in Memet's classroom, students are seated in groups and hence knowledge construction is easily shared among individuals at Memet's table. Social constructivists would be very interested in how peer-to-peer learning appears to extend the knowledge of peers at Memet's table and is also reciprocated. They would also be interested in the role of the teacher in structuring the learning environment to support and enable this form of learning through social interaction.

social constructivism
Emphasises the role of social and cultural factors in shaping learning

There is some debate regarding the merits of distinguishing between psychological and social constructivism and the various ways of applying it (see, for example, Phillips, 1997). As in Memet's classroom, it is possible to analyse and describe the learning through a combination of these theoretical perspectives.

KEY PRINCIPLES OF CONSTRUCTIVISM

Collectively, constructivist theories encourage educators to recognise the value of the knowledge and experience that students bring to learning, and to provide experiences that help students build on their current knowledge of the world, whether as individuals or in social groups (O'Donnell, 2012).

The following principles may help to guide your reading and practice in this area:

- Learners are *active participants* in their learning. 'Learning by doing' is central to constructivism in practice (Howe & Berv, 2000).
- Learners are *self-regulated*. They construct and monitor their own learning, and metacognition plays an important role in facilitating this self-regulation.

- *Social interaction* is necessary for effective learning. Both Piaget and Vygotsky acknowledged the role of social interaction with peers and significant others (such as parents and teachers) in cognitive development.
- Constructivism encourages individuals to make sense of information for themselves (Bruner, 1990). This means that knowledge may be relative and may differ for each learner. (See Matthews, 2000, for a discussion of this issue in the context of mathematics and science education.) And just as individuals construct their own meaning within a social and cultural context, knowledge and understanding may differ across learners and contexts.

CONSTRUCTIVISM IN THE CLASSROOM CONTEXT

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Online resources
Explore an example of the constructivist teaching-learning cycle with the **Interactive Activity** on this text's website.

The constructivist principles already outlined have many implications for classroom practice, and resulting strategies tend to fall into one of three broad categories, in that they:

- attend to learner-centred experiences and processes
- provide opportunities for learners to work together
- assist novice learners to develop expertise.

This section looks in detail at these three categories of constructivist learning, which, although discussed separately, clearly overlap and share a common focus on the learner. We also explore concepts such as Bloom's taxonomy of learning which are often related to constructivist ideas.

1 Attend to learner-centred experiences and processes

Because constructivists believe that learners bring their own knowledge and experiences to the learning context, this is also the theoretical basis of learner-centred approaches. Learner-centred approaches acknowledge that learner experiences may involve many unique learning opportunities or interests that lead to the development of specific knowledge or skills. Therefore, teachers must spend time understanding students' current constructions, and checking what understandings they have constructed from their learning experiences. There is no guarantee that learners will receive knowledge just as teachers have delivered it – it may well be reconstructed by their prior experiences and understandings (Gillies, 2007). Assessment is therefore an important skill for constructivist teachers (see Chapter 13 for more on this topic). Because of constructivism's focus on the value of students' background experiences and prior learning, the approach fits well with acknowledging diverse cultural experiences and the development of personal ideologies (John-Steiner & Mahn, 1996; Solomon, 2000). As we will see below, learner-centred approaches can also provide the teacher with an additional way of motivating students through acknowledging their interests, or simply acknowledging the child's desire to explore their own environment. 'Discovery learning' and 'inquiry learning' are two learner-centred practices that reflect constructivist approaches to learning.

Discovery, inquiry and problem-based learning

discovery learning
The learner actively manipulates materials or ideas in the learning environment and discovers connections between them

Bruner (1966) argued that if students discover the connections between their learning in a meaningful context, they will be able to make sense of, and remember and apply, what they have learnt. He called this **discovery learning**. A relatively natural form of discovery learning occurs when children explore outdoors or pull a radio apart 'to see how it works', and this natural tendency to explore the environment seems to form an important part of many childhood developmental experiences. In the classroom, the learner might manipulate materials or ideas in the learning environment and discover connections among them. This approach proposes that by actively engaging and directing the problem solving,

learners are more likely to remember what they have learnt. They will have increased motivation to continue learning, and will be able to apply their learning to solve new problems in new learning contexts. However, in practice, discovery learning can be approached in very different ways. 'Open' discovery learning approaches allow students a lot of independent or unguided exploration of materials or concepts. Learners are allowed time to explore and have freedom in how to shape their responses or conclusions. On the other hand, in the approach known as 'guided' discovery learning, the learner practises problem solving with the accompaniment of teacher directions for each step, and with closer monitoring by the teacher. It provides students with a framework for learning, and at the same time allows students a sense of autonomy within the guidelines provided by the teacher.

Each method has its advantages and limitations. However, guided discovery is more commonly used in classrooms because open discovery learning has been criticised as less effective than more directed approaches (Mayer, 2004). Box 6.1 describes a debate that occurred between researchers comparing discovery learning with more direct or teacher-led instruction approaches.



Source: Matthew Duchesne, © Mix and Honey Photography, 2010

FIGURE 6.3 Bruner argued that when students discover and actively engage in problem solving, they are more likely to remember what they have learnt.

Inquiry learning and **problem-based learning (PBL)** are separate but related approaches in which learners ask questions and find solutions to problems for themselves. Inquiry learning is often applied in science disciplines, while PBL emerged from medical-education contexts (Hmelo-Silver, Duncan & Chinn, 2007). Both approaches are similar in that they focus on relevant, practical and authentic problems; both place a heavy emphasis on collaboration with others; and both place a heavy emphasis on the cognitive activity involved in sense making (Hmelo-Silver, Duncan & Chinn, 2007). They differ slightly, however, on the basis of the inquiry or problem-solving activities. Hmelo-Silver, Duncan and Chinn claim that due to the medical or scientific inquiry bases of the two approaches, they differ slightly in the learning processes emphasised. Inquiry learning, for example, emphasises scientific processes of posing questions, gathering and analysing data, and coming to evidence-based conclusions. PBL may often use text-based sources of information about the data and a self-directed learning process; it emphasises hypothetical-deductive reasoning skills as might be required for medical-education students studying the diagnosis of disease, for example.

inquiry learning
Students learn content and discipline-specific thinking and practical skills by collaboratively investigating and solving a problem

problem-based learning (PBL)
Students learn content, strategies and learning skills through collaboratively solving problems

The role of the teacher in these approaches is to both provide knowledge and content *and* carefully scaffold the most difficult or complex learning and skills. Both approaches encourage students to frame questions, think in new ways about them, and organise their thinking in effective ways. Like the debate discussed in Box 6.1, there is also a longstanding debate between proponents of these approaches and direct instruction. Kirschner, Sweller and Clark (2006) published a paper called 'Why minimal guidance during instruction does not work', which extensively criticised constructivist approaches as offering minimal guidance for learning and claimed that such learning could be more effectively achieved through direct instruction. Hmelo-Silver, Duncan and Chinn (2007) responded by stating that Kirschner and colleagues had made a serious error in mixing up all constructivist approaches under the label of 'minimal guidance'. In fact, they argued that inquiry learning and PBL approaches are not 'minimally guided' approaches but employ a number of instructional approaches, including direct instruction of knowledge as well as carefully scaffolded and guided instruction when students need support. Kuhn (2007) (see also Box 6.1) and Schmidt, Loyens, van Gog and

Paas (2007) also replied, pointing out that many of the direct instruction pedagogical approaches advocated by Kirschner and colleagues only applied to certain types of learning problems, often non-complex in nature, and often focused on the individuals learning these skills rather than on people working together to solve problems. The debate continues, but it is clear that learner-centred approaches address constructivist principles in different ways, with a broad body of evidence offering support for such approaches.

BOX 6.1 RESEARCH LINKS

THINKING CRITICALLY ABOUT THE ROLE OF ADULTS AND CHILDREN IN LEARNING

One of the approaches to learning and teaching that has emerged from Piaget's theory is 'discovery learning', in which children are given materials and activities that invite them to explore their environment and discover properties and principles. A different approach involves direct instruction, in which the teacher instructs students about what they need to know, what to do and how to do it. (See Chapter 5 for a fuller description of these approaches.)

Klahr and Nigam (2004) investigated whether direct instruction or discovery learning was more effective in helping children learn about the control of variables in scientific work. They found that Year 4 children who received instruction showed superior use of control of variables in their design of experiments. Others have similarly argued that direct instruction is a more effective teaching/learning strategy than discovery learning (for example, Kirschner, Sweller & Clark, 2006).

However, Dean and Kuhn (2007) challenged Klahr and Nigam's findings, showing that over a longer period of nearly six months, the differences between direct instruction and discovery learning were not as clear. Although the children who received direct instruction showed superior performance immediately afterwards, this was not sustained unless there was regular practice. Also, direct instruction was not essential for the learning to occur: practice with a range of problems on its own produced the same effect.

Direct instruction may appear to be a quick teaching strategy with measurable learning outcomes, but Dean and Kuhn's study suggests that, particularly for understandings that take time to acquire, it needs to be paired with practice and experience. There is a longstanding debate between the proponents of constructivism and direct instruction.

ACTIVITIES

1. Which topics or learning goals might be suited to direct instruction or discovery learning?
2. Observe a classroom session in which children are learning a concept (for example, in a Mathematics or Science class). What role does the teacher play in this learning? What role do the students play?
3. Consider your own experiences. Do you recall a concept or knowledge that you explicitly gained from 'discovery' learning or a concept for which you required very 'direct' instruction to learn?

2 Provide opportunities for learners to work together

As we have seen, constructivist approaches have evolved from an emphasis on individual cognitive processes to group or shared cognitive processes. Social constructivist approaches particularly emphasise that knowledge is constructed from the continual interaction between the individual and his or her environment (O'Donnell, 2012). This includes the critical importance of peers or the

community as a source of learning and knowledge construction, and the term 'community of learners' arises from these approaches. Therefore, in many constructivist classrooms, group work features prominently, as students are encouraged to discuss ideas and learn from one another. By working together in a social context, the learner not only brings their personal knowledge or understanding but is also influenced and shaped by that environment. The learning process is reciprocal among members of a group or community and knowledge is often described as co-constructed (Green & Gredler, 2002; O'Donnell, 2012).

There are several ways of enabling students to work together. These include **cooperative learning**, **collaborative learning** and peer-assisted learning, and are also demonstrated in the inquiry learning and PBL approaches discussed previously. Because of the student-focused nature of these strategies, they also illustrate key principles of the humanist perspective of learning (see Chapter 7). For this reason, cooperative learning is outlined in more detail in the next chapter. In this section, we focus on the social constructivist explanations for learning in this way.

cooperative learning Students working together to gain rewards for themselves and their group

collaborative learning Students learning together, drawing on one another's knowledge and skills

Vygotskian and sociocultural theorists (also known as social constructivists; see Chapter 3) propose that cognitive benefits arise from the co-construction and negotiation of meaning that occurs in social interaction. Group members elaborate on and provide feedback for one another's ideas, building a joint understanding that is greater than what they could have produced individually. Scaffolding is critical in this form of instruction. The teacher may be the scaffold through careful instructional design which leads groups from the known to the unknown, with teacher support at each step. Good software design or online learning activities can also facilitate this by carefully scaffolding the instructional tasks (see Box 6.2). However, in accordance with Vygotskian theorists, sociocultural theorists also prize the development of peer-to-peer scaffolding. When more competent students work with less competent peers, they can also lead the zone of proximal development forward through scaffolding by modelling of language or thinking strategies. The teacher's role, however, is not absent

BOX 6.2 CASE STUDY

ONLINE COLLABORATIVE LEARNING

In a senior Biology class, students were developing models of DNA for an assignment. The teacher had noticed that many students used Facebook for informal discussion of school work, and decided to build on this for online collaborative learning.

The school's Learning Management System was used to post readings and resources, such as past students' work. It also contained a discussion space that students were encouraged to use to collaborate on assignments while developing their ideas. Students' plans and work were posted on the site, with a space for review comments. Students were asked to use the task outcomes and marking guide to direct their feedback to fellow students. Both the teacher and the students used this public space to comment on student work, and to discuss one another's feedback.

The teacher felt that her involvement was important to guide discussion and feedback towards the learning outcomes and requirements of the task. She found that there was a need to keep the learning outcomes at the front, to ensure quality of collaboration. (Initially, there was a tendency for general 'Great job!'–style statements).

As a result of the project, students reported stronger understanding of the task requirements and a broader understanding of the topic. They also reported that they were starting to understand the standards and how these related to their work. Students enjoyed being encouraged to work together and share work, and felt they were able to produce quality individual work, benefiting from the input of their peers.

See Chapter 12 for more on using ICT in learning and teaching.

nor merely observational. As has been pointed out previously, teachers must guide peer interaction and ensure that foundational knowledge and skills are present, and may even use direct instruction where necessary.

peer-assisted learning
Encourages social interaction, as peers help each other to learn

peer tutoring
Students are paired in roles of tutor or learner and follow specified learning strategies

Peer-assisted learning is another form of student-centred learning that encourages social interaction and gives learners opportunities to construct their learning and support their peers in doing the same. However, these are often more formalised instructional interventions in which rigorously designed programs employ peers as agents of learning and support. For example, a long-term reading program known as PALS (Fuchs & Fuchs, 1998) is a class-wide **peer tutoring** program in which students are divided into pairs and take turns being the 'coach' or 'reader'. Each pair earns points for good coaching or reading. These types of peer-assisted learning programs are carefully designed and evaluated in intervention studies; for example Fuchs and colleagues have found that this intervention has evidenced-based benefits for students from kindergarten (Fuchs et al., 2002) through to high school (Fuchs, Fuchs & Kazdan, 1999). However, a part of the success of these approaches lies in the design and testing of the programs. PALS, for example, follows rigorous training for teachers, training for the students, and a carefully designed instructional plan, such as three to four lessons a week of 30 or 35 minutes each and carried out over a specified length of time depending on the age and grade levels of students. This is accompanied by assessment and monitoring of learning outcomes for students. The implementation of the intervention is highly important – it must be implemented as designed and proven to be effective in research studies. The benefits of following these programs carefully, however, are enormous. Not only do students improve in their reading skills, but these programs are particularly effective for students with learning disabilities and also enhance the social acceptance of children with disabilities (Fuchs et al., 2002).

Although peer-assisted learning programs can be very effective, the teacher's role remains very important. For example, not all students work well together, and teachers must be observant and take care when pairing certain students for peer-tutoring activities, or when asking students to cooperate in groups. Depending on the type of tasks, there may be an argument for grouping similar-ability students together (homogenous grouping), or, as argued by Mikami (see page 168), it may be better to employ heterogeneous grouping (involving mixed abilities and backgrounds), which has benefits for social acceptance and peer understanding of others. See Chapter 7 for a further discussion of teacher responsibilities in cooperative group work.

3 Assist learners to develop expertise

A primary aim of constructivism is to help novices develop expertise in a particular area of knowledge so that they may become more independent, autonomous and self-regulated learners. The 'cognitive apprenticeship' concept introduced in Chapter 3 provides a useful metaphor for the way in which a young learner or novice is guided by an expert.

Cognitive apprenticeships (Rogoff, 1990) describe how 'apprentice' (or novice) learners are guided by an expert who provides scaffolding (see Chapter 3) so that eventually the novice will be able to perform tasks and work through problems autonomously. This approach is very much like the traditional notion of a master craftsperson working with an apprentice who learns by following the more expert model, tries to emulate their practices, and is coached and guided by the expert along the way. During this process, the apprentice or 'novice' also becomes immersed in the 'community of practice' that shapes and perhaps defines the nature of the craftsperson's work (Lave & Wenger, 1991). For example, the apprentice would learn what techniques were acceptable in the discipline of their craft, what tools should be used, and what language or words are used to describes things in the discipline. They would learn the social rules of the community, and the roles and places of different people in that community. This same notion of apprenticeship is employed by Vygotskian sociocultural theorists (see Chapter 3) to describe a 'cognitive apprenticeship' (O'Donnell, 2012). The teacher as 'expert' would also 'model' the cognitive activities in

such a way that students can observe the thinking processes of the teacher, or the working process of the teacher as a problem is solved. Peers are also important in this community of learners because they too can 'think aloud', thereby modelling their thinking process to other students and also articulating the language of the learning discipline. The teacher or more expert adult or peer gives guidance and assistance in joint problem-solving activities, and is responsive to the novice learner's current level of understanding.

'Reciprocal teaching', a method of teaching reading comprehension developed by Palincsar and Brown, and based on Vygotsky's work (refer to Chapter 3; see page 110), is an example of cognitive apprenticeship commonly used in classrooms. As described in Chapter 3, this teacher-guided strategy involves students working in collaborative teams and practising the reading strategies of predicting, questioning, summarising and clarifying. The teacher models these disciplinary practices and then students must emulate these strategies in their collaborative groups.

Skilful questioning and self-questioning are important in reciprocal teaching (see Chapter 3) and in other constructivist approaches (Henson, 1996). Constructivist educators pose thought-provoking questions to stimulate thinking, reflecting and problem solving. Bloom's taxonomy, as revised by Anderson and Krathwohl (2001), can help to frame those questions, and assist educators in considering the level of thinking required by the questions they ask (see Box 6.3). Reflection is central to constructivist learning and teaching (Tobin, 2000). Students need to be encouraged to reflect on their construction of knowledge. Teachers, too, need to reflect on their practice and their own construction of knowledge, and the learning context. Constructivist questioning and self-questioning help promote reflective learning and teaching.

CourseMateExpress
Online resources
Go further: Read about 'Promoting higher order thinking through constructivist-style questioning' on this text's website.

Apprenticeship occurs in many practical everyday contexts, such as in families where children learn to feed or dress themselves, sometimes with direct guidance from parents, but also by observing and emulating the behaviours of brothers and sisters. However, research shows it can also be applied in classroom contexts with learners of all ages. For example, if you are studying to become a teacher, an experienced teacher may be guiding your apprenticeship as you gain skills and knowledge in their classroom. In any case, the social constructivists have offered us detailed insights into how communities pass on expert knowledge, and how novice or younger members of communities learn from the relatively natural processes of 'apprenticeship'. Adapting these ideas to the classroom is possible, and a range of interventions, such as reciprocal teaching, demonstrate this.

THINKING CRITICALLY ABOUT CONSTRUCTIVIST APPROACHES



Source: © Eliza Snow/iStockphoto

FIGURE 6.4 Peers can be involved formally in cognitive apprenticeship through peer-teaching programs, or informally.

Constructivism has wide support, both from teachers and from research (for example, De Corte & Verschaffel, 2006), but it has also attracted criticism. For example, Rowe (2007; also see Dinham & Rowe, 2008) argued strongly that although constructivism is a well-established theory of learning, it is not a theory of teaching. He was arguing here against the teaching approach that leaves students to discover or construct knowledge on their own, with minimal instruction, guidance or intervention from the teacher. The view of constructivism we have described in this chapter involves teachers in the learning process at every point – scaffolding learning, providing cognitive apprenticeships, asking questions to extend students' thinking, and helping to link new learning to students' existing knowledge. De Corte and Verschaffel (2006) described powerful learning environments in mathematics as those in which there is a good balance between discovery and personal exploration, and systematic instruction and guidance. Rowe (2007) made a similar point.



BOX 6.3 CLASSROOM LINKS

BLOOM'S TAXONOMY AND QUESTIONING TECHNIQUES

Bloom (1956) described a hierarchy of learning objectives (known as a 'taxonomy') ranging from knowing and understanding content to more sophisticated ways of evaluating and analysing material. Bloom's taxonomy of learning was originally developed to assist university educators in describing educational objectives for advanced learners (Booker, 2007). However, it has been appropriated by school educators to assist in describing levels of thinking to students, and encouraging learners to extend and develop their thinking skills. It is just as important for learners to be able to analyse their own learning as it is for them to analyse the information they are reading or learning about.

One approach to scaffolding students' learning and providing cognitive apprenticeships in your teaching is to encourage learners to think and analyse in progressively more complex ways. Bloom's taxonomy of educational objectives was revised by Anderson and Krathwohl (2001) – summarised in Table 6.1 – and is widely used as a planning tool by educators. The taxonomy reflects foundational levels of thinking required to first remember and understand concepts, and moves to progressively more complex or higher-order thinking processes. The sequence of cognitive processes is not intended to devalue the initial cognitive processes but rather emphasises the progression in knowledge and understanding as one moves through the cognitive processes.

TABLE 6.1 Anderson–Krathwohl's revision of Bloom's taxonomy and example tasks or activities

ANDERSON AND KRATHWOHL'S REVISED TAXONOMY	
COGNITIVE PROCESS DIMENSION	**SKILL DESCRIPTIONS**
Remembering	Make a time line of events: Can you describe what happened when ...?
Understanding	Retell the story in your own words: What do you think will happen next?
Applying	Draw a diagram to show how it works: What would happen if you tried this?
Analysing	Design an interview or survey for the story characters to find out what really happened: What were some of the motives behind ...?
Evaluating	Write a half-year report to evaluate a procedure: What changes would you recommend ...?
Creating	Create an alternative procedure assuming your changes were put in place: Design a marketing poster or video to promote the changes.

Source: Adapted from Killen (2007).

Caution is advised, however, in applying this taxonomy as a teaching approach in and of itself. It was not designed for this purpose. Cognitive processes are relevant to task requirements and some disciplines place more emphasis on certain processes and forms of knowledge. Teachers must take care not to overemphasise only the higher-order thinking levels of such taxonomies, as in most disciplines students must still develop foundational levels of knowledge as described at the start of the taxonomy.

One way in which constructivism has been effectively integrated into teaching approaches has been through the phases of '*modelled, guided and independent*' practice that are common in reading programs (for example, in the NSW K–6 English syllabus). The teacher models a reading or writing practice (explicit teaching phase), then guides students as they transform the new knowledge and make it their own, perhaps through group work, independent activity or work with the teacher (the constructivist

phase), after which they engage in independent practice and demonstrate their knowledge (assessment and reflection phase). The focus is on teaching that leads to students constructing learning (Hattie, 2009). Return to the table of Hattie's (2009) research in the introduction to this book (see Table 1.2 on page 12). In it, you will note that both reciprocal teaching (a constructivist approach that involves the teacher) and direct instruction (an approach associated with behaviourism) have been shown to have strong effects on student learning.

STRENGTHS AND LIMITATIONS OF THE CONSTRUCTIVIST APPROACH

Strengths

Constructivism has many benefits for student learning. Constructivism acknowledges that learners are 'constructors' of meaning, actively seeking to discover and learn. In constructivist classrooms, students are encouraged to participate in their learning, rather than being passive recipients of information transmitted by the teacher. Constructivism also attaches importance to students' prior learning and the background knowledge they bring to the learning environment. In a constructivist approach, as in effective teaching, teachers work with student knowledge to make links between what students know and what they need to learn (Anthony & Walshaw, 2007).

Students' social and cultural heritage plays an important part in learning and is valued in the constructivist approach. Social networks are seen as important in constructivist learning environments, with value attached to dialogues and interactions among students and between students and teachers. There is also scope for parent and community-member involvement as 'experts' who can support students in cognitive apprenticeships. These are just some of the many benefits the constructivist approach offers learners and teachers.

Limitations

Constructivism has its limitations, however. One limiting factor is that allowing students to construct their own learning takes a lot of time and may be complicated to set up (Bevevino, Dengel & Adams, 1999). Teachers need to ensure that they provide sufficient scaffolding and support structures to facilitate constructivist learning. If students have questions, they need to feel safe enough to ask them. It may take time to develop a safe and supportive learning environment so that this can happen.

There are also many potential disadvantages to group work (Killen, 2007; Tiberius, 1990). It takes time to set up the groups. Teachers need to equip students with the necessary group-work skills in order for those students to be able to manage their work and their relationships within the groups. Teachers may also need to monitor the groups closely, depending on the task and the students involved.

Discovery learning, too, has limitations. It may work well for self-motivated students, but it can be very frustrating for those who do not feel confident or have not had sufficient experience at discovering information for themselves. The uncertainty of this type of learning environment, in which the teacher does not supply the 'answers', may frustrate and discourage some learners. The discovery process can also be time-consuming, as students may venture down thinking pathways that teachers have neither anticipated nor planned for. Brown and Rose (1995) found that the teachers they surveyed were knowledgeable about constructivist principles, yet did not adopt the approach widely in their teaching. The reasons given were that they lacked sufficient time and often did not feel confident about managing discovery learning along with all the other curriculum demands.

CourseMateExpress

Online resources
Elements of the constructivist approach can be identified in a **video** of a primary teacher describing her teaching approach.

Box 6.4 presents a summary of the constructivist approaches that have been discussed throughout this section, as well as some related strategies for classroom use.



BOX 6.4 IMPLICATIONS FOR EDUCATORS

CONSTRUCTIVIST APPROACHES IN THE CLASSROOM

Constructivist approaches focus on learners actively engaging with making meaning for themselves, supported by peers, teachers, parents and community members. Such approaches place value on the background knowledge and experiences learners bring to the learning environment.

Table 6.2 summarises the main constructivist approaches to learning, and offers some constructivist strategies for classroom use.

TABLE 6.2 Constructivist approaches and classroom strategies

	TEACHING AIM	CONSTRUCTIVIST APPROACH	STRATEGY
1	Encourage learner-centred experiences and activities	**Discovery learning:** The learner works with materials and ideas, discovering connections between them; uses active problem solving **Inquiry learning:** The learner poses questions, researches possible answers and solutions; uses active problem solving	• Facilitate discovery by developing task-appropriate resources, activities and classroom organisation • Provide opportunities for students to develop problem-solving skills • Encourage students' active involvement in learning • Promote students' confidence in their ability to learn and discover new concepts by creating a safe, supportive learning environment • Ask questions to prompt and extend students' thinking, and to expose and correct any weaknesses in their understanding
2	Provide opportunities for students to work together	**Cooperative learning:** Group work, with the teacher managing and organising activities; cooperation required for group rewards **Collaborative learning:** Group work, with greater student autonomy and less teacher involvement **Peer-assisted learning:** Peers teach one another; may be same age or cross-age partnerships	• Develop and implement guidelines for group and pair work • Carefully train students in the skills required to work in groups • Negotiate activities and assessments to encourage student involvement • Arrange the classroom to promote group interaction • Regularly monitor student skills, interactions and achievements • Capitalise on learner strengths and abilities by establishing peer-assisted learning experiences
3	Assist novice learners to develop expertise	**Cognitive apprenticeships:** Experts guide novice apprentice learners with the aim of developing learners' autonomy and expertise **Reciprocal teaching:** Combines collaborative learning with expert guidance and modelling to achieve progressively greater learner autonomy and understanding	• Encourage learner–teacher interaction as a learning partnership • Make time for dialogue – listen and respond to student questions and comments • Draw on the expertise of parents and community members or more able students to develop cognitive apprenticeships in your classroom



THINK ABOUT

- Do you see yourself as a constructivist educator in the making? Why or why not? Discuss your views with your tutorial or study group.

THE INFORMATION-PROCESSING APPROACH

We saw in Chapter 3 that the **information-processing model** is a way of depicting how mental processes operate. There are several views of information processing that attempt to explain how we think and how the mind works. In all of these views, thinking is portrayed as a highly rational process, and our capacity to remember information lies at the heart of information-processing theories.

information-processing model
Likens the human mind to a computer that interprets, stores and retrieves information

Classical viewpoints consider the human mind as a complex machine, resembling the serial processing that takes place in computers. As in a computer, such theorists are concerned with the processes by which the human mind *encodes*, *stores* and *retrieves* information. This viewpoint is clearly depicted in the multistore model of information processing described in Chapter 3, and is based on the original work of Atkinson and Shiffrin (1968). The original model described how information is processed and stored in three compartments of memory: the *sensory memory* (through which we first perceive information), the **short-term memory** or *working memory* (which can only remember information for a very small amount of time), and the *long-term memory* (which stores information permanently). These three compartments of memory do not completely explain how information is processed. Rather, the intervening processes by which information moves from sensory memory to short-term memory are vitally important, as are the processes by which we retrieve information from our long-term memory. An **executive control** system is proposed to oversee these processes (Baddeley, 2012). Return to Chapter 3 to revise your understanding of these processes. In this chapter we will focus on their operation in children's learning.

CourseMateExpress
Online resources
Explore the Multistore model in action with the **Interactive Activity** on this text's website.

short-term memory
A temporary storage place with a limited capacity to store approximately seven items

executive control
Higher-level functions that help with the control of processes and flow of information

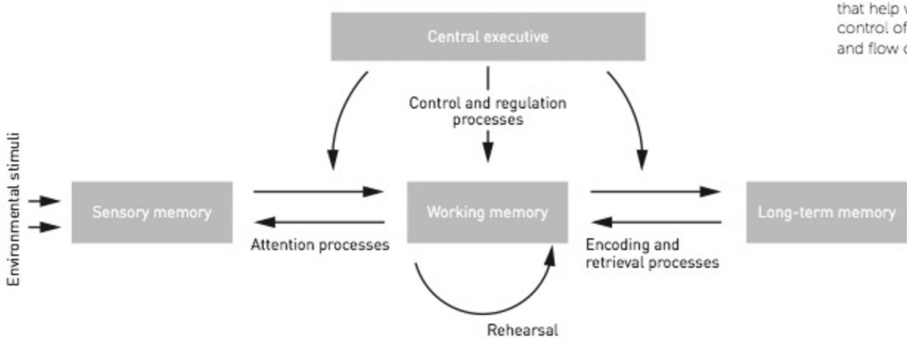


FIGURE 6.5 The multistore model of information processing.

SENSORY MEMORY AND LEARNING

Recall from Chapter 3 that we take in information through our senses and assign meaning to it (perception). Sensory memories extinguish extremely quickly (less than a second for visual information and two to three seconds for auditory information). In that time, we must identify, classify and assign meaning to the new information or it will be gone forever. The role of perception is important here – stimuli that have some meaning to the individual are more likely to be attended to; thus, the two key processes involved at this stage are *recognition* and *attention*. For an example of how sensory memory works, try the activity in Figure 6.6.

Source: © 1998, Dr Graham Cooper, School of Education Studies, The University of New South Wales

As soon as you shut your eyes you may have noticed an image of the picture remaining for a split second 'in your head'. This demonstrates the operation of the part of your sensory memory which manages visual perceptions. This is not restricted to blinking at pictures. Look at anything around you and it will still work.



FIGURE 6.6 Look at this image, then quickly shut your eyes and keep them shut for a few seconds. Repeat this several times. What do you notice?

Separate stores for auditory and visual information suggest we can present information in multiple modalities and thereby increase the likelihood of it being attended to (see Box 6.5 on page 232).

Attention and its role in learning

As the sensory memory is extremely limited in capacity and time, attention is a vital process in determining which stimuli are processed in working memory, and encoded into long-term memory.

Sustaining attention over time can be challenging, particularly for young children. Some features – loud noises, bright colours, surprising events – command attention without our deliberate planning. The individual learner also plays a role in controlling their attention through the central executive (described later in this section of the chapter).

Selective attention

We tend to attend to particular features of a situation that have significance for us. Prior knowledge thus directs attention, as do our expectations. (You can try this in the online resources link.) If you expect that what is about to happen in a room is a lecture, you will tend to ignore much of the sensory information you take in (the colour of the seats, and noise coming from outside, for example). If, on the other hand, you are told that this is the room where you will have to sleep for the night, your attention will focus on the arrangement of the space, and the composition of the seats. Learners may fail to attend to the right features of a learning stimulus unless their attention is directed to it; this is one reason why telling students the goal of an activity or lesson at the start can be helpful to their learning. As learners gain more knowledge – develop more complex schemas in memory – their ability to attend to relevant information improves. There is also the possibility that they may focus on one known aspect of what is presented, ignoring other factors. 'Lateral thinking' exercises can help to refocus attention on new facets of a concept or situation that may not have been 'seen' previously.

CourseMateExpress
Online resources
Watch a **video** on selective attention on this text's website.

Divided attention

Can we split attention between multiple tasks? You may have tried this by texting on a mobile phone while listening to a conversation. In fact, research suggests that attention generally cannot be shared in this way between unrelated tasks (Shomstein & Yantis, 2004). We appear to do this, for example, when driving and holding a conversation at the same time, but in fact one task is largely automatic – does not require our focused attention – so that the other can receive attention. You will notice this if something happens on the road that requires your attention, such as an accident that requires you to take evasive action. In these situations, you tend to stop talking and listening as you focus on your driving. (This happens with walking and talking as well. If your companion tells you something surprising, you may stop walking to take it in.) The other way in which we can appear to 'multitask' or share attention is by rapid switching of attention from one task to another. Baddeley (2012) has shown that switching leads to a substantial slowing of mental processing, which indicates that this is not conducive to effective learning. In the classroom, then, it is important to ensure that students' attention is not divided between competing stimuli.

WORKING MEMORY AND LEARNING

The next store was originally viewed as a temporary storage place with a limited capacity to store approximately seven items of information at a time for a short period (Miller, 1956), and was termed short-term memory. However, the idea of a working memory (Baddeley & Logie, 1999) reflected a much more active role in processing information, containing the short-term memory store but with added components. Although the capacity of short-term memory was known to be quite limited, storing information for only a few seconds, it became clear that working processes enabled the retention of information through processes of rehearsal and chunking. 'Rehearsal' involves us repeating and practising information to help ourselves remember it. 'Chunking' occurs when we group related pieces of information into a single meaningful unit. You may have used chunking to remember a list of numbers. For example, if your student number is quite long, you may chunk the nine digits as '925–231–378'. Thus, nine pieces of information are reduced to three bundles, which makes the number easier to remember. The rhythm of this grouping may also help you remember the sequence. Another example is that of a typical shopping list. Which of the following identical lists of items would you find easier to remember?

List A:	vegemite, dental floss, butter, nectarines, bread, soap, toothbrush, mangoes, pears		
List B:	pears	bread	toothbrush
	mangoes	butter	soap
	nectarines	vegemite	dental floss

In most cases, List B would be easier to remember as the items are chunked in a logical manner. A different kind of chunking occurs as we develop *schemas* (also referred to as *schemes*), or linked networks of knowledge and ideas (see Chapter 3). Thus, as your understanding of this topic develops, one phrase, 'information processing', might bring up a network of associated ideas from your long-term memory. This frees up your working memory, which no longer has to make sense of each of these individually, but can apply the whole schema to the new task. Schemas play other roles in learning too, linking new knowledge with old and facilitating its encoding in and retrieval from long-term memory.

There are various views about the role of working memory, but generally it is assumed that the more effectively the material is chunked and rehearsed, the more likely it is to be transferred to long-term memory. The limited capacity of working memory means that unrehearsed items will be displaced by new information and quickly forgotten. You could easily test this by reading out several telephone numbers for a friend to remember, with no time between each number to rehearse or chunk the digits. Your friend might try to use their working memory to chunk the first number, but as you keep firing new numbers at them, they may not even have enough time to rehearse and store the first number. The process of attention may help us decide which is the most important information to focus on, and therefore we could ignore (and not remember) subsequent or competing information if we were focused on remembering a specific piece of information. Working-memory processes are quite important, then, in a variety of learning tasks. For example, our working memory would enable us to hold the first part of a sentence in our mind while we were reading the last part of the sentence, hence enabling comprehension of the full sentence, and a range of more complex comprehension tasks (see Engle & Conway, 1998).

CourseMateExpress
Online resources
Go further: See an example of information processing in action on this text's website.

Baddeley (2012) has continued to develop the model of working memory, with research suggesting that it processes auditory and visual information separately, through an 'auditory loop' and 'visuo-spatial sketchpad', each with particular links to long-term memory. This has implications for the presentation of information (see Box 6.5).

Cognitive load

Try this problem: *If the problem you solved after you solved the problem you solved before you solved the problem you solved after you solved this one was harder than the problem you solved before you solved the problem you solved after you solved this one, was the problem you solved before you solved this one harder than this one?*

cognitive load
The total demands made on working memory at any one time

Why is this problem so difficult to make sense of? One explanation is that the demands it makes on working memory are too great for its limited capacity – it presents an excessive **cognitive load**. You may have experienced a similar difficulty when trying to listen to a lecture, view a diagram put up by the lecturer, take notes, remember the meaning of new terms that are being used, and make sense of some new and complex information (such as information processing perhaps!) There are three types of cognitive load that may be experienced. One is the cognitive load presented by the information itself, and its level of complexity or novelty to the learner. This is known as *intrinsic* cognitive load. A second is *extraneous* cognitive load, which is the load imposed by the particular way in which the information has been presented. The third type of load is *germane* cognitive load, which refers to the amount of working memory resources devoted to a task by the learner, and is therefore positive in terms of learning. Increasing the germane load and reducing the intrinsic and extraneous loads are the aim of good instruction, according to cognitive load theory. Implications of this for teaching and learning are to attempt to promote germane load by engaging and motivating the learner (see Chapter 8); reduce intrinsic load by simplifying complex material and building automaticity of skills; and reduce extraneous load by attending to instructional design. Research by cognitive load theorists has focused in particular on the last of these – how careful instructional design can reduce extraneous cognitive load, and therefore maximise the transfer of information into long-term memory (Sweller, Ayres & Kalyuga, 2011). A number of effects have been identified by this research and are described in Box 6.5.



BOX 6.5 CLASSROOM LINKS

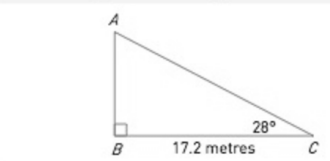
COGNITIVE LOAD AND INSTRUCTIONAL DESIGN

John Sweller and colleagues have identified a number of principles for instructional design based on cognitive load theory.

The following effects have been noted in research to show learning benefits. They are theorised to reduce cognitive load and thereby assist learning by facilitating links with long-term memory. The strategies have been shown to be effective in diverse domains including mathematics, science, learning a second language, writing and reading comprehension, among others (see Sweller, Ayres & Kalyuga, 2011, for a detailed review of the research).

Strategies with benefits for novice learners

Goal-free problems: Novices working on problems that are open-ended, or goal-free, showed better learning outcomes than learners given a specific goal (Sweller, Mawer & Ward, 1983). For example, in the diagram (at right), a goal-specific task would be to ask the students to 'find the length of AB'. A goal-free task, on the other hand, might ask the learner to 'find all the information you can'. This has been shown to reduce cognitive load, as students don't spend time working back and forth between the question and the information given in the diagram.



Source: Cooper (1998)

Worked examples: Studying worked examples of problems proves more effective for learning than solving problems alone. It is most effective to study a worked example, solve a similar problem, study another worked example, solve a problem, and so on.

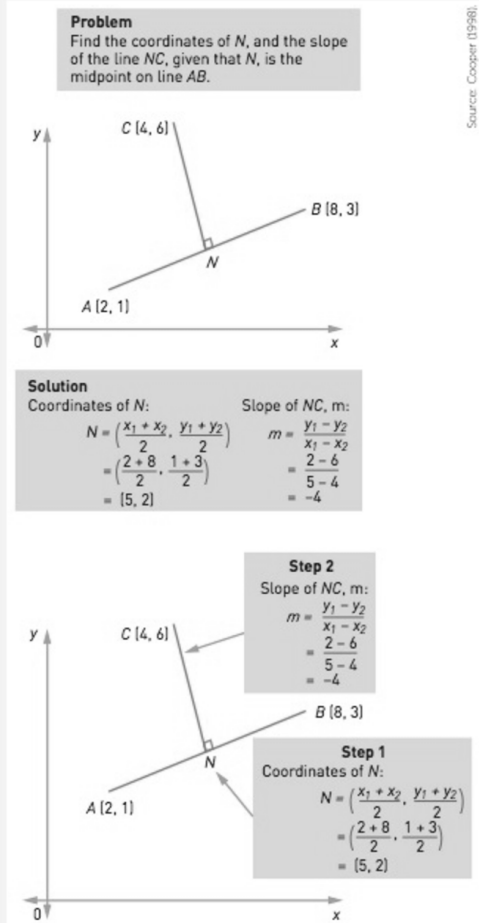
Integrating information to avoid split attention: When two sets of information need to be considered together, integrating them visually and in time reduces cognitive load and facilitates learning (Ginns, 2006). An example is given in the second diagram.

>>

The modality effect: Presenting information multimodally can facilitate learning. For example, a diagram accompanied by spoken explanation is more effective than a diagram accompanied by a written explanation. As working memory processes auditory and visual information separately, engaging both of these modalities expands the space available in working memory. The effect applies to two types (visual and auditory) of related information, which are both needed to convey meaning to the learner. Presenting the *same* information in visual and auditory forms (as when text on a PowerPoint slide is read out, for example) inhibits learning, as extra resources are spent processing redundant information.

Some qualifications of these findings should be noted. First, the strategies above only show benefits for novice learners. As students develop expertise in an area of knowledge, strategies such as these will become less effective for learning than other techniques, as they involve processing unnecessary information. In addressing this limitation, Sweller, Ayres and Kalyuga (2011) identified research that showed that imagination (imagining the process of solving a problem, or carrying out a procedure) and self-explanation are helpful strategies that suggest new mental processes to those who already have expertise in an area. Related to this, the strategies only show benefits when intrinsic cognitive load (the complexity of the task) is high. For simple tasks, they would add unnecessary information. It is therefore important to carefully assess students' prior knowledge and understanding when making decisions about instructional design. A third point should be made, which is that these effects have been noted in laboratory research or artificial classroom simulations, with careful control of variables in order to isolate the effects under investigation. In the classroom, however, other factors such as emotion and motivation come into play, interacting with memory and processing of information and potentially altering the outcome.

Source: Examples drawn from Sweller, Ayres and Kalyuga (2011); and Cooper (1998).



Source: Cooper (1998).

LONG-TERM MEMORY AND LEARNING

The third component of the multistore model shown in Figure 6.5 (see page 229) represents an idea of a permanent storage facility for information, known as the long-term memory. As far as anyone can tell, this storage space is unlimited in capacity and storage time. Memories may remain in long-term memory indefinitely, and long-term memories take many forms. Three main types of long-term memory are 'episodic', 'semantic' and 'procedural' (Tulving, 1985).

episodic memory
Memory for life experiences

semantic memory
Memory about information and knowledge in the world around us

procedural memory
Memory about steps or procedures for performing a skill

Episodic memories are the memories we have for life experiences and events that have happened to us personally, such as a school concert in which you played the lead role, or your first kiss. **Semantic memory** is concerned with information and knowledge about the world around us; for example, knowing that computers may crash in an electrical storm if not disconnected from the power source, or that December and January are summer months in the Southern Hemisphere. Semantic memories generally lack the specific information about time and place that characterises episodic memories. If you remember something that happened to you while you were eating with chopsticks at your favourite Chinese restaurant last summer, this would be an episodic rather than a semantic memory. **Procedural memory** helps us recall steps or procedures for performing a skill; for example, you need procedural memory to help you use chopsticks for eating.

Although episodic, semantic and procedural memories differ in content and function, these types of long-term memory are often interconnected. For instance, your semantic memory of chopsticks may be connected to your episodic memory of the first time you tried to eat with them – and perhaps failed miserably! At times, long-term memories may interfere with one another, making it difficult to recall information, as will be discussed later in this chapter.

As with working memory, a range of intervening processes help us to remember information stored in long-term memory. The two key processes involved are *encoding*, or storing information in the long-term memory store, and *retrieval*, which involves bringing information stored in long-term memory back to be manipulated in working memory. The effectiveness of these processes is the key to the efficiency of our memory. Strategies involved in encoding include rehearsal, elaboration and organisation. Elaboration and organisation involve linking new information to something already stored in the long-term memory. This makes the new material more meaningful because we connect it to something familiar, thus increasing our likelihood of remembering it in the future. Elaboration strategies are positively associated with academic performance, particularly in reading (Sturrock & May, 2002).



FIGURE 6.7 The three main types of long-term memory are episodic, procedural and semantic memory. Can you identify which types of memory are being drawn on here as this person thinks about how much paint he will need to paint a room?

Although the original multistore model of Atkinson and Shiffrin (1968) did not include the function of an executive control system, it is now believed that such a system plays a critical role in controlling attention, shifting between tasks, retrieving information, and generally moving information back and forth between the working memory and the long-term memory (Baddeley, 1996, 2012). In particular, the executive control system may help us inhibit or suppress attention from distracting stimuli, and may help us process more than two types of information simultaneously.

Problems or impairment in the development of some of these executive-level processes have been associated with a range of conditions, such as ADHD and learning disabilities (Cutting & Denckla, 2003). We will now consider the role of metacognitive processes in learning; metacognition is also considered to be one process in our executive control system.

METACOGNITION: MANAGING COGNITIVE PROCESSES

metacognition
Higher-order thinking which involves knowledge of and control over our own cognitive processes

So far, both the constructivists and information processing theorists have taught us that cognition describes the mental processes involved in developing schemes, particularly the individual processes of transforming, coding, storing and retrieving information to build and develop these schemes. But how do we know which mental processes to use, and when, how and why? The answer may lie in our capacity for **metacognition**, which literally means 'thinking about thinking', or 'knowledge about knowledge' (Weinert, 1987). It is the capacity to think about our own cognitive processes (Flavell, Miller & Miller, 1993), and refers to our ability to monitor, control and organise our own mental activities. For this reason, metacognition is known as an 'executive control' process that enables us to monitor and regulate our thought processes (Davidson, Deuser & Sternberg, 1994).

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Online resources
Go further: Explore the difference between cognition and metacognition on this text's website.

As we cannot process all information to the same depth, we need an 'executive' function to oversee the process of encoding, transforming, processing, storing, retrieving and utilising information. This executive function involves both self-monitoring and self-regulation. **Self-monitoring** is a broad monitoring activity that helps us to keep track of our progress in understanding and remembering. **Self-regulation**, however, is concerned with central executive processes that comprise several specific functions such as planning, directing and evaluating our cognitive behaviour (Nelson & Narens, 1994; Schneider & Bjorklund, 1998). Self-regulated learners regulate their actions, cognitions, beliefs and motivations by selecting their own approach to learning and processing information (Shin, 1998).

self-monitoring
A metacognitive activity that involves monitoring how well we are understanding and remembering

self-regulation
A metacognitive activity that involves planning, directing and evaluating one's cognitive processes

When faced with a task, a self-regulated learner will typically:

- analyse the task and interpret task requirements
- set task-specific goals that aid successful task completion
- self-monitor progress and provide 'self-feedback'
- adjust strategies and goals throughout the process
- use self-motivational strategies to ensure task completion.

As shown in Figure 6.8, metacognition functions as an executive control that oversees our capacity to plan, monitor, regulate, question, reflect on and review our cognitive processes.

Metacognitive development

The list of skills presented above appear to represent fairly complex tasks perhaps associated with older learners or even professionals in workplaces. This leads to the question: When does metacognition begin to develop? According to Piaget's theory, young children are cognitively egocentric. They generally do not reflect on their own thinking and do not seem to realise that other people have thoughts or preoccupations. 'Theory of mind' research explores the ways in which children develop theories and understandings of their own mental world and that of others (Flavell, 1999). Like Piaget, John Hurley Flavell contends that children develop an increasingly complex theory of the mind and mental processes. This development is enabled by their increasing capacity for abstract thought. As metacognition requires

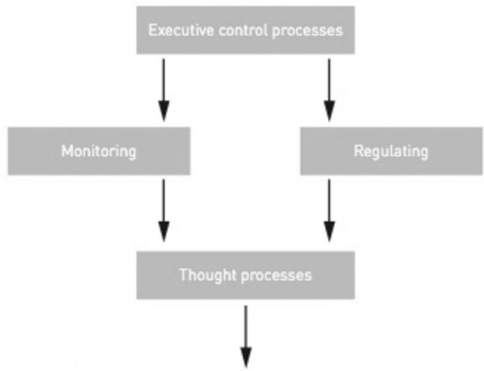

FIGURE 6.8 Metacognition is like a company executive overseeing (monitoring and regulating) the workers (thought processes) of the company.

Source: Adapted from Kluwe, R. H., 'Cognitive knowledge and executive control: Metacognition', in D. R. Griffin (Ed.), *Animal Mind – Human Mind*, 1982, pp. 201–24, reproduced with permissions of Springer Science + Business Media.

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Online resources
Go further: Read about the theory of mind and metacognition in younger children on this text's website.

self-reflection and the awareness of mental processes we cannot see or touch, it requires the ability to reflect on abstract processes. Although research has found some evidence of metacognition in younger children (Fang & Cox, 1999), this skill is most evident among adolescents. It develops over time as cognitive skills increase (Kuhn, 2000). Flavell (1979) developed a model of metacognition in which he proposed that learners develop 'metacognitive knowledge' and have 'metacognitive experiences' that support the self-regulation of learning (Flavell, 1987; Flavell, Miller & Miller, 1993).

Metacognitive knowledge

Flavell described three forms of metacognitive knowledge of person, of task and of strategy. 'Person knowledge' is the knowledge you have about your own cognition and your understanding of others as cognitive processors. For example, we describe some people as 'reflective' or 'thoughtful', while we describe others as 'good with mathematical problems' or as having a 'bad memory'. These descriptions reflect an awareness of individuals' cognitive characteristics. 'Task knowledge' is the metacognitive knowledge that different tasks require different approaches and different types of skills (Pintrich, 2002). With experience, we learn more about task demands and how we can meet them under different circumstances. For example, we learn that a textbook such as this one is packed with information, and that we need to proceed slowly and carefully in order to process the information effectively. We also develop 'strategy knowledge' over time. There are many types of metacognitive strategies, which can be broadly said to belong to one of three categories: planning, monitoring or evaluating (Pintrich & DeGroot, 1990; Pintrich & Schunk, 1996; Wittrock, 1991). (See Table 6.3 for some examples of metacognitive strategies.)

TABLE 6.3 Examples of metacognitive strategies

METACOGNITIVE STRATEGY	EXAMPLES OF SELF-QUESTIONS
Planning	What type of task is this? What skills and resources do I need? What are my task goals? How long will the task take to achieve?
Monitoring	How are my motivation levels? How well am I going? Do I need to change my approach? Do I need to adapt my task goals?
Evaluating	How well did I do? What did I do well? What did not work too well? What should I change next time?

Source: Adapted from Pintrich and Schunk (1996); Wittrock (1991).

Strategy knowledge involves knowing which metacognitive strategies to use and when, in order to accomplish a set task. For example, if you want to know whether a book will be useful for your assignment, strategy knowledge would prompt you to skim-read, or check the table of contents, rather than read the book from cover to cover (see Figure 6.9). Strategy knowledge helps learners to be efficient and effective by giving them the means to select the most appropriate metacognitive strategies for their purpose.

Metacognitive experience

We also have 'metacognitive experiences', which include feelings related to particular cognitive activities (Flavell, 1987; Flavell, Miller & Miller, 1993). For example, you may feel anxious when you realise you do not understand something important your lecturer is explaining to the class. This is a metacognitive experience because you are reflecting on how poorly you are processing the information being shared and you are concerned because you do not understand it. Metacognitive experiences are connected to affective processes such as our self-esteem and self-efficacy: if we feel capable of controlling and regulating our cognitive processes, we will feel more positive about ourselves and our abilities (Borkowski, Carr, Rellinger & Pressley, 1990). These experiences can also act as a 'stream of consciousness' Flavell (1979) and might be recalled to influence how you cope with future tasks. The interrelationships between the different aspects of metacognition are presented in Figure 6.10, while Box 6.6 presents an example of the role of metacognition in the classroom.



Source: Matthew Duchesne, © Milk and Honey Photography, 2010.

FIGURE 6.9 Metacognitive strategy knowledge involves knowing how to use resources efficiently to solve a problem like writing an essay.

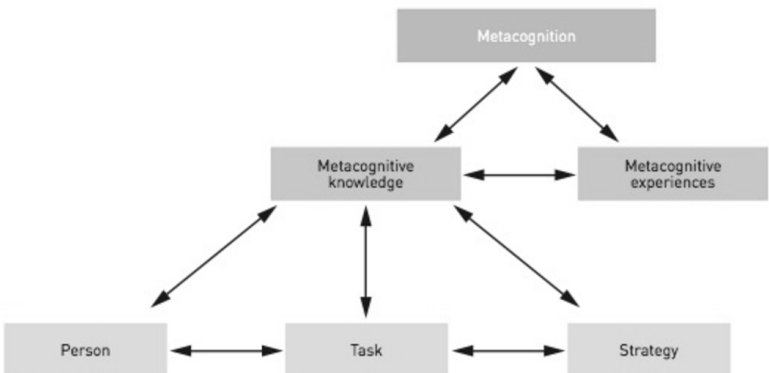

FIGURE 6.10 Dimensions of metacognition.

Metacognitive strategies and learning

As shown in Figure 6.10, Flavell's early work also identified the role of strategies in metacognitive monitoring. Strategies are the ordered or systematic process we use to direct our cognitive processes and ensure that our goals can be met. These are linked to our metacognitive knowledge and influenced by the nature of tasks as well as influencing task outcomes. Strategies can be either cognitive or metacognitive. A cognitive strategy is a fairly basic rule or process for tasks such as adding up a list of numbers or remembering the order of operations in a maths task. A metacognitive strategy, however, would be to remind yourself to double-check your addition of three-digit numbers as you often make mistakes when carrying or borrowing digits. Metacognitive strategies essentially allow the learner to monitor their cognitive processes, to double-check their understanding of order of operations or recalculate a list of figures because they often make a known error.



BOX 6.6 CLASSROOM LINKS

METACOGNITIVE KNOWLEDGE AND EXPERIENCES

Shiori is a diligent Year 12 student who is sitting at her desk with a pile of homework. Before Shiori commences work, she plans the order in which she will complete the tasks. She decides to do her mathematics homework on integral calculus first, because she needs a clear head to work through the calculations. She decides to do her chapter summaries for *Tomorrow, When the War Began* last. She shifts all unnecessary books to the floor so she has fewer distractions.

The calculus problem concerns the concept of area under a mathematically defined curve, and requires Shiori to find the area under a rollercoaster track. Shiori knows how to calculate the area of a rectangle, and understands how she can use what she knows to find the total area under the track. Unfortunately, the rollercoaster example has reminded Shiori of last summer's holiday on the Gold Coast, and memories of the fun she had on a rollercoaster interfere with her ability to focus on the calculus problem. She realises that for the last five minutes, she has been staring at her textbook and reminiscing about her Gold Coast holiday. At the same time, Shiori is distracted by her little brother crying in the next room. She knows she is easily distracted when tired, so closes her door and decides to focus her concentration even more to filter out the noise. She then also realises she can use her memories of the rollercoaster to help her visualise the calculus problem.

Shiori visualises the superstructure that supported the rollercoaster and draws a sketch on scrap paper to see if this will help to solve the calculus problem. Her concentration is broken again when she remembers her teacher mentioning a short quiz that is to be held on this material in the next maths class. Shiori's stomach sinks. She knows she does not fully understand how to solve the calculus problem and apply the equations she has learnt, which means she will need to wake up early tomorrow morning and try to get the teacher's help before school commences.

Source: Adapted from Hacker (1998, pp. 1–2).

ACTIVITIES

There are several examples of metacognition in the scenario above. Have a go at completing the following table to check your understanding of types of metacognitive knowledge that Shiori holds and any potential benefits or outcomes of such knowledge.

KNOWLEDGE TYPE	EXAMPLES OF SHIORI'S METACOGNITIVE KNOWLEDGE	BENEFIT OR OUTCOME
Person knowledge	Shiori knows she is easily distracted when tired	Shiori modifies her environment by shutting the door to her room
Task knowledge		
Strategy knowledge		

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Online resources

Go further: Learn about teaching metacognitive strategies on this text's website.



THINK ABOUT

- Can you recall being taught metacognitive strategies when you were at school? If so, how did you benefit? If not, how did you learn these strategies?
- How do you think your own experience will affect your approach to teaching metacognition?
- Consider the range of subject areas you may teach: Mathematics, Science, Languages, Art and so on. Are there some subject areas in which metacognitive strategies are more important than others? Are they more important for some kinds of tasks?

A significant body of research indicates that students benefit from learning about and using metacognitive strategies. In particular, research suggests a positive relationship between performance on academic tasks and the level of metacognitive awareness. In a study of 155 Year 5 mathematics students, Lucangeli, Coi and Bosco (1997) found that poor problem-solvers had lower metacognitive awareness than average or good problem-solvers. The same authors argued the case for a link between the use of metacognitive strategies and academic performance (see also Carr, Alexander & Folds-Bennett, 1994). Students of lower ability have been found to benefit significantly from direct instruction in metacognitive strategies (Cardelle-Elawar, 1995; Spence, Yore & Williams, 1999). In an Australian study of poor readers in upper primary school, Bruce and Robinson (2001) found that direct instruction in metacognitive word-identification strategies and metacognitive awareness-raising contributed to improved word identification and reading comprehension skills in poor readers within a regular classroom setting. Studies of students with learning disabilities have also found that metacognitive strategy instruction enhances the thinking and social skills of such learners (Powell & Makin, 1994; Rosenthal-Malek, 1997). Strategy instruction even has benefits for quite able students. A study of very capable students found that computerised metacognitive strategy instruction proved beneficial in raising students' performance levels in both reading and writing (Kaniel, Licht & Peled, 2001).

Box 6.7 discusses some classroom implications of metacognitive strategies.

FURTHER MODELS OF INFORMATION PROCESSING

The classical view of information processing includes many other models and approaches to information processing. The **levels of processing model** (Lockhart & Craik, 1990) focuses on the *depth* of information processing and how this affects our ability to recall information. 'Deep processing' means that information is attended to, fully analysed, enriched by association with existing knowledge, and is thus remembered because of the extent of processing that has occurred. 'Shallow processing' occurs when information is not given full attention and is analysed only superficially. It is most likely that information analysed at a surface level will soon be forgotten.

levels of processing model
A process-oriented approach that attaches most importance to the type and depth of processing taking place

The amount of attention allocated, the type of information and its meaning for us, and the time available for processing the new materials all contribute to depth of processing. In a later version of their theory, Lockhart and Craik (1990) pointed out that they originally envisaged processing as sequential, proceeding from shallow to deeper processing. More recently, however, their research has indicated that processing at different levels may occur simultaneously, or that deep processing may precede shallow processing, depending on several factors such as the learner's familiarity with the information being processed and the type of task (Lockhart & Craik, 1990, p. 95).

Recent information-processing accounts have tended to focus on how the human brain functions and the role of neural networks in cognitive processing and memory. This focus has led to **connectionist models**, in which information is seen as being stored in multiple locations throughout the brain, forming networks of connections; that is, the brain is depicted as a complex network of interconnected units of information (Ellis & Humphreys, 1999). In Chapter 2, you learnt about brain development and the increasingly complex networks that develop with age (see Figure 2.10 on page 38). This development of connectivity and complexity in brain networks helps explain why the capacity of a young child's memory is smaller than that of an adult, as we saw in Chapter 3.

connectionist model
Views the brain as a complex network of interconnected units of information, with information stored in patterns of connectivity

According to the connectionist model, there is no such thing as an isolated memory, since one memory is connected to many others as in a vast computer network. McLelland and Rumelhart (1986) have developed one of the more widely accepted connectionist models. They extended the levels of processing model, arguing that information is stored in multiple locations throughout the brain, in the form of networks of connections.



BOX 6.7 IMPLICATIONS FOR EDUCATORS

METACOGNITIVE STRATEGIES IN THE CLASSROOM

Research suggests that educators have a significant role to play in raising students' awareness of their own thinking (Paris & Winograd, 1990), and in teaching them how to monitor their strategic behaviour and performance (Borkowski & Muthukrishna, 1992). However, an important first step is for teachers to become more self-aware and develop their own metacognitive skills (Zohar, 1999). Once you develop the skill of reflecting on your own cognitive processes and developing metacognitive strategies, you will be better equipped to model these for your students and to support their learning.

Here are some strategies to use with your students:

- Teach and model metacognitive strategies explicitly (Boekaerts, 1997), particularly in the basic skills of literacy and numeracy (Maqsud, 1997).
- Demonstrate a procedure and encourage students to follow you step-by-step (Wilen & Phillips, 1995), as demonstrated in Table 6.4 below.
- Journal writing – on paper or online – encourages students to reflect on their learning without worrying about assessment.
- Provide sample questions to encourage self-reflection:
  - > What went well in this class today?
  - > Did I get distracted? When and why?
  - > What will I do next time to keep my attention focused?

This type of reflection encourages students to self-monitor and self-regulate. Table 6.4 provides an example of how to foster metacognition through modelling.

TABLE 6.4 Modelling essay-writing techniques: strategies for promoting metacognition

INSTRUCTIONS TO USE WHEN MODELLING	COMMENTARY
Students, ask yourselves:	
• What is the essay question asking me to do? • What do I know about this topic? • What else do I need to know? • Where will I go to get information?	• Teachers' aim is to model the self-questioning technique so students can employ this strategy on their own when they have to write an essay.
Spend time planning:	
• Break the task into small steps. • How many paragraphs am I going to write? • What will be the topic of each paragraph?	• Teachers help students believe in their own ability to accomplish a task by breaking it into small, manageable steps. • Teachers demonstrate planning strategies so students learn to implement these for themselves.
During the writing process:	
Stop and go back to your plan to make sure you are on track: • How am I going? • What am I doing well? • What do I need to change or add? • Am I answering the question? • Am I using the appropriate style? • How am I going for time?	• Encourage students to self-monitor throughout the writing task. Students need to become aware of what they are thinking as they write and direct their cognitive resources appropriately.
At the end:	
• How did I go? • Did that plan work? • What might I change next time? • What was successful? • Do I need to proofread the essay and check spelling?	• Promote evaluation and self-reflection. • Encourage students to evaluate their strengths and weaknesses and to set goals for improving their execution of the task next time.



THINK ABOUT

- How well does the multistore model describe the way you have processed information during your reading of the previous one or two pages?
- Are you aware of any types of external stimuli that you tried to avoid storing in your sensory register while you read these pages?
- Did you use any specific processes to enhance your working memory and long-term memory while you read the pages?
- How might the multistore model improve the way you teach your students?

These classical views of information processing are extensively described in Munakata (2006). As explained by Munakata, many of these views are underscored by an interest in computer-based modelling of the processes that contribute to thinking and behaviour. These computer-based simulations have taught us a great deal about how and why the brain processes information under many different contexts and circumstances.

However, computer-based views of the brain, and a dependency on computer simulations of information processing, have also been criticised. These laboratory-based simulations are at once complex as well as overly simple (Munakata, 2006). Computer-based models allow us to process and simulate an infinite array of data, but can models represent the complexity of the child's environment, their social interactions and their individual thought processes? Mayer (2003) distinguishes between these classical views of information processing in which learning is characterised as a set of computer-like sequences, and more constructivist views that are concerned with cognitive processing aimed at sense making (p. 49). For example, how do individuals actively construct or *orchestrate* those cognitive strategies that help make sense of information?

This view of information processing closely considers the active role of the learner in constructing knowledge, rather than simply processing information. The term *meaningful learning* is used to describe the use of appropriate cognitive processes to *select* relevant information, to *organise* information into coherent mental structures, and to *integrate* sensory sources of visual and verbal information with each other and the prior knowledge base (Mayer, 2003, p. 52). The coordination of these processes leads to a meaningful learning outcome that can be stored in long-term memory for later retrieval and use.

The constructivist view of information processing is strongly concerned with the various processes or strategies involved in understanding information. In the following section, we will examine instructional applications of information-processing models.

However, as noted by Mayer (2003), the constructivist view of information processing is also limited by a need to account for the wider social and cultural context of cognition, and a need to consider the emotional and motivational state of the learner. It seems that information-processing theory may need to become more and more complex as theorists attempt to account for these abstract processes in the human mind.

INFORMATION PROCESSING AND LEARNING

How can these views of information processing help the teacher who is trying to ensure that students learn and remember important information? The information-processing model in all its forms helps us to understand how we process and store information cognitively. It also seeks to explain the flipside of remembering – that is, forgetting.

Much of what happens in the learning process relies on students' ability to recall necessary information and put stored knowledge into action quickly. The most common reason for forgetting in the short term is

that we fail to pay adequate attention to information that is processed through the sensory register and short-term memory. Another reason for forgetting is that – as mentioned earlier – short-term memory is limited in the number of items it can hold at any given moment, and new information tends to bump old information out of short-term memory store (Engle & Oransky, 1999). Other factors may be a lack of motivation to remember certain information, or a failure to develop adequate memory skills (Guenther, 1998, p. 148). But what about when we forget information we thought we had stored in long-term memory?

Cognitive learning theorists draw on the information-processing model to explain why we forget such information. Sometimes it may feel as if long-term memory 'decays' and disappears over time, but there is little direct support for this explanation (Eysenck & Keane, 2000). A second explanation is the 'interference' approach, which argues that we forget because long-term memories interfere with one another (see Figure 6.5 on page 229). Old memories interfere with storing new ones, while new memories may make it difficult to retrieve old ones. Thus, forgetting occurs when we cannot access a memory effectively, not because the memory has disappeared. The more information we memorise and the more memories we develop over time, the greater the possibility of interference.

Another explanation for why we forget is 'cue-dependent forgetting' (Tulving, 1974). According to this explanation, we do not lose information: it is held in storage, but we cannot retrieve it because we do not have the right cues. The process of remembering is an interconnected one. Information is recalled, which cues other information that, in turn, cues other information, and so on (Nuthall, 2000). Metacognitive strategies deliberately prompt cueing systems by applying a strategy. For example, a strategy might include a cue for remembering compass points such as the phrase 'Never Eat Sour Watermelons', where the first letter of each word corresponds to a compass point. These letters cue long-term memory for individual compass points, and remind us of the order of the points in a clockwise direction. Thus, one piece of information cues another. Table 6.5 gives some examples of strategies known as mnemonic devices that help us to remember information by associating new information with meaningful images or contexts. Box 6.8 provides some principles of instruction drawn from cognitive learning theory and research.

TABLE 6.5 Mnemonic devices for the classroom

MNEMONIC DEVICE	EXAMPLE
The 'loci' or 'place' method *Strategy:* Use familiar locations and visual imagery to remember items.	To remember four unrelated items – such as elephant, car, milk and CD – visualise a familiar location such as your home. 'Place' each item in a location around the house and 'pick it up' as you take a mental walk around the house: 'The elephant arrives home by car. First she walks into the kitchen to put the milk away, then she walks into the living room to play her new CD'.
Peg method *Strategy:* Remember sequences of unrelated items in the correct order using familiar peg words (common peg-word sequences are numbers, and letters of the alphabet).	To remember the names of the three largest New Zealand cities in the correct order, use the familiar peg words '1', '2' and '3': *1 is A1 – A is for Auckland* *2 – 2 'l's in Wellington* *3 – 3 'c's in Christchurch*
Rhymes *Strategy:* Use rhyming sounds to assist memory.	'The First Fleet landed in Botany *Bay* on a 1788 January *day*.'
Acronyms *Strategy:* Remember lists of words by chunking or reorganising information to make a word or phrase that is easy to remember.	In an acronym, the first letter of each word in a list forms a key word, name or sentence. For example, in music theory, to remember the notes that occupy the lines on the treble clef (E, G, B, D, F), you may remember that 'Every Good Boy Deserves Fruit', while the acronym 'FACE' represents the notes that occupy the spaces on the treble clef.



BOX 6.8 CLASSROOM LINKS

APPLYING COGNITIVE RESEARCH TO CLASSROOM PRACTICE

In a document for the International Bureau of Education, Rosenshine (2010) identified 10 principles of instruction from research into the brain and learning, cognitive learning theorists' research, and the classroom practices of successful teachers. The 10 principles work together.

1 Begin a lesson with a short review of previous learning. This can strengthen previous learning and help rapid recall of information over the longer term.
2 Present new material in small steps and have students practise after each step. This addresses the limitations of working memory.
3 Asking frequent questions helps the teacher to check for understanding, and allows students to practise new information and connect new material to prior learning.
4 Teacher modelling by thinking aloud, and using worked examples helps reduce cognitive load and guide students' thinking.
5 Guided student practice of new material provides opportunities for elaboration, rehearsal and organisation of information, which facilitates storage and retrieval. Teacher guidance ensures that the information is correct, and reduces cognitive load, easing transfer to long-term memory.
6 Check for student understanding. Students reconstruct what they hear or experience, connecting new information to old, and the schemas they develop can vary in their accuracy. Identifying and correcting misconceptions helps students to learn the material with fewer errors.
7 Obtain a high success rate in students' answers to instructional questions and practice activities. Practising with a high number of errors will reinforce inaccurate concepts in memory – better to reteach the material in a fresh way, until students are practising with at least 80 per cent success.
8 Provide scaffolds as temporary supports for difficult tasks. This may include the teacher thinking aloud, offering prompts or hints, and providing models for doing a task.
9 Provide opportunities for successful independent practice. Practice is necessary to develop fluency and automaticity in performing a skill, freeing up the working memory. It also strengthens neural connections. Successful independent practice should be supported by careful teaching and guided practice.
10 Weekly and monthly review provides ongoing practice to strengthen sound schemas in long-term memory, making long-term memory more accessible for new learning, freeing up working memory, and helping students to organise knowledge by combining old with new. Material that is not frequently reviewed and practised is more easily forgotten.

Source: Adapted from Rosenshine (2010).

ACTIVITIES

1 Watch an experienced teacher and see how these principles are put into practice in the classroom. Compare notes with others and make up a list of strategies.
2 Consider a time when you had difficulty learning or remembering something at school or university. Which of the principles was missing? How could you put the principles to work in your own learning?

STRENGTHS AND LIMITATIONS OF THE INFORMATION-PROCESSING APPROACH

The information-processing account of how we process and remember information is widely accepted in the field of cognitive psychology. There are several models of information processing, each with its own merits and limitations. In contrast to the behaviourist focus on observable behaviours, the information-processing approach attempts to depict the complex mental processes that contribute to learning and remembering.

Strengths

Using the computer as a metaphor for the human mind, the classical views of information processing help us understand the complexity of cognitive processing and the many stages and processes involved in storing and recalling information. This approach facilitates close study and analysis of cognitive processes – something particularly beneficial for educators seeking to understand how best to assist young people to learn and recall important information. The multistore model draws attention to different dimensions of memory (such as sensory, working and long-term memory) and to the value of strategies such as rehearsal and elaboration in enhancing recall. Levels of processing models are advantageous since they distinguish between type and depth of processing and the subsequent effect on quality of memory storage and recall. Connectionist models, which draw upon research into the brain's neural networks, are valuable because they provide insights into the connectedness and interdependence of cognitive processes and stored memories.

Limitations

The information-processing approach is limited in several ways. Some models of information processing (such as the multistore model) suggest that the mind processes information sequentially. This depiction has been criticised as being too idealised and unrepresentative of the complexity and interconnectedness of the brain's neural networks (see Ellis & Humphreys, 1999). The information-processing approach has also been criticised for an over-reliance on the computer as an analogy for how the mind works. The brain is not constructed like a standard computer (Klahr & MacWhinney, 1998): computers are built of hardy electrical components, and individual items can be reliably stored in discrete locations and accessed in predictable ways when needed (Kanerva, 1993). 'Neural hardware', on the other hand, is made out of 'noisy, unstable components', and it is not always possible to guarantee information retrieval (Klahr & MacWhinney, 1998, p. 651). In using computer modelling, most information processing models fail to take account of environmental, genetic and cultural differences in the ways individuals process information. Such models tend to decontextualise information processing, ignoring situational and personal factors (for example, emotional state, time of day and level of ability) that may influence how an individual responds to and processes information.

The models are nevertheless intended as abstract representations that enable researchers to predict behaviour and test hypotheses. Seen in this light, information processing models draw our attention to several important principles of cognitive processing, and are particularly helpful in examining the learning process.

Box 6.9 presents some implications of the information-processing approach for classroom practice.



BOX 6.9 CLASSROOM LINKS

APPLYING INFORMATION PROCESSING IN THE CLASSROOM

The information-processing model draws attention to the complex mental operations involved in processing information. To apply this model in your teaching, you might do the following:

- Teach students to pay attention to important information from the earliest moment of impact in the sensory register.
- Model how to select and pay attention to the most important information.
- Provide opportunities for students to rehearse and repeat information in working memory, to ensure that the information moves into the long-term memory store.
- Activate learners' schemas by revising prior learning that links to new material. This will assist them to make sense of and remember new information by linking it to the old.
- Give learners opportunities to elaborate on information and to link it to existing information so it will be meaningful and easier to recall.
- Encourage students to process information deeply to transform it into meaningful knowledge for different purposes and contexts.
- Teach and model memory skills and metacognitive strategies (see Table 6.5 on page 242).

BANDURA'S SOCIAL COGNITIVE THEORY

The development of cognitive views of learning was highly dependent on a shift away from the rigid behaviourist views of learning that prevailed in the 1960s. The main criticism of behaviourism was that it neglected the influence of cognition and cognitive skills, such as self-assessment and self-monitoring, on the learning process. It was in this context that Albert Bandura developed his 'social learning theory' (Bandura, 1977). Social learning theory recognised the contribution of personal (mental or psychological) factors to the learning process, providing an explanation of human behaviour in terms of cognitive, behavioural and environmental influences. In his now famous studies of aggression, known as the *Bobo doll* experiments, Bandura demonstrated that children can learn vicariously by observing the behaviour and consequences for others, and this introduced a cognitive component into the traditional behaviourist paradigm.

Learning through observation

Bandura and his colleagues sought to demonstrate that learning could occur vicariously through mere observation of a model performing behaviours. Previously, trial-and-error learning was the main view of learning in the behaviourist tradition. In a series of now famous experiments known as the Bobo doll experiments (see Box 6.10), Bandura and colleagues were able to demonstrate that learning could occur vicariously *without* the use of external consequences (reinforcers), and without the need for repeated trial-and-error learning, contradicting major tenets of behavioural theory (Bandura, 1965).

BOX 6.10 RESEARCH LINKS

BANDURA'S STUDIES OF CHILDREN AND AGGRESSION

Albert Bandura and his team conducted a series of studies that explored the extent to which children's behaviour could be influenced by exposure to adults modelling aggressive behaviour, also known as vicarious learning. Many of the studies involved three groups of children: an experimental group that observed a film of a person acting aggressively, a contrast group that watched an adult behaving in a non-aggressive way, and a control group that did not watch any film.

In one study, the experimental group of children watched an adult directing verbal and physical aggression in relatively novel ways towards an adult-sized inflated plastic Bobo doll that righted itself each time it was hit, while the contrast group watched an adult behave in a subdued and inhibited way towards the same doll (Bandura, Ross & Ross, 1961). The third group saw the aggressive adult, but did not see the doll. Half the children watched an adult model who was the same gender as their own and the other half watched an opposite-gender model. After exposure to the different models, all the children were left alone in a playroom with a few toys that included a Bobo doll. They were then assessed for aggressive and non-aggressive behaviour.

Results showed that the children who had observed an aggressive model showed almost twice as much aggression as did the children in the non-aggressive group. The behaviour of the children in the non-aggressive group was inhibited, like the model they had watched, and they showed less aggression than the children in the third group who had seen the adult behaving aggressively but not the doll. What was so interesting in these findings was the fact that with no reinforcement, children were able to demonstrate very precise imitation (learning) of the model's behaviours; they used the same aggressive strategies, including hitting the doll with a mallet and sitting on the doll, and repeated novel phrases such 'He just keeps coming back for more!'. This imitation of novel behaviours demonstrated that learning had occurred without the need for trial-and-error learning or reinforcement.

These findings were replicated using film and cartoon versions of the real-life situations. Bandura (1963) argued that studies in which young children view films that show models of aggression do show that this 'vicarious participation in aggressive activity increases, rather than decreases, aggressive behaviour' (p. 19). Subsequently, his early studies have given rise to a plethora of research studies about the influence of media violence on aggression in children and young people.



FIGURE 6.11 A Bobo doll is an inflatable self-righting toy that if knocked down can stand up again repeatedly.



Source: shironosov/iStockphoto

FIGURE 6.12 Self-regulation enables this writer to correct his own writing without needing external reinforcement.

Bandura had recognised a fundamental flaw in behavioural learning theories: the neglect of the role of individual self-beliefs in the learning process (Simon, 2001). Bandura (1986) combined the notion of individual cognitive processes with external environmental factors to suggest that cognitive processes such as *attention* to the behaviour and *retention* (memory) of the behaviour was necessary for the person to reproduce those behaviours. Both of these behaviours comprise what early behaviourists such as Watson decried as unobservable 'mentalisms', and therefore not measurable or accountable in the learning process. However, Bandura went even further and also maintained that *motivation* was necessary for the learner to reproduce the behaviour. In this he acknowledged that the environment in which the behaviour occurs provides feedback (reinforcement) that probably determines whether the behaviour will be likely to occur again; essentially, Bandura positioned reinforcement not as the cause of learning, but as a motivator for the individual to display what they had learnt (Bandura, 1986; Simon, 2001).

Bandura proposed that the human being was capable of self-regulating (self-motivating) and determining their own behaviour; they did not necessarily need external reinforcement but could self-reinforce to drive their own actions (Bandura, 1978). He used the analogy of writers to illustrate this point. He argued that writing is in fact a self-regulated act guided by our own capacity for self-evaluation and self-perceptions of our own writing. We are capable of setting our own internal standards for our writing, and modifying or changing (regulating) our behaviours to improve or change a piece of writing.

Reciprocal determinism

Bandura's research increasingly concentrated on the self-regulatory and cognitive processes such as motivation and self-efficacy beliefs that influence learning (see also Box 6.11). Originally called social learning theory, Bandura (1986) renamed his theory 'social cognitive theory' to highlight an emphasis on social cognitive processes. Social cognitive theory positions learners as having personal agency – they are self-regulating, reflective learners who use forethought, rather than simply responding to the environment (Bandura, 2001). In contrast to behaviourist views, the external environment becomes one of three factors that mutually influence each other; namely, personal, behavioural and external environmental factors. Bandura called this a process of **reciprocal determinism** in which all three factors act together to explain learning. Bandura based his model on three propositions that explain the deterministic sequence of interactions that shape learning.

reciprocal determinism
The interactive, complementary system formed by people and environments

Personal factors (also known as cognitive factors) partly determine how external events will be observed and perceived, and whether they will have any lasting effect on the individual. These personal factors include the knowledge we bring to a situation, our beliefs about the situation, how effective we feel in the situation (our self-efficacy), and our emotions. Bandura also included the unique physiological responses of the human body to stress, anxiety or excitement, noting that these biological processes (unique to the individual) send important signals about our likely success or risks in any situation.

Behavioural responses or actions are influenced by cognitive factors because Bandura argued that humans have a unique capacity to alter their own environment by choosing actions and behaviours to shape or respond to their environment. These behaviours in turn, affect the wider social environment.

Environmental factors interact with both cognitive factors and behavioural factors. Through their actions, humans can shape and alter their environment, and in turn these environmental conditions can

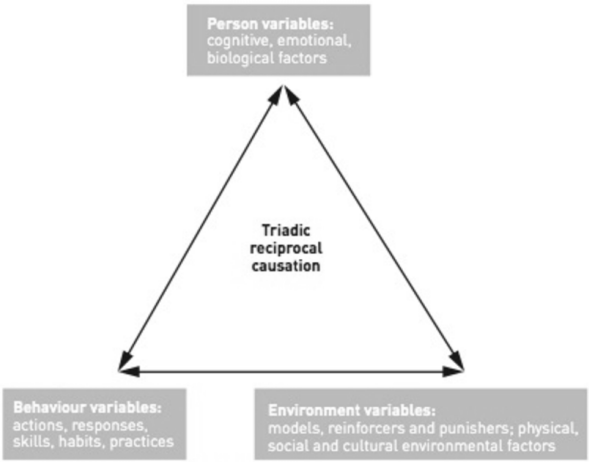


FIGURE 6.13 Bandura's triadic reciprocal causation: behavioural, environmental and personal factors mutually influence one another.

shape future behaviours. All the while, cognitive processes exert an influence and are in turn influenced by responses to the environment and so on (Bandura, 1978).

While this may sound complex, it is an extraordinarily simple proposition that fundamentally shifted views of human behaviour. By proposing that personal (cognitive), behavioural and environmental factors existed in reciprocal determinism, Bandura made a powerful argument that human beings can shape their own environment. They can determine their own behaviours, and they do possess internal mental processes, to control and regulate their own environment. This powerful theory is illustrated in Figure 6.13 which illustrates the reciprocal (bidirectional) links between these factors.

Consider, for example, Memet's classroom (we introduced Memet at the start of this chapter). Memet has his own unique cognitive processes. He seems to have confidence and sufficient self-efficacy to raise his discovery with the teacher. The classroom environment seems to support Memet's open sharing of knowledge, and his own contribution to this environment in turn influences the learning of his peers. In this environment, peers model behaviours to one another and individuals might internalise some of Memet's success and enhance their own maths self-efficacy when they recognise the same pattern in their own times tables. It is likely that teacher and peer responses to Memet will reinforce his own cognitive processes, and he will go forward to future mathematics classes with confidence and perhaps even excitement as he seeks out the next solution or discovery. So, the reciprocal determinism of cognitive, behavioural and environmental conditions continues.

Bandura's work has had an enduring impact on educational psychology in multiple fields. As explained in Chapter 4, self-efficacy has emerged as one of the major constructs that explains how self-perceptions influence learning and other behaviours. Self-efficacy is one of the cognitive beliefs evident in the model of reciprocal determinism. Self-efficacy beliefs can powerfully influence learning behaviours. Low self-efficacy beliefs undermine approaches to learning, while strong self-efficacy beliefs are associated with a willingness to engage with tasks and tackle challenging tasks. As also explained in Chapter 4, the environment is a critical source of information that supports our self-efficacy or undermines it. Vicarious experiences (for example, observing another person trying a new task) can be a powerful source of our self-efficacy. Bandura does not completely neglect the role of external reinforcement in this model of reciprocal determinism. Self-efficacy is also influenced by feedback from significant others such as teachers, and this can be reinforcing. In Chapter 8, we will look further at Bandura's work in considering the influence of his theory on the field of motivation and engagement with learning.

BOX 6.11 ABOUT ALBERT BANDURA



Source: Getty Images/Time & Life Pictures. photo by Jon Brenneis/Life Magazine

Albert Bandura was born in 1925 in Alberta, Canada. He was one of six children, and his parents were migrants from Poland and the Ukraine who were pioneer farmers. Bandura attended a small school in his town, where Bandura recalled:

> the students had to take charge of their own education. Very often we developed a better grasp of the subjects than the overworked teachers ... The content of most textbooks is perishable, but the tools of self-directedness serve one well over time.

Source: Pajares (2004).

At university, he studied psychology almost by accident, as a filler course, and became enthralled. Later, at the University of Iowa, where he received his Masters and Doctorate degrees, Bandura worked with a team seeking to find (behavioural) learning explanations for Freudian concepts of personality. Bandura became frustrated with trial-and-error learning, and was drawn to explanations of learning based on vicarious experience, modelling and imitation.

Bandura moved to Stanford University where he started a program of research investigating the determinants and mechanisms of observational learning, starting with the phenomenon of antisocial behaviour in boys from advantaged areas and intact homes. He found that these boys often had parents who modelled aggressive attitudes. The famous Bobo doll experiments followed this work, and showed that observational learning could occur without any reinforcement, which was in conflict with behaviourist views at the time.

In the 1960s Bandura started to look at self-regulation and self-reward, studies that foreshadowed his later work on personal agency in learning.

Social learning theory was published in 1977, and influenced psychology research through the 1980s. Then, in 1986, Bandura published *Social foundations of thought and action,* which described social cognitive theory and emphasised the agency of the learner, and distinguished his view from other social learning theories.

Work with people with snake phobias led to a focus on the power of beliefs in one's own abilities, or self-efficacy, and has had a significant impact in the field of motivation.

Bandura has continued to research and publish widely in the fields of self-regulation and self-efficacy.

Source: Adapted from Pajares (2004).

Strengths and limitations of social cognitive theory

Strengths

Bandura acknowledged that a broad range of factors – internal (cognitive and personal) and external (environmental or contextual) – influence learning. This broader explanation of learning, with its recognition of the learner's active contribution to behaviour change, is evident in subsequent developments in psychology, including cognitive-behavioural therapies which explicitly recognise the role of the person and their cognition in changing and directing their own behaviour. It has also had a major influence on the study of motivation via the capacity of the human being for self-regulation of behaviour. As with the field of cognitive explanations of learning, motivational explanations of learning increasingly accounted for individual self-regulatory mechanisms in motivation and behaviours (see Chapter 8). Bandura's focus on the place of observation and imitation in learning also meant that his work served to heighten awareness of the possibility of 'calculated manipulation and control of people' (Bandura, 1977, p. 208) through such sources as film and television. Subsequent examination of the media as a source of influence on human behaviour has become a major field of study.

Limitations

The conditions under which vicarious learning occurs have been questioned. Why do children imitate some of the behaviours they observe but ignore others? How can educators be sure that desirable behaviours modelled in learning situations have an impact on learners, while undesirable behaviours are ignored and forgotten? Research studies in this field (for example, Bandura, Ross & Ross, 1961) were concerned with children's responses to observed aggression in the period immediately following exposure to a model. How long after this experience would the children remember and imitate what they had seen? What would happen when the children observed models in similar situations behaving differently? Considering the myriad situations that children experience, it is difficult to accept that specific observational experiences will have a long-term impact on viewers. However, the advent of violent, interactive video games has increased concern about a possible link between habitual early exposure to violence in media, and an increase in aggressive behaviour (for example, fighting, arguing and bullying) and a decrease in helping behaviour (Anderson, 2004; Funk, 2005; Gentile, Lynch, Linder & Walsh, 2004; Olson, 2004).

Box 6.12 explores some classroom implications of social cognitive theory.



BOX 6.12 IMPLICATIONS FOR EDUCATORS

SOCIAL COGNITIVE THEORY IN THE CLASSROOM

The idea of reciprocal determinism indicates that teachers can adopt a holistic view of the classroom and consider that all aspects of the learning context – individual cognitions, behaviours and the environment itself – have an influence on learning. They can also take account of the place of observation and modelling in the learning process.

- Model effective learning behaviours or expectations:
  - Demonstrate a high self-efficacy by approaching tasks positively, and provide 'think aloud' demonstrations of tasks.
  - Give feedback that provides a model of self-regulation and self-reinforcement; for example, 'Great proofreading. You used your writing checklist very effectively!'
- Create an environment that supports positive behaviour:
  - Provide self-regulatory checklists for group work.
  - Encourage peers to be open and sharing of learning discoveries.
  - Use peers as models of learning and behaviours in providing examples of activities, peer tutoring or collaborative work.
  - Be aware that watching a teacher reprimand a child, or criticise a child for a wrong answer, can be a powerful disincentive for trying.
- Encourage self-regulation and awareness of own learning behaviours:
  - Task checklists can be used to self-monitor one's own progress.
  - Reflection strategies such as asking questions about progress – for example, 'How am I going?', 'What did I find confusing on this page?' – can promote self-regulation and awareness of behaviour.
  - Emphasise skill development and mastery, rather than simply enhancing self-perceptions, by making the skills explicit and the 'can do' elements of the task obvious, providing authentic indicators of success or improvement.

LEARNING STYLES AND APPROACHES TO LEARNING

CourseMateExpress

Online resources
Take a moment to consider your philosophy of learning and teaching. You may wish to use the **Develop your philosophy** tool on this text's CourseMate Express website.

The previous examples of cognitive explanations of learning have attempted to show how learners' cognitive processes influence their learning. We have learnt that individuals process information in unique ways through a range of processes assumed to be common to human beings, including the formation of schemes, the actions of working memory and the long-term storage of information in memory. An alternative viewpoint is offered in the literature concerning cognitive and learning styles, and in another body of literature concerning approaches to learning (Furnham, 2012).

The notion of 'style' (cognitive styles or learning style) refers to the idea that learners have a stable preference for the way in which they process information (Furnham, 2012; Sternberg & Grigorenko, 2001). This idea has gained considerable popularity in recent decades, but is perhaps one of the most controversial areas of educational psychology.

Furnham (2012) outlines two main ways in which styles have been approached – namely, cognitive styles and learning styles. **Cognitive style** refers to the characteristic ways of thinking and perceiving that individuals use to process and remember information (see also Ferrari & Sternberg, 1998; Riding & Rayner, 1998). **Learning style**, on the other hand, tends to be defined in terms of preferred ways of interacting with information, demonstrating learning or acquiring knowledge (Furnham, 2012). **Approaches to learning** is a category of research defined by Furnham (2012) as more reflective of motivational approaches to learning – how and why people approach learning tasks or course selection in the way they do (p. 67). He also describes this body of work as predating the work on cognitive and learning styles and being more coherent than the learning styles literature. First, we examine cognitive and learning style explanations, and then we examine the notion of approaches to learning.

cognitive style
The way an individual tends to perceive and process information

learning style
Learner preferences for types of learning and teaching activities

approaches to learning
Learner motivational approaches to learning

COGNITIVE STYLES

Cognitive style research has developed quite a range of labels identifying various cognitive styles. A review of literature by Messick in 1970 identified 19 cognitive style variables (Furnham, 2012). This list was subsequently reduced in a review of nine cognitive styles by Riding and Rayner (1998), and here we will look closely at just two examples. Each of these cognitive styles reflects a focus on holistic versus analytic thought processes (Furnham, 2012). Quite simply, holistic thinking refers to 'big picture' thinking – thinking about a whole system and how it works, or the patterns and systems of the whole. Analytic thinking tends to refer to a focus on the detail or 'parts' of the system or problem – thinking about the individual elements that make the system work. These concepts are evident in the two cognitive styles described here.

Field dependence–independence

Look at Figure 6.14. What do you see? When shown a picture of this rural landscape containing a cow, a pig, some sheep and a dog, one child might describe the picture in broad terms, as 'in the country'. Another will see the picture in terms of details such as a cow, a pig, some sheep and a dog in a large field, describing it as 'cows and sheep and pigs and a dog in a paddock'. In the first case, the overall scene in the picture dominates the child's perception (field dependence); when describing the picture, the child pays attention to the *overall impression* of the scene rather than the details. On the other hand, the second child's interest is in the *detail* of the picture (field independence), rather than the background scene. The way we perceive the world is an important element of cognitive style.

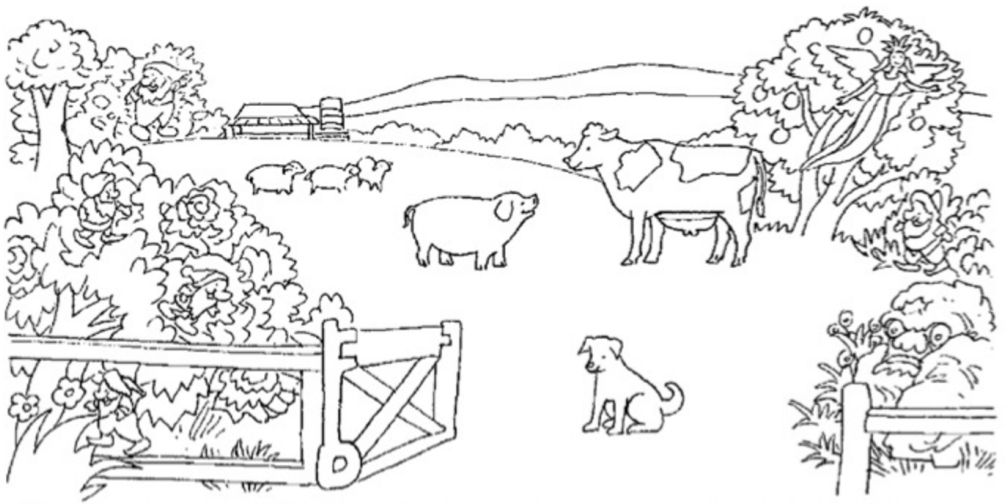


FIGURE 6.14 Example of an embedded figures task. Can you find a gargoyle, a key, a hat, five dwarves and a fairy?

field dependence
A cognitive style related to perceiving items, events or information as an integral part of a broader context (or 'field')

field independence
The tendency to perceive individual items, events or pieces of information analytically, and as distinct from the broader context (or 'field')

The terms **field dependence** and **field independence** are used to describe two extreme dimensions of human perception of visual stimuli. The more a learner is able to separate relevant material from its context (or 'field'), the more 'field independent' they are said to be.

This image is known as an 'embedded figures test' and is based on the extensive work of Witkin, Oltman, Raskin and Karp (1971). Research into the impact of field dependence–independence on perception suggests that these are stable traits that affect individual responses in a variety of situations. For example, people who are field-dependent are likely to see problems as a whole and have difficulty separating component parts (Riding & Cheema, 1991). They are typically more intuitive in their perception, and tend to be socially oriented, enjoying situations that allow for interaction and group work (Jonassen & Grabowski, 1993). By contrast, field-independent learners tend to be more analytical and prefer analysing visual stimuli and breaking down problems into component parts. They tend to be more efficient than field-dependent learners in processing information, are better readers, are highly task-oriented, and prefer structured, impersonal situations. Field-dependent learners tend to do better in the humanities, while field-independent learners do better in mathematics and the sciences (Witkin & Goodenough, 1981).

In learning contexts, field-dependent learners have been shown to be more likely than their field-independent peers to use rehearsal strategies, repeating information mentally, orally or in writing (Frank & Keene, 1993). Field-independent learners, on the other hand, tend to rely more heavily on elaboration strategies. This is consistent with their greater tendency to be analytical in their approach to learning (Tinajero & Paramo, 1998). Research indicates that field-independent children learn new computer languages more quickly and make fewer errors than do their field-dependent peers (Easton & Watson, 1993; Watson & Brinkley, 1992). In a study of 239 Canadian primary school children (Baillargeon, Pascual-Leone & Roncadin, 1998), field-dependent learners were less efficient in their mental processing and attentional capacity on a set task than were field-independent learners. However, as ever, generalisations should be treated cautiously.

There is some evidence (see, for example, Armstrong, 2000) that the methods of assessment used in educational institutions tend to favour students who are field-independent. Such assessments usually focus on written work involving systematic analysis of information and the development of

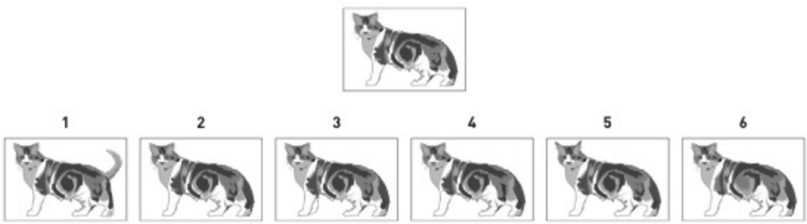
well-structured, logical arguments. The field-dependent tendency to focus on global aspects may be a problem for tasks that require learners to be more analytical in their approach (Tinajero & Paramo, 1998). Somewhat predictably, studies have demonstrated a positive association between field independence and performance on intelligence tests (Sternberg & Grigorenko, 1997), since the skills measured by most intelligence tests cover the types of learning included in the traditional academic studies in which field-independent people excel (see Chapter 9 for more on intelligence). By contrast, there has been little effort to design tests that are more congruent with the cognitive style of field-dependent learners. Such tests might include elements of dance, art, music, drama, video and film production, and other non-traditional forms of visual and oral presentation.

Impulsivity–reflectivity

Another dimension used to distinguish between learners' cognitive styles is concerned with the speed of their responses to a task, or the degree of 'impulsivity' or 'reflectivity' (also known as 'conceptual tempo') demonstrated in their responses. When presented with a task, some students react very quickly, sometimes without much thought. Others in a similar situation respond more slowly, pausing to consider possibilities. These distinctions, first defined by Kagan (1958, 1966), have been the subject of considerable research. Much of this research has involved the Matching Familiar Figures Test (Kagan, 1966), which consists of a set of pencil and paper tasks and involves selecting, usually from a set of very similar drawings, a drawing that exactly matches a model. Individuals with rapid response times are termed as having **impulsivity** and those who respond more slowly are described as having **reflectivity**.

impulsivity
Having a cognitive preference for rapid problem solving

reflectivity
Having a cognitive preference for taking time to solve problems and to analyse oneself and the context



Source: Matching Familiar Figures Test (MFFT20). Educational Engineering Lab, University of Zurich. Available at: www.project-hortus.net/mfft-framework/groupfiles/webexperimentlist.html

FIGURE 6.15 The speed of response to this kind of task determines impulsivity or reflectivity.

Various studies have reported on the impact of conceptual tempo on children's learning (see, for example, Wagner, Cook & Friedman, 1998). In general, reflective children take longer to complete tasks but are often more accurate than their more impulsive peers (Entwistle, 1991). They are also often better readers (Smith & Caplan, 1988). The value of helping impulsive learners to become more reflective has also been demonstrated. For example, Navarro, Aguilar and Alcalde (1999) reported success in a training program that aimed to help children in Grade 3 solve arithmetic problems by becoming more reflective. Not surprisingly, the intervention program had no impact on the performance of reflective students.

Sociocultural factors and cognitive style

Vygotsky and neo-Vygotskian accounts of cognitive development (see Chapter 3) emphasise the importance of social and cultural factors in cognitive development. It follows, then, that sociocultural factors may have an impact on learners' preferred ways of thinking, processing and remembering. Social structures and processes influence the types of activities we engage in and value, and these activities have a powerful impact on cognitive development (Herbert, 2000; Meadows, 1998). Meadows argues that, as teaching and learning do not occur independently of culture and history, they cannot be studied 'irrespective of the cognitive and affective history of the individual learner' (Meadows, 1998, p. 6).

A study of East Asian learners found them to be holistic and field-dependent in their preferences, compared with Westerners whom the researchers described as more analytic and field-independent in their cognitive styles (Nisbett, Peng, Choi & Norenzayan, 2001).However, more recently, Nisbett and Miyamoto (2005) have concluded that although these differences do exist, they are not as fixed or permanent as previously thought, and they are very much influenced by the surrounding cultural context, and hence malleable or changeable. Biggs (2001), on the other hand, argues that the research focus should not be on cognitive style but on the teaching and assessment methods used and the types of cognitive styles they encourage. He cautions against stereotyping learners from particular cultures, and emphasises the importance of considering cognitive style in a cultural context, just at Nisbett and Miyamoto's research would seem to confirm. This advice is very valuable because it guards against false generalisations. In contrast to the view that there are differences in cognitive styles across cultures, another body of cross-cultural research argues that cognitive style is a universal phenomenon that is not culturally bound (Kubes, 1998; Riding & Al-Sanabani, 1998).

LEARNING STYLES

Learning styles are almost universally acknowledged as being more controversial and problematic than cognitive styles or approaches to learning (for example, Desmedt & Valcke, 2004; Furnham, 2012). Proponents of learning styles also believe the learner develops characteristic preferences over time, but these theorists are concerned with learning modalities, not information processing. These concepts of learning styles have been extensively researched but have also met with significant criticism. In this section, we will briefly review a particularly prominent approach that has gained attention in teaching and popular culture: the idea that learners have modality preferences in terms of visual, auditory or kinaesthetic learning.

This approach is often termed the VAK, VAKT or VARK (visual, auditory, reading, kinaesthetic/tactile) approach to learning styles. Various theories (for example, Dunn & Griggs, 2003; Dunn, Dunn & Price, 1984; Fleming & Mills, 1992) have espoused a view that learners have a preference for receiving information in a visual form (looking at pictures, using diagrams to interpret information), an auditory form (preference for listening, discussing, talking), or a kinaesthetic/tactile form (preference for doing, touching and active interaction with information). These views of learning preference are distinct from, but closely related to, views of learning that emerged from Howard Gardner's (1983, 1993) theory of 'multiple intelligences', in which he described different domains of intelligence, including bodily/kinaesthetic, spatial (which reflects visual abilities), linguistic and many more (see Chapter 9). Both the VAK family of theories and Gardner's theory of intelligence have been popularised as a form of pedagogy in which teachers sought to adapt their teaching to reflect different forms of intelligences, and a belief that learners with strengths in these intelligences would be best served by instructional materials matching that preferred mode of learning – see Chapter 9 for more on Gardner's theory and its proper application in the classroom.

Dunn et al. (1995) conducted a meta-analysis of 36 studies based on the 'Dunn and Dunn Learning Style Model', and concluded that learners taught in their preferred learning style have a significant achievement advantage. That is, if a student has a preference for auditory modalities, they should be given learning activities and tasks that support this modality, such as listening rather than reading and so on. However, as discussed below, this view of matching learner preferences to learning activities is also considered very problematic. The range of studies presenting different teaching approaches using this view of learning styles is extensive, and a simple search of an educational database will yield any number of papers in a broad range of domains. The remainder of this section addresses extensive critique of cognitive and learning styles approaches that is essential for beginning teachers to consider.

CRITIQUE OF COGNITIVE AND LEARNING STYLES APPROACHES

The notion of 'styles' or preferences for learning have been extensively evaluated and critiqued. Many of these reviews and evaluations have concluded that there is very little consistent and quality evidence to support learning style theories. Two reviews are of most relevance here. The first is a review conducted in 2004 by Coffield in the United Kingdom, and the second is a review conducted by Pashler, McDaniel, Rohrer and Bjork for the American Association for Psychological Science (2008). Each review notes significant limitations in this field of study.

An extensive review of 13 models of cognitive and learning styles – including the Dunn, Dunn and Price (1984) learning style model – concluded that there was very little or no evidence to suggest that popular views of learning styles have any place in classroom practice (Coffield, Moseley, Hall and Ecclestone, 2004a, 2004b). In particular, they report that many models have not received adequate, *independent* research, citing a tendency for researchers in this field to make elaborate overstatements of the effectiveness of their own methods, and to hold vested interests in their own models by selling training programs to teachers and practitioners, as well as a serious lack of empirical research (by other researchers) to support the effectiveness of the models.

The more recent review by Pashler, McDaniel, Rohrer and Bjork (2008) draws a similar conclusion, but is even more specific about the scientific evidence available: specifically, they claim that there are very few, if any, studies that truly meet the rigorous experimental design standards necessary to determine if matching teaching style to learning preference produced better learner outcomes. They also cite a range of recent independent studies that were well-designed experiments, that have found no relationship between learning style and learning ability in the preferred modality, and no benefit for learners who had their learning preferences matched with targeted help in their preference modality.

A particular concern relates to instructional applications of the models that could lead to learners making simplistic or overly generalised assumptions about their abilities, or could lead teachers to stereotype learners in such a way. For example, Coffield, Moseley, Hall and Ecclestone (2004a, 2004b) cite one example of a student who illustrated this point by saying, 'I learned that I was a low auditory, kinaesthetic learner. So there's no point in me reading a book or listening to anyone for more than a few minutes'. This tendency of learning-style models to stereotype or label learners raises a concern that such labels might limit the development of a wider range of skills and abilities. Pashler and colleagues (2008) concluded that attempts to measure or sort people into learning styles in educational institutions is unwise and a wasteful use of resources.

Nonetheless, Coffield and colleagues (2004a) do suggest that some models of cognitive and learning styles offer greater potential than others to assist students. In particular, they identify models that are based on ideas of deep, surface and strategic approaches to learning, as discussed in the next section.

Box 6.13 (page 256) explores some classroom implications of students' cognitive and learning styles.

APPROACHES TO LEARNING

Another body of research that is a little different but similar to the cognitive styles research, considers how learners approach learning tasks or course selection. This research is distinguished by Furnham (2012) from the cognitive style research above, because it is more concerned with motivational styles.

Deep and surface learning approaches

A number of researchers in the 1970s observed and categorised an interesting tendency of learners when engaging with texts that were about to be examined. Some learners would try to memorise the facts of the text, while others would try to understand and contextualise the big-picture content. These approaches came to be called surface or deep approaches to learning (Furnham, 2012).



BOX 6.13 IMPLICATIONS FOR EDUCATORS

COGNITIVE AND LEARNING STYLES IN THE CLASSROOM

- Carefully consider the supporting evidence for any learning intervention before implementing it in the classroom – seek out critical reviews that explore the pros and cons.
- Recognise the diversity of students in your classes and adapt your teaching by using a variety of teaching methods, resources and assessments:
  - > Students from some cultural groups may prefer learning in non-competitive, sharing environments; for example, see Charter (1996) on integrating traditional Aboriginal teaching and learning approaches in education.
  - > It is wise to consider the linguistic differences of students for whom English is not the first language, making use of multimedia and online learning environments to individualise instruction where necessary.
  - > Expose students to a range of learning approaches and encourage them to experiment with different styles so as to broaden their repertoire of learning skills. This includes using a combination of individual and group work, abstract and concrete examples, and visual and aural learning resources. Provide students with learning strategies that will enable them to cope with situations where their preferred style is not the most appropriate (Riding & Rayner, 1998).

Studies of the ways in which children approach a learning task, such as reading text, suggest that from an early age, all learners try to self-regulate and have distinct motives and strategies for learning (Zimmerman, 1998). Students with a 'deep approach' to learning are intrinsically motivated to study, and are interested in satisfying their curiosity about a topic or understanding the meaning of a text. They approach learning tasks using problem-solving strategies (such as questioning, planning and evaluating) to maximise their understanding, as shown in this statement: 'I try to relate what I have learned in one subject to what I already know in other subjects' (Biggs & Moore, 1993, p. 316). Students with a 'surface approach' to learning typically have extrinsic motives and want to avoid failure. They tend to do as little work as possible and use memorisation or rote learning as a key strategy during study, as evidenced in the statement: 'I tend to study only what is set; I usually don't do anything extra' (Biggs & Moore, 1993, p. 316).

Approaches to learning are also related to learner self-concept. In their study of 580 Australian students in years 6 and 7, Burnett and Proctor (2002) found a significant relationship between deep approaches to learning and student self-concept. Deep approaches to learning for both boys and girls showed the highest positive correlations with school self-concept and learning self-concept. Learners with deep approaches to learning perceive their learning environment very differently from those with surface approaches. Campbell et al. (2001) interviewed and surveyed 490 Australian high school students regarding their approaches to learning and their perceptions of teaching and learning in the classroom. Overall, students with deep approaches to learning generally had more sophisticated understanding of the learning opportunities offered to them than did their surface learning peers (see Box 6.14).

In addition to deep and surface approaches, learners may demonstrate an 'achieving approach' to learning (Biggs, 1987a). Learners in this category are typically intrinsically motivated by a desire to do well at school, and adopt study techniques such as efficient use of time and resources to maximise their chances of success, as exemplified in the statement: 'I regularly take notes from suggested readings and put them with my class notes on a topic' (Biggs & Moore, 1993, p. 316). In a review of research on deep and surface approaches to learning, Zhang and Sternberg (2000) concluded that the evidence did not

BOX 6.14 RESEARCH LINKS

STUDENT APPROACHES TO LEARNING

Students were interviewed about their approaches to learning. The researchers explored the following questions:

1 Do students with differing approaches to learning view the same learning environment differently?
2 Do some learning environments influence students to perceive learning in ways that differ from those more typically generated by their current approaches to learning?

Research method

Four-hundred and ninety students from 24 classes at two high schools completed the Learning Process Questionnaire (LPQ) about their approaches to learning (Biggs, 1987a, 1987b). Students were also asked about their perceptions of teaching and learning in the designated class. Ninety-two students and their teachers were interviewed from the 24 classes.

Results

The interview data showed that students with deep approaches repeatedly demonstrated a more sophisticated understanding of the teaching/learning opportunities offered to them than did students with surface approaches.

Students with deep approaches to learning spontaneously mentioned a greater variety of class activities; made links between different learning activities; and had a broader understanding of what they had learnt, of the purposes of learning and of their teacher's objectives. By contrast, students with surface approaches to learning tended to lack understanding of their teacher's efforts to adopt more constructivist teaching and learning strategies, and remained focused on classroom features related to the transmission and reproduction of learning.

Students with deep approaches to learning generally reported taking a more active role in their own learning and using a greater variety of methods, while students with surface approaches tended to focus more narrowly on repetition and reproduction.

Students with deep approaches to learning also tended to have a richer appreciation of what they had learnt, and to relate their learning to broader issues or personal change. Students with surface approaches to learning tended to remain very focused on specific content.

Source: Adapted from Campbell et al. (2001).

ACTIVITIES

1 Search for the article online or in your university library. The full article contains much more detail, with illustrative examples from participants.
2 Discuss the findings with your tutorial group and comment on how you will foster deep learning among learners in your classroom.
3 Consider your own approach to learning. Can you see any benefits in changing or modifying your approach?

appear to support the existence of Biggs' third category (achieving approach), although there were data to confirm both deep and surface styles.

Critique of approaches to learning theories

Many teachers might seek to encourage a deep rather than surface approach to learning, but students may perceive a need to be pragmatic about their learning, depending on factors such as their workload, number of assignments due or other impinging factors. These issues are closely related to the notion

of mastery and performance goals that we will examine in Chapter 8. In this case, some researchers have controversially argued that it might be more strategic for learners to adopt performance or surface goals in some circumstances, especially if courses are structured in a similar way. As such, it seems that learning approaches could be influenced by the environment experienced by learners. It is certainly known that teachers, too, have certain approaches to teaching, and some disciplines might encourage memorisation of facts or rote learning of concepts.

The notion of links between approaches to learning and achievement outcomes could also be complicated by a reported association between approaches to learning and certain personality variables. For example, a tendency towards anxiety in learning has been associated with more surface approaches to learning (Furnham, 2012). Therefore, teachers and researchers trying to understand the connection between approaches and achievement might also need to pay attention to the role of other factors such as personality that could influence learner approaches.

CONCLUDING COMMENTS

Cognitive learning theories attach importance to the cognitive processes that occur as we learn. Different approaches emphasise different aspects of these processes. We began this chapter with a description of the constructivist view of learning which focuses on the construction of schemes or knowledge and understanding in the individual. This theory also focuses on the role of social interaction and sociocultural factors in one's ability to process information. The information-processing account examines how learners acquire and organise information in memory. Inspired by the inner workings of computers, the information-processing approach provides various models of how the mind processes, stores and retrieves information. The social cognitive approach, which links behaviourist and cognitive views, is the most holistic of all theories integrating personal (or cognitive) processes, with consideration of behaviour and environmental processes. Each of these explanations contributes to our understanding of how students learn. Furthermore, such explanations share a focus on the learner and the value of providing learners with opportunities to make meaning of and be active participants in the learning–teaching experience. We examined some concepts and theories often associated with cognitive approaches, such as the notion of cognitive and learning styles, and differing approaches to learning. While there are some overlaps with cognitive learning theories, there are also notable limitations in some of these theories.

CHAPTER REVIEW

- Cognitive views of learning focus on internal mental processes, and on learners as active constructors of meaning.
- Constructivist approaches emphasise the role of social interaction and the impact of sociocultural factors on our ability to process information.
- Four key principles of constructivism are:
  1. Learners are active participants in learning.
  2. Learners are self-regulated.
  3. Social interaction is necessary for effective learning.
  4. Learners' knowledge may be relative, since learners construct their own meaning, which depends on individual factors such as prior knowledge and sociocultural context.
- The information-processing model likens the human mind to a computer, and learning is depicted as the processing of information.
- The multistore model of information processing describes three memory-storage areas in the brain: the sensory memory, the working memory and the long-term memory.

- Metacognition is an executive control process that directs our thinking.
- The levels-of-processing approach distinguishes between deep and shallow information processing. According to this model, depth of processing determines how information is processed and remembered.
- Connectionist models focus on the connectivity between pieces of information that are stored as memories. They depict the brain as a vast computer network, with all of the information interconnected.
- Cognitive learning theory offers several explanations of why we forget. Three reasons for forgetting are that:
  1 Memory decays over time.
  2 Long-term memories interfere with each other and inhibit remembering.
  3 We do not always have the necessary cues to retrieve stored information.
- The social cognitive approach refers to reciprocal determinism to explain the interaction between personal (cognitive), behavioural and environmental factors that shape learning.
- Self-regulation is emphasised in social cognitive theory as the individual's control over their learning and behaviour.
- Cognitive styles depict learner differences in the processing of information, and may be understood in terms of field dependence–independence, and impulsivity–reflectivity.
- Learning styles describe learner preference for learning in different ways or through different modalities.
- Significant criticism of learning style approaches suggest they should not be used in classrooms.
- Approaches to learning reflect motivational preferences (for example, deep or surface approaches to learning).

ONLINE STUDY RESOURCES

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- a **self-check quiz**
- **crosswords**, **flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.

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QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1 How would a teacher of the constructivist style encourage students to think in more complex ways?
2 Draw a schematic representation of information processing and describe how information is processed according to the multistore model.
3 For each of the processes in information processing (attention, chunking, rehearsal, elaboration and organisation), identify strategies the teacher can employ to support the process and maximise learning.
4 How important is metacognition for learning? Explain how it contributes to the learning process.
5 What are the key features of constructivist theories of learning? How could you use this theory as a learner and as a teacher? What could you do to avoid its limitations?

6 Design a collaborative learning task with the aim of developing students' thinking about a concept. How will you structure the task, the group and your role to maximise the benefits of this approach? Which theories help you to make these decisions?
7 Describe your own cognitive style and approach to learning. To what extent are you a reflective or impulsive, dependent or independent, deep or surface learner? What benefits stem from your particular style? How can you become a more effective learner?
8 Have you ever described yourself as a 'visual' or 'auditory' learner? What new information do you have to guide your thinking about this notion?

KEY TERMS

approaches to learning
cognitive learning theories
cognitive load
cognitive style
collaborative learning
connectionist model
cooperative learning
discovery learning
episodic memory
executive control
field dependence
field independence
impulsivity
information-processing model
inquiry learning
learning style
levels of processing model
metacognition
peer tutoring
peer-assisted learning
problem-based learning (PBL)
procedural memory
psychological constructivism
reciprocal determinism
reflectivity
self-monitoring
self-regulation
semantic memory
short-term memory
social constructivism

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'COGNITIVE EXPLANATIONS OF LEARNING' AND MATERIAL IN OTHER CHAPTERS

- Compare the behavioural (refer to Chapter 5) and cognitive approaches to learning. Which is closer to the ways you have been taught? Which do you prefer as a learner and as a teacher?
- Return to Chapter 3 and consider how development of cognition might influence how you teach, and how students learn at different stages of development. Are there approaches that would be more and less effective for students of different ages?
- In Chapter 8, note the linkages between cognitive theories of learning and motivational theories.

FURTHER RESEARCH

RECOMMENDED READING

Boostrom, R. (2005). *Thinking: The foundation of critical and creative learning in the classroom*. New York: Teachers College Press.
Edwards, J. (2005). *How to teach thinking skills: Creative thinking, critical thinking, problem solving*. Melbourne: Curriculum Corporation.
O'Donnell, A. (2012). Constructivism. In K. R. Harris, S. Graham and T. Urdan (Editors-in-Chief). *APA educational psychology handbook: Vol. 1. Theories, constructs, and critical issues* (pp. 61–84). Washington, DC: APA.
Pashler, H., McDaniel, M., Rohrer, D. & Bjork, R. (2009). Learning styles: Concepts and evidence. *Psychological Science in the Public Interest, 9*(3), 105–19.

RECOMMENDED WEBSITES

Brain information: http://brainconnection.brainhq.com
The Association for Constructivist Teaching: https://sites.google.com/site/assocforconstructteaching/
Learn about your own learning styles: www.engr.ncsu.edu/learningstyles/ilsweb.html
MindTools memory techniques: www.mindtools.com/memory.html

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

- cognitive learning theory
- cognitive style
- constructivism
- discovery learning
- information processing
- learning style
- memory AND children
- memory AND learning
- metacognition
- metacognitive development
- reciprocal teaching

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

Chapter 7

HUMANIST APPROACHES TO LEARNING

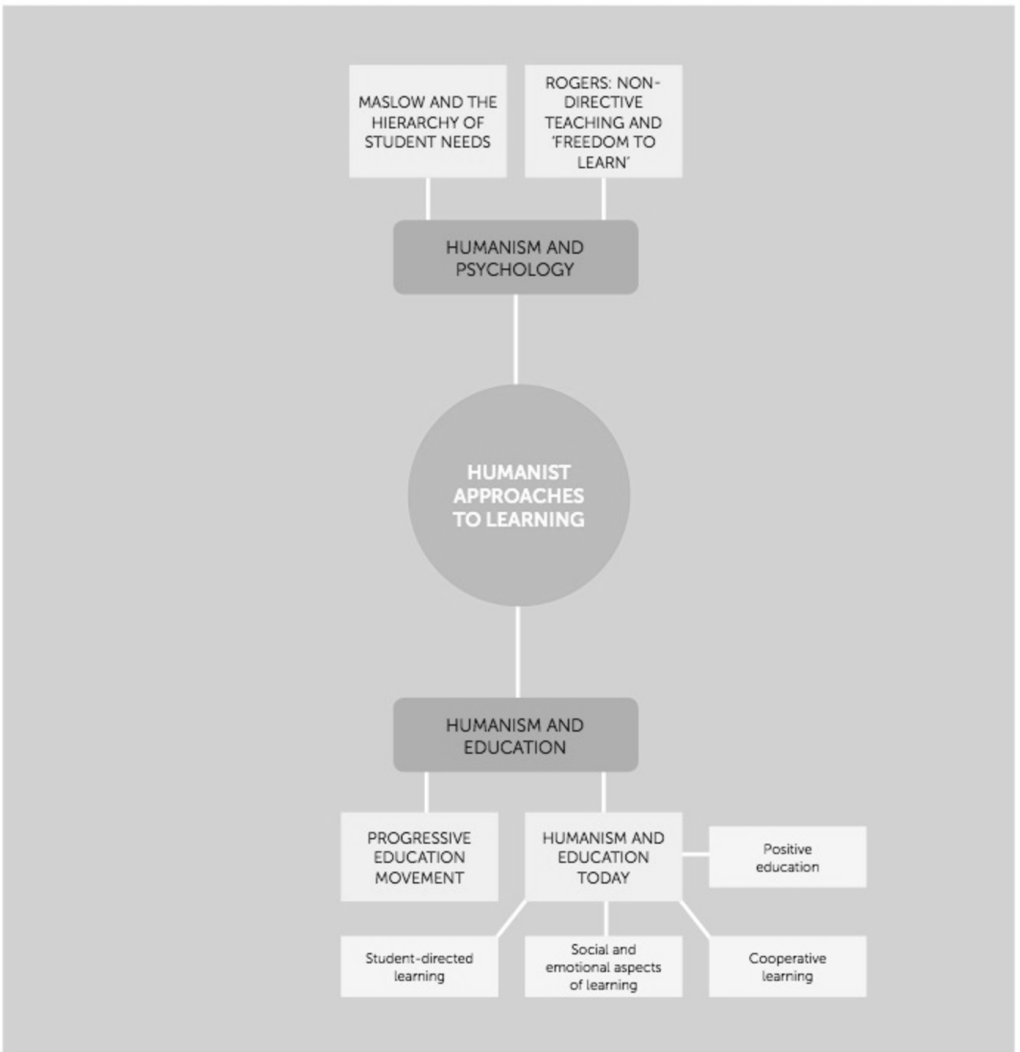

FIGURE 7.1 Chapter 7 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- How does Maslow link human needs and learning?
- How have humanist ideas influenced current practices in primary and secondary education?
- How can teachers best support student wellbeing?
- How does social and emotional learning contribute to academic achievement?
- What are the main elements of cooperative learning?
- What elements of humanism do you observe in your own philosophy of teaching and learning, and in the classrooms you have seen?

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INTRODUCTION

Kieran is working on an algebra exercise in his mathematics class, and sighs loudly. His teacher notices that Kieran is struggling with the task, and takes some time to sit with Kieran to find out what else might be competing with the task for Kieran's attention. It emerges that there are a number of issues: Kieran is worried about his brother, who is away at sea on a navy mission, his best friend from primary school is hanging out with a different group of friends, and he's beginning to wonder about the point of school – it doesn't seem to link to his abilities and interests. None of these issues are about algebra itself, yet they are collectively affecting Kieran's ability to think about algebra. What can the teacher do, and how much of this is the teacher's responsibility?

In Chapter 4, social and emotional development is described as a key piece in the jigsaw of overall development. This chapter is concerned with humanistic approaches to education, which consider the broad needs of children, including not just cognitive but also social and emotional needs. They recognise that, just as we saw for development in Module I, learning is interconnected across the cognitive, physical, social and emotional domains. Links in learning between cognitive (thinking) and affective (feeling) domains are well established (Weissberg & Cascarino, 2013); for example, in Chapter 4, you read about links between self-concept and learning, and in Chapter 8 we examine the links between motivation and learning. This has led to a concern to teach the whole child, and to consider skills such as emotional literacy to be just as fundamental as literacy and numeracy. These concerns are not just the domain of humanist educators, but are shared by many religious schools, which also have a concern to teach the whole child.

Humanist approaches also tend to emphasise the agency of the learner in directing what and how they learn. The focus in humanist approaches is on the child and his or her needs and wants, rather than on the curriculum content being delivered.

Child-centred views of education can be traced back to the influence of humanistic thinkers such as Jean-Jacques Rousseau, Friedrich Froebel, Johann Pestalozzi, Maria Montessori and, more recently, to the ideas of Abraham Maslow, Carl Rogers and John Dewey. The ideas of Piaget and Vygotsky (discussed in Chapter 3) and Erikson (discussed in Chapter 4) have also been influential.

WHAT IS HUMANISM?

humanism
An orientation or philosophy that recognises the uniqueness of human beings and the qualities of life that contribute to our humanity

Most dictionaries define the term **humanism** as any system of thought that is predominantly concerned with human experience and reasoning rather than with spiritual aspects of life (see, for example, the *Macquarie Dictionary*). The word 'humanist' is used to describe a general orientation to life or a personal philosophy that recognises the uniqueness of human beings and the qualities of life that contribute to our humanity, in art, literature, music and all aspects of daily living. It upholds the dignity of the human condition and, by extension, of the individual. Humanists believe that individuals have the potential to set goals, solve problems and achieve their own potential (Lamont, 1961). Humanism can be traced back to ancient Greece and thinkers such as Aristotle and Epicurus, who were both interested in everyday life and the real world rather than in religious beliefs and the gods. Humanistic thinking also shows evidence of Chinese and Indian influences through some of the writings of Confucius and Buddha (Brockett, 2000; Misiak & Sexton, 1973).

HUMANISM AND PSYCHOLOGY

Throughout the first half of the 20th century, psychology was strongly influenced by two theoretical approaches: behaviourism, represented by B. F. Skinner (1957) (see Chapter 5), and psychoanalysis, represented by Sigmund Freud (1933). Psychoanalytic explanations of behaviour are derived from Freud's work (Freud lived from 1856 to 1939) and are concerned with psychosexual development and the way in which individuals resolve conflicts between biological drives (or basic needs) such as sexual desires and aggression, and social expectations and values. Humanist psychology began to emerge in the 1950s as a reaction against the 'overscientific' or 'dehumanising' methods of behaviourists, and psychoanalysts' pessimistic obsession with mental illness and disturbance.

self-actualisation
The achievement of one's full potential

The two theorists who contributed most to the development of humanistic ideas in psychology and education in the 20th century were Abraham Maslow and Carl Rogers. Both emphasised the essential goodness of human beings and the need for each individual to achieve **self-actualisation** (or self-fulfilment). Maslow (1969) described humanist psychology, with its focus on the healthy person, as the 'third force' (the other two forces being behaviourism and psychoanalysis). These ideas – particularly Maslow's theory of human motivation and the hierarchy of needs, and Rogers' (1951) model of client-centred therapy and the concept of 'freedom to learn' – have continued to influence professional practice in both psychology and education.

MASLOW AND THE HIERARCHY OF HUMAN NEEDS

The most basic of human needs are physiological, such as a newborn infant's need for food and warmth. Later, infants begin to need safety, social contact and love. During childhood and adolescence, needs extend to include esteem (from the self and others), and finally, in maturity, there is the need for self-actualisation or the achievement of one's full potential. Maslow's early interest in human beings' basic needs arose from his work as a psychotherapist helping people who were psychologically disturbed (see Box 7.1). Through this work, Maslow came to believe that human activity is motivated by an urge to satisfy a set of basic needs and growth needs.

BOX 7.1 ABOUT ABRAHAM MASLOW

Abraham Maslow (1908–70) was born on 1 April 1908 in New York, the eldest of seven children. He remembered his childhood as being very unhappy (Boeree, 2000a), and described himself as being 'extremely shy, nervous, depressed, lonely and self-reflecting' up to the age of 20 (De Carvalho, 1991, p. 19). The family lived in a non-Jewish area in New York, and Maslow (who looked Jewish) encountered anti-Semitism there. Unhappy at home and isolated at school, he spent many hours in the library (De Carvalho, 1991).

As a student, Maslow did well and his parents encouraged him to study. He spent a brief period studying law in New York, as advised by his father, but this did not interest him. He then married and enrolled in psychology at the University of Wisconsin. At this time, he was interested in the work of John Watson and the behaviourists (see Chapter 5), and his early research was concerned with emotional and social relationships in dogs and apes. Later, Maslow worked with Harry Harlow (Harlow & Zimmerman, 1959), who is known for his studies of attachment behaviour in infant rhesus monkeys.

Maslow returned to New York, where he worked in the area of social psychology with E. L. Thorndike (see Chapter 5) at Teachers College, Columbia University. During this period, he came to know a number of German psychologists who had escaped to the USA during the Second World War. One outcome of Maslow's contact with these European psychologists was his interest in mental health and the potential of human beings. He began to take notes about successful individuals and the way they behaved, finding it significantly different from the behaviour of mentally 'ill' people who were his main focus of attention at the time. Maslow now began to argue that human beings were essentially good, but if their basic needs were frustrated or denied, this inner nature could be suppressed, leading to undesirable or bad reactions. He proposed that these basic human needs could be viewed in terms of a hierarchy or pyramid. The base of the pyramid consisted of the most basic human survival needs (see Figure 7.3), with the need for self-actualisation at the apex. Maslow saw motivation as a means for the satisfaction of basic needs.

Maslow had a successful career in psychology. He taught at Brooklyn College, was chair of the Psychology Department at Brandeis University, and in 1968 was president of the American Psychological Association. He died in 1970.


Source: © Catalogue Kaplan

FIGURE 7.2
Maslow believed that humans are essentially good, but that this inner goodness can be suppressed if their basic human needs are denied.

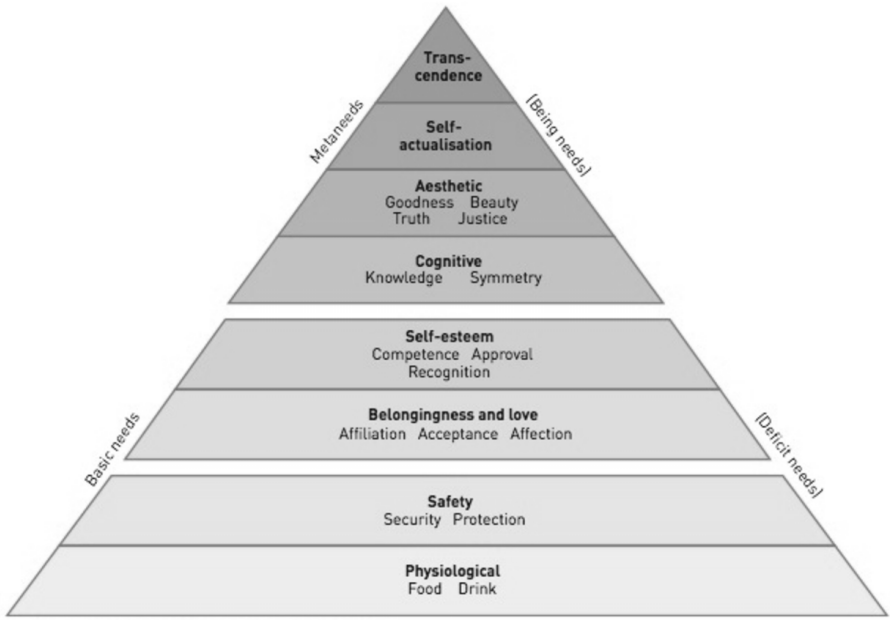
ACTIVITIES
1 How might the events of Maslow's life have shaped his ideas about human needs?
2 How have the events of your life shaped your thinking about learning and teaching?

Maslow (1968, pp. 199–200; Maslow & Lowery, 1998) described humans' **basic needs** and **growth needs** originally in terms of five ascending levels, later extending these to eight by differentiating the growth needs (Huitt, 2011) (see Figure 7.3):

1 *Food, shelter, clothes* – sometimes referred to as 'physiological needs'; the most urgent basic elements needed for survival.
2 *Safety, protection, security* – once basic physiological needs are satisfied, we seek a sense of security and stability.
3 *Belongingness, love* – such as that in a family, a community, a clan, a gang, friendships; involving feelings of affection.

basic needs
Lower-level or 'deficit' needs, such as the need for food, safety, love and respect

growth needs
Higher-level or 'being' needs, such as the need for self-actualisation



Source: Adapted from Lefrancois (2000); Hulit (2011).

FIGURE 7.3 Maslow's hierarchy of human needs.

4 Respect, esteem, approval, dignity, self-respect – involving two sets of needs:
   a *respect from others,* including status, public recognition and acclaim, even fame and in some instances dominance
   b *self-respect and feelings about the self,* including a sense of competence, self-confidence, independence and freedom.
5 *Cognitive needs* – knowledge, understanding and exploration.
6 *Aesthetic needs* – symmetry, order and beauty.
7 *Self-actualisation* – freedom for the fullest development of one's talents and capacities, or the achievement of one's full potential.
8 *Transcendence* – moving beyond the self, to help others find self-fulfilment and achieve their full potential.

deficit needs (D-needs)
Basic needs that motivate individuals to action in order to reduce or eliminate the need

being needs (B-needs)
Growth needs that motivate individuals to achieve personal fulfilment and self-actualisation

Maslow referred to levels 1 to 4 in the hierarchy as **deficit needs (D-needs)** and levels 5 to 8 as representing growth or **being needs (B-needs)**. He believed that only a small percentage of individuals – less than 1 per cent of adults (Maslow, 1968, p. 204) – truly reached the seventh and eighth levels of development, identifying historical figures such as Mahatma Gandhi, Albert Einstein, Abraham Lincoln and Eleanor Roosevelt as examples of people who reached this level.

According to Maslow, children whose basic material needs are satisfied (see Figure 7.4), and who are assured of safety, love and a sense of belonging, are able to cope with some frustration and disappointment, provided these are not overwhelming. Such challenges strengthen the individual and lead to healthy self-esteem that is based not only on the approval of others, but also on a realistic view of the self, an awareness of personal success, and an intrinsic motivation towards achievement and growth.



Source: © JoseCarlarte/Stockphoto.

FIGURE 7.4 Maslow's hierarchy of needs reminds us of the importance of considering children's basic needs before their academic needs. These children can focus on learning because their basic needs of safety, shelter, food, love and respect have been met.

Box 7.2 discusses the implications of applying Maslow's ideas in the classroom.

BOX 7.2 IMPLICATIONS FOR EDUCATORS

APPLYING MASLOW'S IDEAS IN THE CLASSROOM

The implications of Maslow's ideas for education mainly concern the place of basic needs and motivation in the learning process. For example:

- Children's basic physiological needs must be met before they can be motivated to learn. School breakfast programs for children who are from economically disadvantaged homes are based on Maslow's human needs model. School health and dental programs have similar origins.
- Strategies that are designed to enhance children's self-esteem and develop positive feelings in children about their own competence and effectiveness (see Chapter 4) reflect Maslow's ideas about the importance of motivation and wellbeing in learning and achievement.
- Children should be provided with opportunities to develop their understanding and appreciation of affective aspects of human achievement as exemplified in music, art, poetry and literature, since for many individuals these provide a means of achieving self-fulfilment.

Strengths and limitations of Maslow's theory

Strengths

Maslow's ideas about human needs and self-actualisation have had a continuing impact on education: the 'needs' hierarchy is mentioned in most educational psychology textbooks. Since Maslow's work, several theorists have expanded and added ideas about the human need for autonomy and self-fulfilment. Ryan and Deci (2000a; Deci & Ryan, 2006) in particular have applied these concepts to education and motivation, as we will see in Chapter 8. Positive psychology also takes up Maslow's ideas of wisdom, meaning and happiness. Their application in Seligman's 'positive education' principles is discussed later in this chapter.

Also significant is the focus on students' needs in a learning situation, rather than those of the teacher or curriculum. Attention is on children's basic needs for food, safety and belonging; on the affective or emotional aspects of their development (feeling, interest, attitudes and values); and on motivation rather than academic achievement.

Limitations

One of the main criticisms of Maslow's work concerns the hierarchical nature of his human-needs model. Critics have argued that the sequence of Maslow's human needs does not always apply, as in the example of the hero who 'may sacrifice his life for honour' (Patterson, 1973, p. 67). In this case, the hero's need for self-actualisation is stronger than his more basic need for safety. Other criticisms of Maslow's work concern the vagueness of terms such as 'self-actualisation', and the uncertainty about measuring its achievement. (For example, when can it be said to have been achieved, and under what conditions?) Although widely accepted, the theory has not been empirically tested, partly because of the difficulty in measuring the concepts (Wahba, 1976).



THINK ABOUT

- Reflect on Maslow's hierarchy of needs as it applies in your life. Can you identify with each of the needs? Which have priority? Are there any that don't apply to you?
- What role do you think Maslow's hierarchy of needs has in a 21st-century classroom?

ROGERS: NON-DIRECTIVE TEACHING AND 'FREEDOM TO LEARN'



Source: Tetra Images/Alamy.

FIGURE 7.5 Actively listening to a child talk about her worries involves attending carefully to what the child says, then giving calm, brief and accurate feedback.

Carl Rogers is another key figure associated with humanist approaches. Principally working in the field of psychotherapy, Rogers also wrote about education, both in *Client-centred therapy* (1951) and in *Freedom to learn* (1969, 1983; Rogers & Freiberg, 1994), advocating a person-centred approach to education. Rogers' view was that people had within themselves the ability to solve their problems and heal themselves, and that the therapist's role was to release them to do that. In education, he urged that the teacher's role was to free and assist students to explore their intrinsic interests and enthusiasms, rather than to force them to learn a curriculum determined by others. Rogers argued that real learning can occur only to the degree that problems are real and significant to the learner.

Rogers believed that therapists and others could help people to begin to heal themselves by developing supportive, non-directive relationships with them. Similarly, he argued that teaching must be grounded in such relationships. Teachers' attitudes to students were essential to developing such relationships, and they had three core conditions if learning was to be facilitated:

1 Teachers had to be real or genuine in their relationships with students.
2 Teachers had to prize the learner, accepting them for who they were, and trusting their ability to learn and develop. He termed this 'unconditional positive regard'.
3 Teachers had to have empathic understanding of their students – an ability to see the world through their students' eyes, without judging them (Rogers, 1983; Zimring, 1994).

BOX 7.3 ABOUT CARL ROGERS

Carl Rogers (1902–87) was born in Chicago, the fourth of six children, into a well-to-do and very religious family that emphasised the value of hard work. When he was about 12 years old, the family moved to the country so the children could escape the temptations of the city. Rogers became interested in agriculture, choosing to study in this area when he left school, but he soon changed to history as preparation for later entry into the ministry.

After graduating from the University of Wisconsin-Madison, Rogers married and then moved to New York to enter the very liberal Union Theological Seminary. At about this time, he attended a World Student Christian Federation Conference in China. This experience led him to see that people could sincerely hold very divergent religious viewpoints, and he began to question the strict religious views he had been taught, developing his own philosophy of life (Boeree, 2000b). He decided to abandon his plans to join the ministry. An interest in child guidance led him to enrol at the Teachers College, New York, where he specialised in clinical and educational psychology.

Initially, Rogers worked as a psychologist with delinquent children, becoming increasingly involved in child guidance and therapy. Based on his view that human beings have an inner drive towards self-fulfilment and maturity, he proposed that therapy should be non-directive, or 'person-centred' (Rogers, 1939, 1942), and concerned not with finding a 'cure' but rather with setting up a supportive climate and relationship within which a disturbed or disordered person could find self-acceptance, understanding and personal growth (Carl R. Rogers Collection, 2003). Rogers promoted his ideas at a time when psychologists were 'heavily experimental, 'rat-oriented', distrustful of clinical psychology and sceptical of his [Rogers'] views' (De Carvalho, 1991, p. 23), but his non-directive form of psychotherapy came to be widely used as an alternative to psychiatry and psychoanalysis.

Later, through his work with encounter groups – groups in which participants can express their feelings free from the usual social constraints – Rogers became interested in education. He began to encourage teachers to become more personal, innovative and non-directive in their teaching, arguing that their goal should be to nurture students rather than control their learning (De Carvalho, 1991; Rogers, 1969).

Both he and Maslow emphasised the importance of freedom and choice for mental and emotional health. Education was seen to contribute to these goals by providing a nurturing environment in which learners could follow their interests. Similar goals could not be achieved through traditional educational programs, with their emphasis on the delivery of a fixed curriculum. A new, non-directive teaching approach was needed that would free students to develop their talents through self-directed activity.



Source © Brigel Reesmeyer

FIGURE 7.6 Rogers believed that a supportive, non-directive relationship helps individuals begin to heal themselves.

non-directive teaching Teaching in which the teacher is a facilitator, guiding students and nurturing their learning

Rogers acknowledged that developing and enacting these attitudes is by no means easy. One vital skill therapists (and teachers) had to develop was to become active listeners (see Box 7.4). For Rogers and other humanists, **active listening**, sometimes called 'reflective listening' (Arthur-Kelly, Lyons, Butterfield & Gordon, 2006; Porter, 2007), involves more than simply hearing individuals describe their difficulties. It involves attending purposefully to the meaning and intention of what is said, then paraphrasing or reflecting back both content and emotion as a way of demonstrating that the message has been received and understood. This response strategy encourages the individual to continue talking. It is also an opportunity to release any tensions or emotions, and to clarify aspects of the communication that might have been misunderstood. Active listening helps teachers to build more effective relationships with their students.

active listening Attending purposefully to the meaning and intention of what another person is saying

BOX 7.4 CASE STUDY

THE CLASS FORUM

The idea of conducting a class forum in which all participants – teacher, aides and students alike – have equal say may strike some teachers as too challenging for primary school–aged children, or even as a practice which could, potentially, undermine the teacher's authority in the classroom. One teacher, however, who works in a small, rural school in NSW, believes her weekly classroom forum is a cohesive practice that promotes ownership of classroom behaviour and culture, and provides an opportunity for students to cultivate higher-order thinking and communication skills.

At these forums, participants have the chance to discuss their respective school and classroom experiences – they may choose to air concerns about problems or acknowledge positive developments. At the outset of each forum, the teacher reminds participants that they must raise their hands to speak – though the teacher plays the role of forum facilitator, at no point does the teacher's comments or tone of voice serve to position her as an authority figure in the forum. The teacher also starts each forum with a reminder of active listening principles, and stresses that responses to comments should be respectful, not dismissive or critical. Consequently, each forum is a free-flowing exchange of ideas during which students offer their opinions without fear of being corrected or ridiculed.

CourseMateExpress

Online resources

Go further: Try active listening for yourself on this text's website.

On one occasion, a student expressed his frustration about the frequency of reprimands he experienced in the classroom. The teacher modelled active listening by paraphrasing his comments to show that she had genuinely heard and understood him, and by indicating that she appreciated his feeling of frustration. Significantly, and as a result of the teacher's skilful facilitation of the forum, what was then discussed was not the specific content of the boy's actions and why they warranted reprimands, but what he might be doing to bring about this situation; for example, other students suggested that perhaps he needed to listen more carefully to the teacher's instructions. The upshot of this discussion was that the student concerned was encouraged by his fellow forum participants to reflect on his own behaviour, and that the teacher gained an insight into how frequent reprimands were making this student feel about being in the classroom.

At another forum, a student commented that the incidence of disruptive behaviour in the classroom had decreased and that the class was achieving more as a result. In this way, the weekly forum gave students the chance to acknowledge and celebrate their achievements as a group.

The success of these forums is due largely to the teacher's facilitation skills. By modelling active listening; relating personably with students by using nicknames, eye contact and humour; and by judiciously and efficiently steering the discussion away from attempted disruptions and focusing on positive contributions, this teacher uses the weekly forum to consolidate an inclusive and democratic classroom culture.

Source: Anne Warburton

ACTIVITIES

1 How does this description of a teacher's practice reflect a humanist approach?
2 What challenges might there be in running class forums such as this? How do they relate to the challenges to Rogers' ideas and to humanist approaches presented in this chapter?

Strengths and limitations of Rogers' educational ideas

Strengths

The strength of Rogers' ideas is in his emphasis on the value of each individual, on the importance of teachers having a positive view of children, and on the need for teachers to actively listen to children. Also significant is his concern that teachers create in their classrooms a climate of trust to support and

enhance children's social, emotional and cognitive development. In a meta-analysis, Cornelius-White (2007) found a number of aspects of Rogers' learner-centred approach to have benefits for students' cognitive behaviour and emotional outcomes. Variables of positive relationships, non-directivity, empathy, warmth, and encouraging thinking and learning all showed above-average correlations (compared with more traditional approaches) with variables such as participation, critical thinking, satisfaction, mathematics achievement, self-esteem, verbal achievement and positive motivation.

Limitations

The main limitation of Rogers' ideas is that he presented no guidelines to help teachers who lack the personal or professional skills needed to implement a non-directive program. There are also few suggestions for helping students who lack motivation and are underachieving, or for coping with disruptive behaviour. In addition, the procedures Rogers described may not be appropriate for students who lack the language or cognitive skills needed to negotiate effective classroom arrangements (Kohn, 1996; Porter, 2000).

Box 7.5 discusses the implications of applying Rogers' ideas in the classroom.



BOX 7.5 IMPLICATIONS FOR EDUCATORS

APPLYING ROGERS' IDEAS IN THE CLASSROOM

The major impact of humanist psychology on educational practice has been felt through the work of Rogers (1969, 1983; Rogers & Freiberg, 1994) and his belief that positive human relationships provide children with a context within which they are free to grow. He criticised the traditional approach to education, with its:

> prescribed curriculum, similar assignments for all students, lecturing as almost the only mode of instruction, standard tests by which all students are externally evaluated, and instructor-chosen grades as the measure of learning.
>
> Source: Rogers (1983, p. 21).

Rogers argued that:

- teachers should be non-directive, focusing on their role as a facilitator, guiding students, nurturing their learning and developing student–teacher partnerships, rather than being primarily concerned with subject matter and instructional objectives
- the key to effective education lies not in the curriculum, but in the development of a positive and supportive relationship between learner and teacher
- teachers should treat students with genuineness, empathy and 'unconditional positive regard' – their acceptance is not conditional on students' ability, behaviour or ideas
- the role of the non-directive teacher is to nurture the learner as a person, rather than to instruct
- rather than talking, the teacher needs to listen actively or reflectively
- the key to achieving effective education is in the quality of the relationship between the learner and teacher.

THE PROGRESSIVE EDUCATION MOVEMENT

In the first half of the 20th century, when educators emphasised subject mastery in the context of a traditional classroom, humanists such as John Dewey (1859–1952) began to advocate 'experience-based', 'child-oriented' or **progressive education** that was based on a commitment to democratic ideals. The different forms of progressive education that developed in response to these ideas – usually referred

progressive education A child-centred approach to education based on a commitment to democratic ideals

open education
A model of learning and teaching that provides a warm, caring environment, and that builds on children's interests and experiences and actively involves them in the learning process

to as 'child-centred' education in Britain, **open education** in the USA (Darling, 1990, p. 43) and 'progressive education' in Australia (Barcan, 1980) – involved classrooms that provided a warm, caring climate, and that built on children's interests and experiences. Greater emphasis was placed on children's thinking, feelings and effective communication than on their acquisition of knowledge 'that may soon be obsolete or forgotten' (Walberg, 1986, p. 226). Students were encouraged to develop personal values and a clear sense of self. The teacher's task was to provide a stimulating environment in which children would be actively involved in the learning process. Strategies included using small groups, individual instruction, flexible timetabling, mixed-ability groups and a reduced emphasis on grading. School would be fun and students would be motivated to learn.

The most important characteristics of progressive education reflect the humanist concern with the unique characteristics of each child, and a belief in the capacity of each individual to realise their full potential. Darling (1994) identified some of the critical features of child-centred approaches to learning:

- Development in childhood is seen as a natural progression; children are not miniature adults.
- Children are naturally active. Education involves them in mental (creative) and physical activity.
- Children are respected for their individual talents and needs. Different needs are recognised, diversity is valued and conformity is avoided.
- The curriculum is determined in terms of each child's needs and interests. The classroom atmosphere is relaxed and children are responsible for their own learning; they are 'free to learn'.

Descriptions of humanist education, or what came to be called progressive education, can be found in Dennison (1969), Kohl (1968, 1969), Neill (1968), and in the accounts of those who attempted to establish such schools in the 1970s (see, for example, Conroy, 1980). With the growth of concerns about standards of schooling in the 1980s, the progressive movement lost favour, but humanist principles continued to be implemented in schools. The curricula in most early childhood programs and primary classrooms in Australasia follow humanist principles, including the use of cooperative group work, individual contracts and child-centred teaching. They have been built on constructivist models of learning and teaching (see Chapter 6), but in addition to the cognitive focus there is a concern for children's social and emotional wellbeing. In recent times, there has been a resurgence of interest in humanist aspects of education.



THINK ABOUT

- What difficulties can you see in trying to implement the principles of progressive education in mainstream classrooms?
- What are the potential benefits of progressive education principles?

SOME EXAMPLES OF HUMANIST MODELS IN SCHOOLS IN AUSTRALIA AND NEW ZEALAND

Reggio Emilia
A system of education for the early childhood years, with a particular focus on children expressing their ideas in many different language modes

Humanist principles are evident in classroom programs that are described as 'open' or 'open-space' (Bennett, Andreae, Hegarty & Wade, 1980; Doyle, 1986; Sharples, 1990). Also exemplifying these principles is the **Reggio Emilia** approach to early education, which was developed in the northern Italian city of Reggio Emilia and which uses a constructivist project-based approach with a particular focus on children expressing their ideas in many different language modes (such as drawing, sculpture, dramatic play, writing and so on) (Edwards, Gandini & Forman,

1998; New, 2003; Turner & Krechevsky, 2003). Examples of non-traditional or alternative schools in Australia include 'Preshil', the Margaret Lyttle Memorial School in Melbourne; and the Brisbane Independent School. In New Zealand, alternative schools include Tamariki School, and Unlimited Paenga Tawhiti School, a government school in Christchurch. Schools based on the educational philosophy of Rudolf Steiner (1865–1925), who was an Austrian-born philosopher and educationalist concerned with the physical, spiritual and mental aspects of children's development, and Maria Montessori (1870–1952), who was an Italian physician and educator who believed in nurturing children's natural love of learning, can be described as humanistic in orientation (Lange & Sletten, 2002).



Source: SerNovik/iStockphoto

FIGURE 7.7 Most early years classrooms embody humanist principles with child-centred approaches that develop the whole child.

The Dalton Plan was first implemented in the USA in 1920 and continues to be used in a number of Australian schools; for example, in Ascham in Sydney and the secondary program at the Perth Montessori School. It is based on an individualised, child-centred approach to learning that seeks to introduce the features of a democratic community within the framework of a progressive school. Within the Dalton Plan, each curriculum area is divided into a set of monthly contracts and daily assignments. Students are free to plan their own work timetables, although they are also responsible for finishing one assignment before they begin another. Group work is encouraged (Edwards, 1991; Semel, 1992).

CourseMateExpress

Online resources
Watch a **video** of a teacher talking about her approach to humanist education on this text's website.

Home schooling, an alternative form of education provided by parents for their children at home, is also based on a humanistic desire for an education that is sensitive to children's unique talents and needs (Rivero, 2002; Romanowski, 2001).

Many middle-school programs in Australia are also based on humanist principles, with the aim of engaging young adolescents in schooling by focusing on students' needs and giving them direction over what and how they learn (Dinham & Rowe, 2008).

The Queensland School Reform Longitudinal Study (Queensland Department of Education, 2001), which examined effective teaching practices in schools, identified connectedness, a supportive classroom environment and the recognition of difference, together with intellectual quality, as 'productive pedagogies' observed in classrooms (see Box 7.6). It recognised that effective teaching–learning practices consider and involve the whole child in learning. Other States in Australia (see, for example, NSW Department of Education and Training, 2003) have developed similar models of pedagogy to Queensland's.

BOX 7.6 RESEARCH LINKS

PRODUCTIVE PEDAGOGIES: THE QUEENSLAND SCHOOL REFORM LONGITUDINAL STUDY

From 1998 to 2000, 975 classroom lessons were observed in 24 Queensland schools, in an effort to identify classroom practices that resulted in social and academic benefits for *all* students. Teachers were rated as 'high', 'average' or 'low' in the 'productive pedagogies' of intellectual quality, connectedness, supportive classroom environment and recognition of difference. The study found the following differences between high- and low-scoring teachers.

>>

HIGH SCORING TEACHERS	LOW SCORING TEACHERS
• acknowledged that they could not force students to learn • considered themselves responsible for providing opportunities for student learning • viewed all learners as capable of improving • spoke of themselves as facilitators of learning • saw it as their task to set up environments where students could explore, and where there was some openness about what students would produce • focused more on the development of skills and concepts than on the transmission of content • were more prepared to 'subvert the curriculum' to create spaces for learning activities that they valued • problematised assessment practices more often than the low-scoring group • tended to have high levels of extracurricular involvement • engaged in professional conversations with colleagues about their teaching • were willing to talk about their failings and about changes they had made to their teaching.	• expressed the belief that students were responsible for their own learning • held that factors totally outside the teacher's control largely 'determine' student outcomes • aimed instruction at the 'middle level' of the class • assumed that some students would learn, while others would not – it was up to the student • saw themselves as explainers of information • complained of lack of time to get through the curriculum • appeared to have a strong focus on content, rather than on skills or concepts • did not as readily discuss assessment limitations • seemed largely in the dark about the pedagogical work of their colleagues • were more guarded than their high-scoring colleagues about their own work • reported a greater sense of feeling under surveillance in conducting their work.

ACTIVITIES

1 To what extent does this study reflect a humanist approach to teaching and learning?
2 The 'productive pedagogies' framework has been challenged by a number of teachers and researchers (Mills & Goos, 2007). What do you consider to be 'productive pedagogies'? Are they characteristics of teaching that contribute to positive social and academic outcomes? Test your beliefs against the research literature. Can you find evidence to support them?
3 See www.education.qld.gov.au for more on the study, and on the productive pedagogies.



THINK ABOUT

- How do you plan to balance in the classroom the goal of teaching content with the goal of meeting students' personal needs?
- Can you think of situations when these two goals might be in conflict? (See the case study in Box 13.12 on page 530.)

CHALLENGES TO HUMANIST APPROACHES

People who advocate teacher-dominated approaches to instruction criticise humanist models of education on the grounds that these lack the structure needed to ensure that the desired learning outcomes are achieved. The structures referred to here can include a formal course of study, clearly stated teaching objectives or learning outcomes, procedures for regular progress assessment, and defined instructional methods and materials (see Brady & Kennedy, 2012). This view is in conflict with that promoted by humanists, who are more concerned with children's personal and emotional development within a caring and supportive environment than with ensuring that set topics are covered and that students achieve prescribed learning goals. Choosing between these differing positions is a dilemma that must be resolved by parents and anyone planning to become a teacher. The increasing demand for schools to be more accountable in terms of learning outcomes achieved by students can be seen as a

reaction against the influence of humanist principles on school practices. Calls for schools (particularly those concerned with the middle years of schooling) to more closely reflect and respond to the needs and interests of students in turn represent a reaction against traditional approaches, and a return to humanist approaches (Hunter, 2007).

More-traditional educators who are critical of the progressive education movement argue that it is simply a fad that leads to 'watering-down the traditional curriculum and coddling students' (Richards & Combs, 1993, p. 256). However, a synthesis of research on open (or progressive) education reported by Walberg (1986) concluded that, provided the programs were not extremely radical, students in open-education programs were not academically disadvantaged when compared with other students. Moreover, they did substantially better on educational goals that were highly valued by educators, parents and students, such as cooperation, critical thinking, self-reliance and constructive attitudes. The more effective programs did not stress multi-age grouping, open space and team teaching, but did emphasise 'the role of the child in learning, use of diagnostic rather than norm-referenced evaluation, individualised instruction, and manipulative materials' (Walberg, 1986, p. 226) (see also Chapter 14).

Examples of teaching strategies that share common elements with humanist ideas, and that have been widely used and evaluated, include 'cooperative learning', 'problem-based learning', 'peer tutoring', 'team teaching', 'family-based groups', 'ungraded schools' and 'open-plan schools'. Many of these approaches, such as cooperative learning (described in detail later in this chapter) and peer tutoring, are also the domain of cognitive learning theory (described in Chapter 6).

HUMANISM AND EDUCATION TODAY

Like cognitive and behaviourist approaches, humanist approaches have widespread applications in contemporary classrooms. Three main influences can be observed:

1 Students are allowed to direct the goals and means of their learning.
2 The whole child is considered, particularly by focusing on the social and emotional aspects of learning.
3 The emphasis is on the relational aspects of learning, including the use of cooperative group work.

STUDENT-DIRECTED LEARNING

Instructional models derived from or strongly influenced by humanistic principles give greater primacy to the student's role in the learning process. In contrast to the behavioural models discussed in Chapter 5, where the teacher is seen as controlling all aspects of instruction, the teacher's role in a humanist classroom is more indirect.

The humanist teacher is expected to be 'open' and honest with students as a way of setting up an 'authentic' humanist relationship with them. Such teachers are responsible for planning what happens in the classroom, and for providing an array of intellectual activities that will develop creativity and critical-thinking skills. They should strive to value students' ideas, culture and language, and nurture students' emerging sense of identity and self-esteem. The humanist teacher's role is to facilitate learning, although humanist teachers have no direct control over how and what students learn, which is instead controlled by students. In the humanist teaching situation, the teacher needs to ensure that students are motivated to learn (see Chapter 8). This is where one of the main characteristics of humanistic approaches to teaching becomes evident. Humanist teachers take advantage of children's natural activity, curiosity and interest in learning, ensuring that students are not 'turned off' by negative experiences at school or by a mismatch between what students want to learn and what teachers want them to

learn (Darling, 1990). Students are encouraged to use their inner resources in order to become fully functioning individuals (Rogers, 1969). While Maslow and Rogers contributed to the emergence of a humanistic view of education, the ideas of philosophers such as John Dewey (1916, 1937) and the movement that is referred to as 'progressive education' are also relevant.

EDUCATION FOR SOCIAL AND EMOTIONAL WELLBEING

Concerns about the rate of mental health problems such as anxiety and depression experienced by children and young people have contributed to increasing focus on student resilience and wellbeing. The depression- and anxiety-focused organisation beyondblue reported in 2014 that 26.4 per cent of young Australians had experienced a mental health disorder in the last 12 months, and in the same year, stress was reported as the number-one concern of young people aged 16–19 in a Mission Australia Youth Survey (Fildes et al., 2014). These issues also have consequences for student learning. For example, Suldo, Thalji and Ferron (2011) found in a longitudinal study that wellbeing predicted academic achievement a year later. A number of strategies have been employed to address this need.

Pekrun (2014) stressed the importance of teachers recognising students' emotions, given the strong effects they have on learning. As well as attending to students' emotions, teachers can teach students skills to understand and regulate their own emotions. Drawing initially on work such as Maslow's theory suggesting the influence of social and emotional needs on learning, teachers are encouraged to develop students' social and emotional skills as 'basic skills' alongside academic skills, to 'educate the whole child' (Elias, 2003, 2006).

Elias (2003, 2006) identified 10 principles for developing academic and also social and emotional skills in schools:

1 Learning requires caring. Caring relationships and warm, yet challenging classroom environments are important for effective and lasting academic learning, and social and emotional learning.
2 Teach everyday life skills explicitly at every grade level. These include the five key social and emotional competencies identified by the Collaborative for Academic, Social and Emotional Learning (CASEL): self-awareness, self-management, social awareness, relationship skills and responsible decision making.
3 Link social and emotional instruction to other school services such as anti-bullying, drug-education and conflict-resolution programs, and support services for students experiencing difficulty.
4 Use goal setting and problem solving to focus instruction, and to provide direction and motivation for learning.
5 Vary instructional strategies to cater for the preferences and styles of all learners.
6 Build empathy by promoting community service, thereby fostering the generalisation of social and emotional skills.
7 Involve parents in partnerships with the school to maximise students' academic learning, and their social and emotional learning.
8 Develop social and emotional skills gradually and systematically, building on the existing strengths and needs of the school setting, and integrating social and emotional learning with academic learning.
9 Prepare and support staff with ongoing professional development.
10 Evaluate efforts to promote social and emotional learning through ongoing monitoring of the program, assessment of outcomes, and feedback from teachers, learners and parents.

Advocates of social and emotional learning programs cite the changes they can make to students' behaviour and attitudes to school, and through them, to students' academic achievement.

A meta-analysis of school-based social and emotional learning programs found benefits for students' social and emotional skills, attitudes, behaviour and academic achievement (Durlak et al., 2011). Sklad et al. (2012) confirmed these outcomes and found additional benefits for mental health from such programs.

Positive education applies the principles of positive psychology, developed by Martin Seligman among others, to classroom contexts. The approach is termed 'positive' as it focuses on individuals' strengths rather than their weaknesses, on positive experiences rather than problems, and on what is working well rather than what is not working (Noble & McGrath, 2008). While Seligman (Seligman & Czikszentmihalyi, 2000) described positive psychology as improving on and being more scientific than humanistic psychology, positive education shares a number of the elements of humanistic approaches to education. Seligman et al. (2009; see also Seligman, 2011) proposed five pillars of wellbeing: positive emotion, engagement, relationships, meaning and accomplishment. In positive education, teachers teach these skills to students both explicitly and implicitly. Box 7.7 describes a framework of practices schools can employ to put the pillars into action.



Source: Monkey Business Images/Shutterstock

FIGURE 7.8 Student wellbeing can be addressed by teaching social and emotional learning, with benefits for students' relationships, behaviour, learning and mental health.

positive education
Applies the principles of positive psychology to education



BOX 7.7 IMPLICATIONS FOR EDUCATORS

THE POSITIVE EDUCATIONAL PRACTICES FRAMEWORK

Noble and McGrath (2008) suggested that schools can become places that promote wellbeing by teaching essential skills related to the five pillars identified by Seligman.

Foundation One: Social and emotional competency

This includes teaching of values and skills: *prosocial values* of, for example, respect, cooperation, tolerance and compassion; *resilience skills* including optimistic thinking, seeking assistance and using humour appropriately; *social skills* such as sharing resources, cooperating, disagreeing respectfully, negotiation and conflict management; *emotional literacy skills* that enable students to understand and manage their own emotions and those of others; and *personal achievement skills* which include recognising one's own strengths and weaknesses, thinking about one's own thinking (or metacognition; see Chapter 6), goal setting, planning and persistence.

Foundation Two: Positive emotions

Rather than focusing on managing negative emotions or attitudes, schools are encouraged to create and nurture positive emotions in students such as *feelings of belonging*, by using cooperative learning approaches, and communicating to students that they are cared for through buddy programs and peer tutoring; *feelings of safety*, by discouraging put-downs and having an effective positive behaviour management plan (see Chapter 14); *feelings of satisfaction, affirmation and pride*, by celebrating success; *feelings of excitement and enjoyment*, using games for learning and fun; and *feelings of optimism about school*

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success, by explicitly teaching optimistic thinking, focusing students' attention on positives, and encouraging attributions of effort rather than ability (see Chapter 8).

Foundation Three: Positive relationships

This includes both *positive peer relationships*, which can be encouraged through cooperative learning (discussed later in this chapter), class meetings (see Box 7.4 on page 270), cross-age house systems and peer-support programs, and *positive teacher–student relationships* that teachers can develop by being interested in their students, effective classroom-management programs (see Chapter 14), having more sustained time with students, and being available for students outside class time.

Foundation Four: Engagement through strengths

Teachers identify each student's learning and character strengths, and provide opportunities for them to use and further develop strengths and to work on weaknesses.

Foundation Five: A sense of meaning and purpose

Curriculum should have relevance to students' lived experience. Approaches such as service learning, in which students engage in curriculum learning through service projects, provide a sense of purpose, particularly when students are involved in decision making. Such projects can be arranged within the school as well as outside, as, for example, when one class designs and produces a learning resource for a younger class, or when a group of students travels overseas to work with a disadvantaged community.

Source: Adapted from Noble and McGrath (2008).

ACTIVITIES

1 Think about how these skills might affect students' learning in schools. Investigate the research literature that supports their role in learning.
2 Consider a school you are familiar with. To what degree are these skills taught and encouraged? What could the school do to further develop a culture promoting student wellbeing?

Approximately 50 schools in Australia were estimated to have integrated positive education into their curriculum in 2013 (McNellage, 2013). Kings College in Auckland also employs a positive education approach. It is notable that, on the Positive Education Schools Association website (www.pesa.edu.au), the majority of schools adopting this approach are non-government schools in privileged areas.



THINK ABOUT

- Why has positive education been taken up overwhelmingly by privileged schools?
- Refer to the productive pedagogies identified in Box 7.6. How do they compare with the pillars of positive education detailed in Box 7.7?

Positive education is a more recent movement than social and emotional learning programs, and the research evidence has not yet built up to evaluate this approach. Several longitudinal studies of the effectiveness of positive education programs in Australian schools are in train, and it will be interesting to see the results of these programs for student wellbeing and learning. Kristjansson (2012) evaluated the positive education movement in respect to educational psychology. He identified difficulties with some of the underpinning theory in positive psychology, in particular the clarity of the definition of happiness (equated with wellbeing), and cautioned that some aspects of positive education, such as working first on building signature strengths, and the 'broaden and build' approach that asks students

to pretend or imagine positive emotions, require a theoretical and research basis to support them. Other elements, such as teaching social and emotional skills, and mindfulness, draw on approaches described in this section.

Mindfulness is drawn from Buddhist practices of meditation, and is a practice that has been applied in clinical therapy as well as in schools. It involves an open, non-judgemental focus on the current situation through meditation, breathing and/or yoga. In schools, mindfulness may be one means used to train students to regulate their emotions and attention, and has been successfully applied for students with ADHD, as well as those experiencing stress, depression and anxiety (Zenner, Herrnleben-Kurz & Walach, 2014). Zenner and colleagues undertook a meta-analysis of school-based mindfulness programs and found a wide range of programs in practice. Overall, mindfulness interventions were found to influence cognitive performance in attention and learning, resilience and stress, but the authors cautioned that more research is needed to further examine these findings.

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Online resources
Go further: Explore one school's approach to Positive Education via the link on this text's website.

COOPERATIVE LEARNING

In Chapter 6 we discussed the centrality of cooperative learning in the constructivist classroom. Along with constructivist theorists, humanists value the importance of student-centred classrooms that emphasise student interaction as a way of encouraging learners to make learning meaningful. Glasser (see Chapter 14) believed that cooperative learning was critical in enabling students to gain a sense of belonging and exercise control over their own learning, especially by working with and helping others.

There are many ways in which classrooms may be organised to facilitate student learning (see Chapter 14). Some approaches encourage individualistic and competitive work habits, while others encourage cooperation among students who learn from one another in groups. The way in which you organise your classroom will depend on a number of factors, including your level of expertise and familiarity with the group, what and how you would like the students to learn, and your philosophy of learning and teaching (Palincsar & Herrenkohl, 2005). Johnson and Johnson (2014) identified three ways in which teachers can organise their lessons and classrooms. Each of these approaches achieves different outcomes, as listed below:

1 Students may work *competitively* to do better than their peers on norm-referenced tests (see Chapter 13). Those who know they have a chance of success are highly motivated to work as fast and as accurately as they can, while the rest of the class loses interest.
2 Students may work *individually*, at their own speed, to achieve personal goals on criterion-referenced tests. Students are encouraged to focus on their own learning, to ignore others and to see their own achievements as unrelated to the progress of others.
3 Students may work *cooperatively* in small groups to achieve shared goals that benefit the student and other members of the group. Group members develop an interdependence and a pride in one another's achievements, and recognise that group goals will only be reached if everyone collaborates on each task.

Cooperative learning, the most humanistic of these three alternatives, refers to learning situations in which small groups of students are encouraged and motivated to cooperate and help each other learn in order to gain contingent rewards. Success is dependent on all working together to achieve a common goal. There is a shared-incentive system, with students' work evaluated in terms of personal and group outcomes.

Cooperative groups can operate formally, with students working on a set task or parts of a task during regular class periods (such as the Friday mathematics class), or over a brief or an extended period of time (for example, for three weeks in Term 1 or across the school year). Groups can also be informal, created as appropriate in a lesson to fulfil an immediate need, such as when students are asked to turn

to their neighbours and spend five minutes clarifying their ideas about a particular topic. Johnson and Johnson (2014) pointed out two other ways cooperative learning occurs: in 'base groups', in which students support one another over an extended period; and in 'constructive controversy', in which students may take or hold different points of view, and work to come to an agreed position. Before working cooperatively, students need to be taught specific social skills to ensure that the group achieves its particular goals. Required skills include communication, conflict management and decision making, along with group trust-building exercises (Johnson and Johnson, 2014).

Two critical features of cooperative learning concern task structure and the use of contingent rewards. Students can work on a task cooperatively as a group, or individual students may undertake separate components of a common task. Rewards can be contingent on the group's successful completion of a task, or on the average achievement of the group's individual members. Slavin (2014) reviewed research on cooperative learning approaches, finding that group rewards based on individual marks are important to student achievement in cooperative learning. Some form of cooperative activity occurs in all types of group learning, but the use of a system of rewards that are contingent on group performance or on the sum of individual performance within the group is unique to cooperative learning. Slavin's (2014) review of research noted above found that the second of these reward systems is the more effective, and that, in fact, cooperative activity without rewards has fewer results for student learning. Teachers often encourage students to share their ideas with others when they are working on a task, arguing that this is a form of cooperative learning (see Model 1 in Box 7.8). However, this type of arrangement does not use contingent rewards and so does not satisfy the criteria for cooperative learning. Models 2 and 3 in Box 7.8, which involve students working individually on elements for a joint outcome (Model 2) and working together for a joint outcome (Model 3), are examples of cooperative learning in practice.

BOX 7.8 CLASSROOM LINKS

ALTERNATIVE MODELS OF GROUP LEARNING

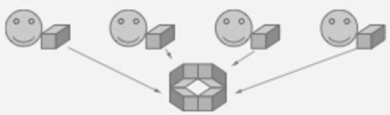


Model 1: Working individually on identical tasks for individual products



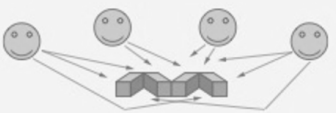
This appears to be a group of students working independently on a task. However, the students may share ideas and contribute to others' interest and motivation if the teacher builds such elements into the task. Otherwise, the students are simply working individually, since the task does not demand cooperation.

Model 2: Working individually on 'jigsaw' elements for a joint outcome



Each student works on one element of the task and parts are eventually fitted together, as in a jigsaw. No student can leave their part of the task incomplete and not jeopardise the group's task completion. With the jigsaw method of working, cooperation is built into the task, together with individual accountability.

Model 3: Working jointly on one task for a joint outcome



Here, students work cooperatively, as there is only one task. The contribution of each student is important for task completion.

Source: Adapted from Cowie, Smith, Boulton and Laver (1994, pp. 96–8).

Slavin (2014) described four major theories that have been proposed to explain the effects of cooperative learning on student learning achievement, and to provide guidance for cooperative learning design. All four theoretical perspectives on cooperative learning have empirical support. Slavin argued that rather than competing, the four theories can be integrated into a broader model that takes in all four dimensions. These are *motivational* theories, which emphasise the importance of group goals and individual accountability that motivate students to learn the set material and work towards a common outcome; *social cohesiveness* theories, which emphasise students' commitment to the group as the key motivating factor, and hence stress the importance of team building and social skill development; *developmental* theories that draw on Vygotsky's and Piaget's theories (described in detail in Chapter 3), which argued that children's cognition develops through interaction with their peers; and *cognitive elaboration* theories, which emphasise the importance of elaboration – as happens when students explain a concept to someone else, or argue for a particular point of view – to the building of links in long-term memory (this draws on information-processing theory, also described in Chapter 3).

Gillies (2014) focused on the ways that student and teacher talk contributes to both development and learning in cooperative learning, drawing on a number of studies. She concluded that students benefit from listening to one another's ideas, questioning, exploring challenging concepts, sharing strategies and thinking, and as they explain their own thinking, develop metacognition (see Chapter 6 for more on this).

Johnson and Johnson (2014) identified a number of 21st-century issues that cooperative learning can help to prepare students for, by developing conflict-resolution and relationship skills, and attitudes of tolerance and respect: increasing global interdependence; greater numbers of democracies worldwide; the need for creative entrepreneurs; and the importance of interpersonal relationships, whether these are face-to-face or online.



THINK ABOUT

- Has cooperative learning featured in your educational experiences? If so, what did you like or dislike about it? What skills did you develop?

The impact of cooperative learning on prejudice

Sharan (1980, 1990) presented evidence to confirm claims that cooperative learning not only enhances children's academic progress, but also has a positive impact on interpersonal relationships in classrooms with students from different ethnic backgrounds; see also Duran (1994) and Box 7.9 on page 283. The approach has also been found to be effective in enhancing the social acceptance of students with disabilities (see, for example, Jacques, Wilton & Townsend, 1998). Walker and Crogan (1998) confirmed these findings, though they also demonstrated the importance of the type of cooperative learning model used in a classroom (see Box 7.8) and the need for training in appropriate social skills as a prerequisite for success. In an Australian study of cooperative learning, Walker and Crogan compared the relative effectiveness of a simple cooperative learning environment, in which cooperation is encouraged by the teacher but not built into the task (see Box 7.8, Model 1), and **jigsaw**, a type of cooperative learning involving both cooperation and interdependence, in which each group member works individually on components of a shared task (see Box 7.8, Model 2). They reported that introducing tasks involving simple cooperation

jigsaw
A form of cooperative learning in which each group member works individually on components of the one task

prejudice
A preconceived, uninformed opinion or feeling

in the classroom can exacerbate existing ethnic tensions and **prejudice** (that is, a preconceived, uninformed opinion or feeling) among the students, whereas use of a jigsaw strategy (Aronson, 2012a; Hedeen, 2003), which involves both cooperation and interdependence, leads to improved academic performance and liking of peers, and reductions in racial prejudice. The observed effect of cooperative-learning strategies such as jigsaw on interpersonal relations in classrooms, including finding more and different friends (Smith, Schneider, Smith & Ananiadou, 2004, p. 579), is consistent with Gordon Allport's (1954) identification of the basic conditions needed to overcome prejudice, which are that:

- contact is direct and involves students from different ethnic (or disability, religious or socioeconomic) groups
- students are equal in status
- contact is concerned with common interests and goals.

Aronson (2012b) described how the jigsaw cooperative learning strategy was developed in 1971 in Austin, Texas, following the desegregation of public schools in the USA. At that time, residential areas in Austin were racially segregated, so students were 'bussed' to desegregated schools outside their own area. For the first time, students from White, African American and Hispanic backgrounds came together in desegregated classrooms. However, 'long-standing suspicion, fear and hostility' among students towards those from different ethnic backgrounds (Aronson, 2012b, p. 1) led to an explosive situation, with increasing levels of antagonism and aggression. Aronson and a team of graduate students were asked to help defuse growing classroom tension.

Observation of teaching procedures in the desegregated classrooms showed that the use of traditional individualistic and competitive teaching methods exacerbated student anger. Research had demonstrated that simply bringing groups of children into contact with other groups only heightened any conflicts that already existed between the groups (Sherif, 1967). However, there was also evidence that such contact could be positive when an activity was introduced that involved sharing, particularly where positive interdependence and cooperation was involved (Allport, 1954; Brown & Turner, 1981; Sherif, 1967). Aronson concluded that the climate in the desegregated classrooms needed to be changed from individualistic and competitive to group-focused and cooperative. It was on the basis of this decision that Aronson and his colleagues devised the jigsaw strategy, a cooperative learning technique that required students to work *cooperatively* and *interdependently* to complete a set task.

Working with Grade 5 teachers, the jigsaw strategy was developed around a unit concerned with biographies of famous Americans. Students were divided into groups of five or six, mixed in terms of gender and ethnicity. Biographies to be used in the jigsaw lesson were then 'jig-sawed' (Abrami et al., 1995, p. 143) or divided into five or six segments (for example, family history, childhood and adolescence, early employment, middle age, final years and major contribution). Each student in a group was allocated one segment of the biography, with instructions not to let others in the group have access to that segment. After reading their own segment several times, each student left their own group to join others who had been given the same segment in a temporary 'expert' group. The task of the expert group was to identify the main points in their segment and practise ways of presenting this material to their own group. Once this process was completed (about 10–15 minutes), students returned to their jigsaw groups to teach what they had learnt to the others in the group. In this way, each member of a jigsaw group became an expert in one part of the learning task and was instructed in the remaining parts by the other experts in the group. At the end of the learning period, students were tested individually on their knowledge of the topic as a whole. A case study reported by Aronson (2005) is presented in Box 7.9.

BOX 7.9 CASE STUDY

A COOPERATIVE-LEARNING EXPERIENCE FOR A STUDENT FROM A MINORITY ETHNIC BACKGROUND

Carlos, a Grade 5 Hispanic student attending a recently desegregated school, was shy, insecure and spoke English as a second language with a slight accent. His previous school was a poorly resourced, substandard school that catered for local Hispanic students, but he now went by bus to a well-resourced school in a middle-class part of town, attended by a mix of White, African American and Hispanic students.

Participating in the small jigsaw group was initially very confronting for Carlos, particularly when he had to speak in front of his group to give them information on his segment of the biography of Eleanor Roosevelt. The other students in his group ridiculed Carlos for his stammering, blushing and poor English. Hearing comments such as 'You're stupid', 'You don't know what you're doing' and 'You can't even speak English' (Aronson, 2005, p. 2), a graduate student working with Aronson reminded the group that they needed to learn what Carlos knew about Eleanor Roosevelt's life because the test would be in 15 minutes. The students quickly realised that they needed to listen to Carlos so that they could do well on the test. By the end of the first week, the rest of the group had begun to help Carlos to communicate better, asking relevant questions and encouraging him to articulate more clearly the information they needed to be given. Carlos gradually became more confident and began to see the others in his group as friendly and helpful. His communication skills increased and the other students realised that the boy was not stupid. All began to like the others in their group. Their stereotypes about other ethnic groups began to change. They enjoyed school more and absenteeism decreased.

The jigsaw lessons amounted to only three or four hours each week, so students in the jigsaw classrooms spent most of the time in a competitive classroom environment. After eight weeks, when tested objectively on levels of prejudice and ethnic stereotyping, there was evidence that even a small amount of time spent in a jigsaw group resulted in students expressing less prejudice and negative stereotyping, and higher levels of self-confidence. Compared with their peers in traditional classes, the jigsaw students had learnt to cooperate within a group, to empathise with others ('put themselves into another person's shoes') and to tolerate poor performance in both themselves and others. In addition, academic achievement improved, with less successful (or African American and Hispanic) students in jigsaw classes scoring significantly higher on objective tests than similar students in traditional classes, while good (or White) students, who had been encouraged to see themselves as 'teachers' within the jigsaw group, performed at much the same level as similar students in traditional settings.

Source: Adapted from Dr Elliot Aronson, 'Jigsaw classroom: History', from http://jigsaw.org/history/, reproduced by permission of Dr Elliot Aronson.

ACTIVITIES

1 How do you explain the impact of cooperative group work on Carlos? Which aspects of the jigsaw technique are crucial for achieving these changes?
2 How might academically gifted students respond to jigsaw classes? What about students with learning difficulties?
3 For teachers, what are likely to be the positive and negative aspects of using a jigsaw technique?
4 If you were Carlos' teacher, would you recommend that a cooperative approach be continued in the next school year? Why? Why not?
5 What other strategies could be used to help address the difficulties experienced by students like Carlos in ethnically diverse classroom settings? (You may find some ideas for this in Chapter 11.)

Many forms of cooperative learning have been described in the literature (see, for example, Cowie and Rudduck, 1990; Dunne and Bennett, 1990). Examples of cooperative learning in practice can be found in programs such as Group Investigation (Sharan & Sharan, 1992); Learning Together (Johnson & Johnson, 1999); Student Team Learning, which includes Student Teams and Achievement Divisions (STAD) (Slavin, 1994) and Teams-Games-Tournaments (TGT) (De Vries & Slavin, 1978); and Jigsaw (Aronson, Blaney, Stephen, Sikes & Snapp, 1978; Slavin, 1994).

Summarising the results of studies of the efficacy of cooperative learning, Good and Brophy (2008, pp. 200–1) concluded the following:

- Cooperative learning methods can realistically be implemented in many classroom situations and are likely to have positive effects. They do not replace whole-class instruction, however, but are best used as an adjunct to it, with teachers providing instruction of key content.
- Positive effects result from the use of group rewards rather than the cooperative nature of the activities. Cooperation should be emphasised over competition.
- Students need to be supported for cooperative learning, with explicit teaching of required skills such as listening, or dealing with disagreement, and careful choice of tasks and activities suitable for cooperative work.
- For subjects such as mathematics, when practice of skills is important, the effects are greatest when there are group rewards, and when students are accountable not only for their own mastery of the task but also for their teammates' mastery. In subjects such as social sciences, in which analysis, synthesis and evaluation are key, cooperative learning methods that emphasise constructive controversy, group discussion, and assigned roles and responsibilities may be more effective.

Although there is considerable evidence of the effectiveness of cooperative methods for enhancing student achievement and learning (Johnson & Johnson, 2014), there is also evidence that students and teachers can experience problems when cooperative learning strategies are introduced into a classroom (Gillies, 2007). Gillies (2008) demonstrated that structured cooperation (that is, groups that are structured in terms of size and composition, type of task, behavioural expectations, individual and group responsibilities, and teacher's role) was more likely to result in positive social and emotional outcomes than unstructured group work.

Gillies (2007) identified the following responsibilities for teachers when establishing cooperative learning:

- *Structure groups to ensure positive interdependence, interaction, individual accountability, interpersonal and small-group skills (see Box 7.10), and group evaluation of the process.* Interdependence ensures that members are working towards group rather than individual goals. Teaching interpersonal skills is vital for the success of cooperative learning, and should be an ongoing focus. Some training in effective communication (communicating ideas, listening, trying to understand another's point of view and constructively giving feedback), as well as in sharing, taking turns, resolving conflicts, democratic decision making and learning to accept, support and trust others in the group, will be needed prior to the commencement of a cooperative activity, when interpersonal problems arise that students are unable to resolve, and as an ongoing program of development (see Cowie & Berdondini, 2001; Gillies, 2007; Goodwin, 1999). Giving group members the responsibility to evaluate their group skills and outcomes promotes responsibility for the group process as well as the product they produce.
- *Consider the size, ability and gender composition of groups. Group size can have an impact on the success of a cooperative learning program.* Groups need to be small enough to facilitate interaction and interdependence. Fuchs et al. (2000) reported that students working in pairs achieve superior levels of collaboration and higher performance scores than students working in small groups, but the level of cognitive functioning (an outcome of cognitive conflict; see Chapter 3) is higher in the small groups.

  Research by Lou et al. (1996) found that group composition makes a difference: low-ability children tend to learn more in mixed-ability groups, where they receive tutoring from others; medium-ability children learn more in same-ability groups, where they tend to be more active; and

high-ability children learn equally well in either setting (although others have found that gifted children benefit from being with gifted peers; see Chapter 9 for a fuller discussion of this issue). In terms of gender, research cited by Gillies (2007) is mixed about whether same-sex or mixed-sex groups are more effective, with a balance between numbers of males and females and group dynamics influencing the outcomes.

- *Set tasks that encourage students to interact.* Examples of this are open-ended and discovery-learning tasks in which students interact over content, planning and decision making.
- *Ensure that all students can participate in the task.* This may mean making adjustments to allow the equal participation of students with learning difficulties, limited social or emotional skills, disabilities, language backgrounds other than English, and varied cultural backgrounds. Examples of adjustments include more tightly structured groups or tasks, consideration of particular combinations of students (avoiding combinations that are likely to have problems working together, for example), time limits on group work, assistive materials or technologies, and use of personal aides to support individuals.
- *Have clear expectations for students' task-related and interpersonal behaviours.* See Box 7.10 for an example of how group behaviours can be discussed with students.



BOX 7.10 IMPLICATIONS FOR EDUCATORS

TEACHING INTERPERSONAL AND SMALL-GROUP SKILLS

One way to help students understand what skills are needed in groups and to monitor their own skills is to have them draw up a chart like the following, describing what each skill would look and sound like. The chart could then be displayed to remind students of good interpersonal skills, and for students to refer to when evaluating their group skills.

SKILL	LOOKS LIKE ...	SOUNDS LIKE ...
Listening	*Maintain eye contact; nodding, smiling, interested expression*	• Mmm, I see, ah ... • So what you're saying is ... • I know what you mean.
Stating ideas clearly	*Face group and talk to all; use open gestures; lean forward*	• I think ... • What if we ...?
Accepting responsibility	*Face group and talk to all*	• Use 'I' statements.
Constructive criticism	*Open gestures*	• That's a good idea. Have you thought about ...?
Taking turns	*Facing the group; watching what others do*	• It's your turn. • I've had a go. • Have you finished?
Sharing tasks	*Pass materials; allocate jobs*	• What are you doing? • Do you need ...?
Understanding others	*Look interested; make eye contact*	• Do you mean ...? • Are you saying ...? • Can you explain what you mean by ...?
Clarifying differences	*Eye contact*	• I'm not sure I understand. • So what you're saying is ...

Source: Johnson, Johnson and Holubec (1998); Gillies (2007).

- *Give students individual and group responsibilities.* The task itself should be carefully structured, with the final goals clearly stated and, in the case of the jigsaw strategy, the task and any resources designed so that they can be broken into roughly equivalent parts. Each student should be given a task and the responsibility to complete it within a set time frame and share the information with the group. Students can also be given particular roles (for example, the 'chairman', who ensures everyone gets a turn and that the group stays on track; the 'reporter', who compiles the group's efforts to report to the class; the 'researcher', who locates resources for the group to use). Individual accountability is important to avoid one student doing all the work, or the opposite (and sometimes simultaneous) problem of 'social loafing' – one student relying on the efforts of the others. Students need to learn how to get help from other group members (such as by asking questions or watching what others do), how to pace what they do to fit with others in the group, and the particular strengths (and weaknesses) of each group member.
- *Teach students to monitor their group's progress in terms of their own skills and the effectiveness of the group as a whole.* Students should be encouraged to reflect on their learning, as they would in other circumstances, and on the group processes. This can be done through questionnaires, periodic conferences with the teacher, or journals. Teachers also have a responsibility to monitor the effectiveness of each group, and to intervene where necessary to ensure groups are productive, receive the help they need to complete the task, and that necessary skills are learnt as they are required.



Source: Thomas Barwick/Getty Images

FIGURE 7.9 Interpersonal skills are a key factor in well-functioning cooperative groups.

The following are some other issues that may need to be considered when cooperative methods are implemented:

- *Rivalry among groups, and misbehaviour.* This can disrupt the function of groups. Changing group membership at the end of a unit of work, or after regular periods of time, can help to reduce this effect, but difficulties may still be experienced in classes with a small number of disruptive, difficult, unpopular or non-cooperative students (Cowie, Smith, Boulton & Laver, 1994). Teachers need to have clear expectations concerning the behaviours required for successful classroom functioning, and need to use a group-based positive reward system and appropriate classroom-management techniques (Kagan, 1992; Slavin, 1994). Training in conflict-resolution techniques may be helpful (see Chapter 14).
- *Arrangement of furniture in the classroom.* Furniture arrangement can influence the success of cooperative learning. The teacher needs to have easy access to each group and there should be space for students to move around as required (see Chapter 14).
- *Teacher commitment and classroom-management skills.* Teachers implementing cooperative strategies need to be committed to using cooperative learning methods, but they also need reasonably high-level classroom-management skills and/or training before the new methods are implemented. It is also important that, where necessary, there is provision for an aide, a volunteer parent or a student tutor to provide additional assistance to individuals and groups. This is particularly important when there are disruptive students in the class (Cowie, Smith, Boulton & Laver, 1994). Participation in a teaching team or teachers' learning community (Calderon & Slavin, 1999) and ongoing support from colleagues, administrators and students have been shown to have a positive influence on the long-term use of cooperative learning strategies (Ishler, Johnson & Johnson, 1998).

- *Cooperative learning strategies should complement rather than replace existing classroom practices.* Team-based methods can be used for following up learning after whole-class instruction, and for the practical application of new material. However, cooperative learning strategies should not replace whole-class instruction by the teacher where new subject matter is being introduced, or when the learning tasks are not suited to cooperative activity (such as in routine computation practice).

Evidence on teachers' use of cooperative methods suggests that many regularly use some form of cooperative activity in their classrooms (see, for example, Antil, Jenkins, Wayne & Vadesy, 1998). In most primary classrooms, students spend much of the day learning in supportive groups sitting at a table with other students, rather than in individual activities at a single desk or listening to whole-class 'teacher talk'. However, few of the teachers Antil and colleagues (1998) surveyed used a recognised form of cooperative learning, primarily because they did not link individual accountability to group goals. Interestingly, the increasing availability of computers in classrooms may contribute to greater use of cooperative learning strategies, as computers have been demonstrated to provide an effective platform for cooperative learning activities among students of varying ages and ability levels (McDonald & Ingvarson, 1997; Sussman, 1998; see also Chapter 12).

STRENGTHS AND LIMITATIONS OF HUMANISM IN THE CLASSROOM

Since the development of humanist learning methods in the mid-1970s, considerable evidence has accumulated about its effectiveness. The results are generally positive, although some problems have been reported, particularly in regard to implementation.

STRENGTHS

Richards and Combs (1993, pp. 266–7) summarised the impact of ideas promoted by humanist psychologists and educators such as Maslow, Rogers and Dewey as:

- recognition of each human being's uniqueness, and support for individualised instruction
- recognition of the importance of a positive self-concept and self-esteem in the objectives of education (see Chapter 4)
- reduction in dependence on whole-class methods of instruction, coupled with more widespread use of small-group and cooperative strategies, an increased emphasis on the teacher's role as facilitator and helper rather than as director and manager, and increased efforts to include students in decision making in schools
- attempts to make schools pleasant and caring places, with warm or positive relationships between teachers and students
- widespread provision of school-based guidance and counselling services.

LIMITATIONS

Much of the criticism directed at humanistic education has resulted from the humanist focus on affective aspects of development, rather than on more objective and quantifiable aspects of learning. Because of the qualitative nature of the outcomes of humanistic teaching models, relatively little research has been reported on their effectiveness. Most accounts of humanistic classrooms have tended to be subjective descriptions of program implementation. Quantitative evaluations have tended to indicate a risk of poor progress in basic skills such as reading and writing within humanistic programs, since attention is focused on affective rather than academic

outcomes. A further source of difficulty in evaluating humanistic approaches to learning is that teachers often lack the knowledge and skills needed to implement humanistic ideas (Antil, Jenkins, Wayne & Vadesy, 1998; Rich, 1992). In addition, school systems may be unsympathetic to such instructional models, particularly when comparisons can be made between schools on the basis of widespread basic skills testing (see Chapter 13).

Box 7.11 details the implications of humanism in the classroom.



BOX 7.11 IMPLICATIONS FOR EDUCATORS

HUMANISM IN THE CLASSROOM

The key elements of humanism, or progressive education, in classroom practice include:

- an emphasis on *experience-based instruction* – or 'learning by doing' – building on students' interests and experiences, and involving them in mental and physical activity (see Chapters 3 and 6)
- concern with *students' thinking, feelings and communication skills*, together with respect for their needs and talents
- encouragement for students to develop *personal values and self-awareness* (see Chapter 4)
- provision of a *stimulating environment* to actively involve students in learning, giving them 'freedom to learn'
- provision of *progressive education* as exemplified in the programs of A. S. Neill, Rudolf Steiner, Maria Montessori, the Reggio Emilia early-childhood education model, and non-traditional or alternative schools
- application of *individualised, child-centred teaching strategies*, as used in the Dalton Plan and in the different forms of cooperative learning.

Key elements of cooperative approaches to learning include:

- *positive interdependence*, in which students are linked to others in their group in such a way that if one fails, all fail (none can succeed unless the whole group succeeds), and where tasks and resources are shared and each group member is responsible for completing a task and for ensuring that others in the group complete their tasks
- *face-to-face facilitative interaction*, in which students aid group success by listening to and helping one another, by sharing information and resources, by resolving differences, by giving feedback, and by encouraging and motivating one another to participate fully and to achieve shared goals (Gillies & Ashman, 2000)
- *individual accountability and personal responsibility*, in which the assessment results of each student's work are reported to both the student and the group as a whole – 'students learn together and then perform alone' (Johnson, Johnson & Holubec, 1994, p. 31) – with each member of the group contributing a 'fair share' to the task
- *interpersonal and small-group skills*, in which students learn academic subject matter and small-group social skills in order to function effectively within a team – getting to know the others in their group, learning to trust them, communicating clearly with them, supporting them and resolving conflicts successfully; training may need to be given to ensure that students have these skills
- *group review (processing)*, in which students reflect on how effectively their groups have operated, giving positive feedback about actions that are helpful and those that are not helpful. Research cited by Johnson, Johnson and Holubec (1994, p. 34) indicates that group review of activities is most effective (that is, it contributes to higher levels of student achievement) when teacher and students all participate in the review process.

CONCLUDING COMMENTS

The humanists' most important contribution to the debate about effective education has been to heighten our awareness of teaching as an art to be undertaken by caring individuals committed to helping their students to succeed in the difficult process of growing up. Education is not just a mechanical process. Although highly structured teaching methods and related technologies are very important in the learning process, the humanity of teachers and others who contribute to children's learning should also be recognised.

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Online resources
Take a moment to consider your personal philosophy. You may wish to use the **Develop your Philosophy** tool on this text's website.

CHAPTER REVIEW

- Humanism is a philosophy of life that is primarily concerned with human experience. Humanist approaches tend to emphasise teaching the whole child, with a focus on social, emotional and creative needs alongside academic needs.
- Humanists Abraham Maslow and Carl Rogers are known for their work on motivation and the hierarchy of human needs, and on the need for teachers to nurture rather than instruct, allowing children the freedom to grow and learn.
- Humanism in education emphasises children's thinking and feelings, and effective communication rather than the acquisition of information that will quickly be forgotten or become obsolete. The teacher's task is to believe in the potential of every child, and to provide a stimulating environment where children can be happy, motivated to learn and actively involved in learning.
- Concerns about student wellbeing have led some schools to integrate programs teaching social and emotional skills, mindfulness and positive education into school curricula. Research into the effectiveness of such programs is ongoing.
- Progressive education strategies that are used in humanistic classrooms include small groups, individual instruction, flexible timetabling, mixed-ability groups and a reduced emphasis on grading. Examples of the application of humanist ideas in education include individual schools such as A. S. Neill's Summerhill, British infant schools, most early-childhood and lower-primary classrooms in Australasia, and other alternative or non-traditional schools.
- Examples of teaching methods that incorporate humanist principles include cooperative learning, team teaching, peer-tutoring, family-based groups, ungraded schools, open-plan schools and the Dalton Plan.
- Critical features of cooperative learning include students working cooperatively in small groups to achieve shared goals that benefit individuals within the group and the group as a whole. Results of evaluation of these methods demonstrate the efficacy of cooperative learning across a range of age groups and curriculum areas, and in developing positive interpersonal relationships within classrooms.
- Problems noted in cooperative learning have included students lacking the personal and social skills needed to participate successfully in a cooperative group, tasks that are poorly designed, and the teacher's lack of the necessary planning and management skills.
- Critics of humanistic education identify the 'watering-down' of the curriculum and 'coddling' of students as major concerns. However, research has suggested that, provided the programs are not extremely radical, students in child-centred or non-traditional schools are not disadvantaged academically when compared with those in more mainstream schools.
- Most teachers use cooperative activities to complement other, more traditional classroom practices, but these methods often lack the key cooperative-learning elements of individual accountability linked to the achievement of group goals.

ONLINE STUDY RESOURCES

COURSEMATE EXPRESS

Visit http://login.cengagebrain.com and use the access code that comes with this book for 12 months' access to the student resources for this text.

The CourseMate Express website contains a range of resources and study tools for this chapter, including:

- a **self-check quiz**
- **crosswords, flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.

SEARCH ME! EDUCATION

Explore *Search me!* education for articles relevant to this chapter. Fast and convenient, Search me! education is updated daily and provides you with 24-hour access to full-text articles from hundreds of scholarly and popular journals, ebooks and newspapers, including *The Australian* and *The New York Times*. Log in to Search me! through http://login.cengagebrain.com and use the search terms listed in the 'Education databases' section (page 291) as a starting point.

QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1. Explain how humanist approaches differ from behavioural and cognitive approaches to learning and teaching.
2. Identify some specific consequences you might see in classrooms of students' needs at each level of Maslow's hierarchy.
3. How could you use active listening in the classroom? What contribution might this make to your teaching, and to students' learning?
4. What is the importance of including social and emotional aspects of learning? How would you do this in your subject area?
5. How will you contribute to student wellbeing in your classroom? To what extent do your ideas overlap with those of Seligman in regards to positive education?
6. What experiences have you had of cooperative learning? How could your experience have been improved?
7. Think about your own philosophy of teaching and learning. Can you identify elements that could be described as humanist? Are there also behavioural and constructivist elements? In what aspects of classroom experience are humanist ideas likely to be influential? Where would behavioural and constructivist ideas be more appropriate?

KEY TERMS

active listening
basic needs
being needs (B-needs)
deficit needs (D-needs)
growth needs
humanism
jigsaw
non-directive teaching
open education
positive education
prejudice
progressive education
Reggio Emilia
self-actualisation

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'HUMANIST APPROACHES TO LEARNING' AND MATERIAL IN OTHER CHAPTERS

- Social and emotional development are described in Chapter 4. How would teachers' approach to social and emotional wellbeing need to change at different stages of students' development? Identify the social and emotional concerns that are likely to be uppermost for students at each stage of development, and consider how this might be addressed in the classroom.
- Motivation is discussed in Chapter 8. Consider the role that students' wellbeing, social, emotional and other needs play in their motivation to learn. What else plays a role here?
- Chapter 14 discusses the management of classrooms and working effectively with students. What role should students play in this? How could teachers take humanist principles into account in their management decisions and relationships with students?

FURTHER RESEARCH

RECOMMENDED READING

Gillies, R. M. (2007). *Cooperative learning: Connecting theory and practice*. Thousand Oaks, CA: Sage Publications.
Good, T. L. & Brophy, J. E. (2007). *Looking in classrooms* (10th ed.). New York: Allyn & Bacon.
Joyce, B., Weil, M. & Calhoun E. (2008). *Models of teaching* (8th ed.). Boston: Allyn & Bacon.
Killen, R. (2012). *Effective teaching strategies: Lessons from research and practice* (6th ed.). Melbourne: Cengage Learning.

RECOMMENDED WEBSITES

CASEL (Collaborative for Academic, Social and Emotional Learning): www.casel.org
Jigsaw Classroom: www.jigsaw.org
KidsMatter: www.kidsmatter.edu.au
MindMatters: www.mindmatters.edu.au
Positive Psychology Center: www.ppc.sas.upenn.edu

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

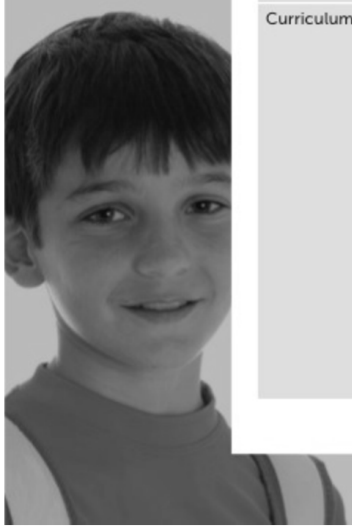
- alternative programs
- alternative schools
- at-risk students
- cooperative learning
- humanistic education
- jigsaw
- learner-centred classrooms
- mixed-age grouping
- non-traditional education
- open education
- positive education
- Reggio Emilia
- social AND emotional wellbeing
- Summerhill
- team teaching.

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

THE LEARNING PROCESS

In this module we have provided an overview of three main approaches to learning and teaching. Take some time to consider your own philosophy of learning and teaching. What elements of each approach will you emphasise? The summary table below might help you

	BEHAVIOURAL EXPLANATIONS OF LEARNING	COGNITIVE EXPLANATIONS OF LEARNING	HUMANIST EXPLANATIONS OF LEARNING
Main focus	Behaviour – learners' actions and activities that are observable and measurable. Learning – permanent changes in behaviour resulting from experience.	Internal mental processes – how learners make information and experience meaningful and remember what they learn; information processing; cognitive style and constructivism.	Human experience – thinking, feelings, communication skills, needs, talents, motivation, self esteem. Learning – personal and emotional development within a caring and supportive environment.
Primary goal	Behaviour change or learning – achievement of defined behavioural or learning objectives.	Effective learning – the cognitive processes that underlie learning, and the complexity of these processes.	Satisfying basic needs and self-fulfilment.
Role of learners	To participate in planned learning tasks to achieve targeted behavioural outcomes.	To work collaboratively with teacher and peers, to negotiate activities and assessment, and encourage involvement.	To become self-directed and active learners.
Role of teachers	A direct role – to assess current skills of students, identify behavioural objectives, design structured teaching programs that involve systematic control of stimuli and continuous feedback to learners, and to achieve planned outcomes efficiently.	To provide learner-centred experiences that encourage student engagement in active learning, confidence in their ability to learn, and opportunities for student–teacher interaction within a learning partnership.	An indirect role – to facilitate learning by providing a stimulating and supportive environment, to actively involve students in learning.
Curriculum	Carefully designed to achieve efficient learning through observation and assessment of behaviour to identify instructional objectives, identification, design and implementation of effective instructional programs, including procedures for presenting material, frequent observation and monitoring of progress, correcting student errors, and modification of program as required (the teach–test–teach cycle).	Designed to encourage and facilitate autonomous learning through planned group activities involving same-age and cross-age partnerships, cooperation with parental or community-based experts, capitalising on student strengths and cognitive style, while also encouraging metacognitive self-knowledge; providing a safe, supportive environment arranged to promote effective interaction and cooperation.	Flexible, based on student interests and needs, allowing each student to negotiate a curriculum and pursue their own interests; cooperative learning, active learning, discovery learning, constructivism.



as you think about your beliefs about the learner's role, your role as a teacher, and some key aspects of your practice.

Before you start, consider the three approaches to learning and teaching you have read about in this module. Which do you prefer as a learner, overall? Which would you prefer as a teacher? Why might this be?

	BEHAVIOURAL EXPLANATIONS OF LEARNING	COGNITIVE EXPLANATIONS OF LEARNING	HUMANIST EXPLANATIONS OF LEARNING
Assessment	Diagnostic, part of the teaching process, a means of monitoring student progress towards identified goals; involving continuous collection of data that are both descriptive and quantifiable.	Provision for individual cognitive styles, with opportunities for students who need recognition of their accomplishments, those who prefer group-based activities and assessments, and reluctant learners who need motivation to become engaged.	Diagnostic rather than formal testing, with students involved in design and implementation of the assessment process.
Most effective uses and target groups	To teach skills, impart information, control behaviour; particularly useful with students who have difficulty in learning as a result of moderate-to-severe intellectual disability or behavioural disturbance.	To understand how information is processed and how the mind works, to provide for individually distinct learning styles, and to help learners to 'construct' knowledge through physical and mental activity in a social context.	To increase motivation, self esteem, empathy; to decrease discrimination, prejudice and bullying; particularly useful with students who are not interested in school, lack motivation or have low self-esteem.
Motivation strategies	Use of extrinsic contingent reinforcement, leading to development of intrinsic motivation.	Students with a 'deep', 'achieving' or 'discovery' approach to learning are intrinsically motivated to do well and use time and resources efficiently to maximise chances of success. Need to provide appropriate incentives to motivate unenthusiastic learners and participants in cooperative learning groups.	Ensure a match between learners' interests and curriculum, encouraging natural curiosity and interest in learning; providing opportunities for choice (see Chapter 8).
Behaviour-management strategies	An interventionist approach, with use of positive and negative reinforcement and punishment, extinction and time out; cognitive behaviour modification and self-regulation.	Ensure students are actively engaged in learning, motivated to succeed, and have the skills needed to participate successfully in social interaction; encourage self-regulation and intrinsic motivation.	A non-interventionist approach, with encouragement of self-direction and responsibility; give students autonomy and responsibility, help them to understand consequences of behaviour and identify solutions (see Chapter 14).
Strengths	Provides effective strategies for teaching new skills quickly and efficiently; particularly useful for helping students with intellectual and behavioural difficulties.	Highlights the importance of students being actively involved in learning within supportive social groups.	Supports personal aspects of development – needs, feelings, self-esteem, motivation, counselling and guidance services for students; social and emotional wellbeing; and reducing discrimination, prejudice, bullying.
Limitations	Focus is primarily on achieving set goals, with little attention to implicit (that is, not observable) thoughts, interests and feelings. Risk of long-term dependence on extrinsic rather than intrinsic reinforcement.	Time, skills and resources needed to create safe and effective learning environment. Students need appropriate skills to participate effectively in groups. Students lacking motivation may have difficulties learning in this type of program.	Limited guidance for teachers helping learners who lack motivation or are disruptive. Evaluation tends to be qualitative rather than quantitative, focused on affective rather than academic outcomes.

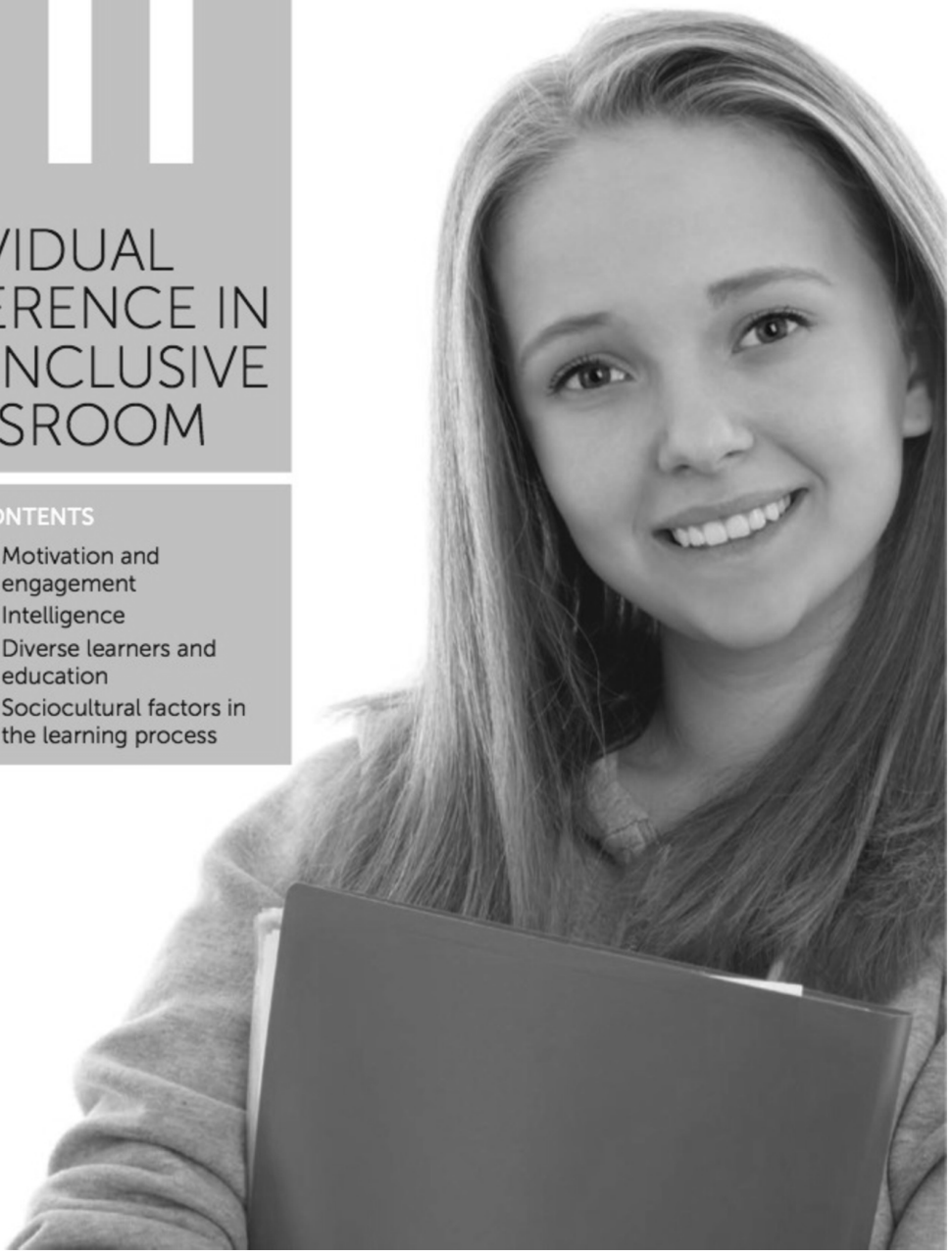
Module

III

INDIVIDUAL DIFFERENCE IN THE INCLUSIVE CLASSROOM

MODULE CONTENTS

Chapter 8	Motivation and engagement
Chapter 9	Intelligence
Chapter 10	Diverse learners and education
Chapter 11	Sociocultural factors in the learning process



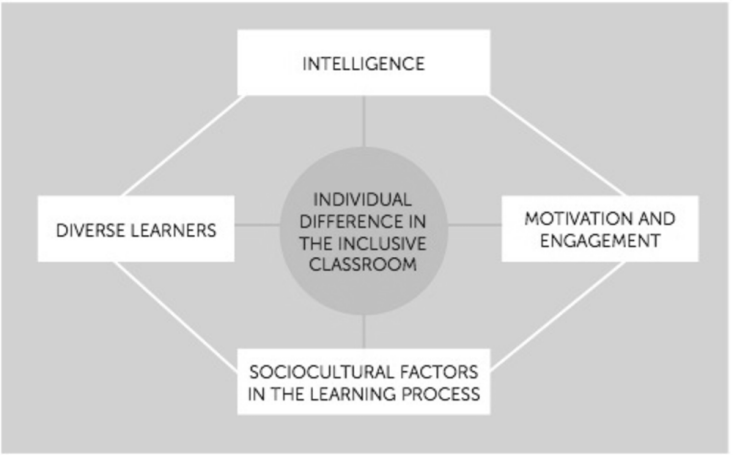


FIGURE MIII Module III concept map

Core question: How does educational psychology help us to understand learner differences?

Each student comes to the learning environment with a different set of experiences, values, interests, needs and abilities. In an inclusive classroom, teachers recognise difference, devise ways to address students' differing needs, and also take into account what each learner brings to the learning process.

School systems and individual teachers also play a significant role in addressing sources of educational disadvantage, and in taking steps to ensure that all learners are catered for and that background factors affecting learning are taken into account. Teachers need to be aware of sources of 'cumulative' disadvantage, and of issues facing students whose cultural backgrounds differ significantly from the dominant culture of the society in which they live.

Chapters 8 and 9 examine motivation and engagement, and intelligence – factors intrinsic to all children, which affect school learning and contribute to differences among students. Chapter 10 considers how to include and support students who have diverse learning needs associated with disabilities and learning difficulties. Chapter 11 addresses the complex sociocultural factors that contribute to student difference – factors that are particularly important in understanding equity in education.

Your understanding of and response to the issues discussed in this module should be central to your development as a critically reflective educator and to your developing philosophy of learning and teaching. As you consider sources of student difference, reflect on how teachers might cater for individual differences to maximise the learning of all their students.

Chapter 8

MOTIVATION AND ENGAGEMENT

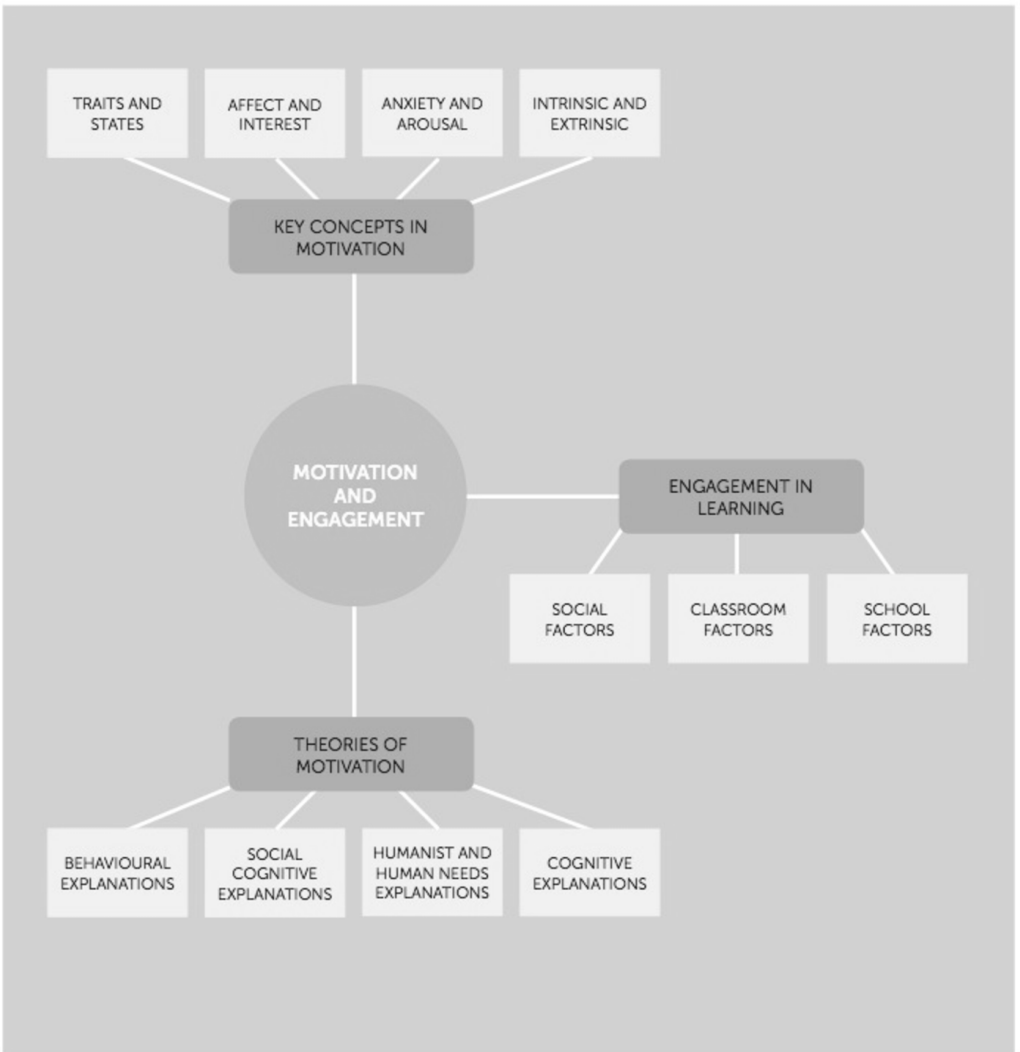


FIGURE 8.1 Chapter 8 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- What is motivation and how does it influence behaviour?
- What are some models of motivation proposed in educational research?
- What is engagement and how does it differ from motivation?
- Can you explain some of the different types of engagement identified by researchers?
- How does engagement influence a student's experience at school?
- Which factors influence or shape engagement in school?

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INTRODUCTION

Ben is in his second year of university and his sister Jodie is in the final year of school. Both students are preparing to hand in major assignments, and they discuss their workloads and social plans.

Jodie is quite focused and has a study plan which she discusses on the phone with her friends before agreeing to meet them at a party at a certain time. Ben groans and says, 'Gee, you're so good! I was never that focused at your age. I'm still not. Wouldn't see me giving up a party any day!' Jodie laughs. 'Yeah, but you're a lazy bones. How many times have I heard you say "Ps get degrees". Do you think a boss is going to want to see that many passes or fails on your record?'

Feeling insulted, Ben replies, 'Oh, come on, a pass is fine'. Waving his hand at the extra books Jodie has borrowed to complete her history assignment, he says, 'Why learn all that stuff if you don't have to?'

'Well,' says Jodie, 'I learn it because I'm interested. This book has stuff we didn't even talk about in class. It's absolutely scary to look into what the bad guys were thinking of doing!'

Ben rolls his eyes. 'Anyway, I'm off to the footy. Enjoy studying!' he taunts.

Jodie shakes her head and says: 'Honestly, Ben! You've got final exams next week. Anyone would think you didn't want to pass'.

Whether or not Jodie's response actually helped Ben think about his study is unknown, but their conversation highlights a range of interesting processes at work. How do students such as Jodie and Ben develop and maintain their motivation over time? Could students actively undermine their own performance by starting a task too late or by going to the footy instead of studying? Does it help to have a feeling of curiosity or interest when we are completing our assignments? Why do some students feel less engaged, like Ben? In this chapter, we will explore these processes and many others by examining the concepts of motivation and engagement in learning.

KEY CONCEPTS IN MOTIVATION

Motivation can be thought of as an internal process that energises, directs and maintains behaviour over time. Each of these components is important. 'Energising' is what starts you off and gets you going. 'Direction' determines what you do, what choices you make or what interests you pursue, while 'maintenance' ensures that this activity continues over time. The concept of motivation is linked to many

motivation
An internal process that energises, directs and maintains behaviour over time

other concepts you have studied so far in this book, such as our feelings of self-concept and self-efficacy (Chapter 4), our ability to focus and maintain our attention (Chapter 6), and our human needs for belonging and security (Chapter 7). Many other factors also contribute to the stimulation of students' interest in learning and their intention to engage in particular activities and achieve various goals.

engagement
The energy that connects and shows our participation in an activity; it consists of behavioural, cognitive and emotional components

Engagement can be described as 'energy in action', reflecting a connection between the person and the activity (Russell, Ainley & Frydenberg, 2005). We can be engaged in several different ways. For example, our *behaviour* can show that we are engaged through signs of paying attention, being on task and following instructions; our *cognitive processes* also show engagement when we are actively thinking about a task and setting goals for ourselves; and our *emotions* can show engagement when we are interested, bored or when we react to teacher feedback (Fredericks, Blumenfield & Paris, 2004).

The terms 'motivation' and 'engagement' are often used interchangeably, as though they describe the same type of behaviour, but they do not. As described by Russell, Ainley and Frydenberg (2005), a student can be motivated by a topic but disengaged in the classroom, and this presents a major challenge to educators. In the remainder of this chapter, we will outline major concepts and theories of motivation, followed by an examination of engagement in the classroom.

There are several key concepts or ideas that need to be explained when considering motivation. The first important concept involves asking whether motivation is a 'trait' or a 'state'. This is closely related to another concept, 'anxiety' or 'arousal', which can also be described in terms of a state. Another pair of concepts, 'intrinsic' and 'extrinsic' motivation, is often encountered in discussion of behavioural theories of motivation (see also Chapter 5). Finally, the concepts of 'affect' and 'interest' are relevant to the role of emotions in learning.

TRAITS AND STATES

trait
An enduring characteristic

Traits are stable, lasting dispositions that motivate us to behave in certain ways. They may be innate (for example, instinctive sex and exploratory drives) or learnt (for example, the need for achievement or power in personal relationships). Traits that are learnt become part of an individual's personality and can be displayed across a range of situations. More temporary forms of motivation are described as **states**. They are usually short-term conditions or feelings, although they can recur and are often innate (for example, hunger and thirst). For example, test anxiety (see below) is a learnt response, but it is best described as a state because it is associated with specific, often short-term situations. Many feelings of motivation are now recognised to be situational or reflective of states in certain situations.

state
A temporary condition or feeling

ANXIETY AND AROUSAL

anxiety
Feelings of tension, uneasiness and apprehension

arousal
Alertness and attentiveness

test anxiety
Fear of performing poorly in tests

Anxiety is a state of **arousal** characterised by heightened alertness and awareness. It is a state described as feelings of tension, uneasiness and apprehension about a particular task or event. The symptoms can vary dramatically in each person or in accordance with a situation, ranging from mild feelings of uncertainty or butterflies in the stomach, to severe sweating, dizziness or fainting. However, it is also a normal response state that enables us to sense danger, escape if we want to, or prepare for a situation. In the context of performance, pianists, dancers, swimmers and golfers say that some anxiety or high arousal is good, provided it does not reach the level where it impedes performance (Hanton & Connaughton, 2002). Performance on any task is usually best when accompanied by a level of arousal appropriate for the activity, such as high arousal before performing or before taking a test, and lower levels for tasks such as reading for pleasure or watching television. The Yerkes–Dodson Law describes a fine balance between a state of arousal and performance (Yerkes & Dodson, 1908). As shown in Figure 8.2, our level of arousal can rise only so high before performance starts to decline. This effect is most evident in **test anxiety** (a fear of performing poorly in tests), which is experienced at some time by as many as

40 per cent of children in the upper primary levels (years 3–6) (Beidel, Turner & Taylor-Ferreira, 1999). Excessive levels of arousal associated with anxiety can lead to poor academic achievement and difficulty adjusting to school (Rodgers & Dunsmuir, 2013).

Increasing levels of anxiety and depression, coupled with a decrease in self-efficacy, have also been observed in students preparing for final examinations such as the Higher School Certificate (Robinson, Alexander & Gradisar, 2009; Smith, 2004a). This effect has been explained in terms of Bandura's (1986, 1997) view of motivation, which asserts that anxiety and depression are experienced in situations where the individual has no control over a potentially adverse outcome (Smith, 2004a, p. 79). Generalised anxiety often results in poor rates of attendance at school and difficulties in learning. Box 8.1 provides more information about recognising and responding to anxiety in children and school students.

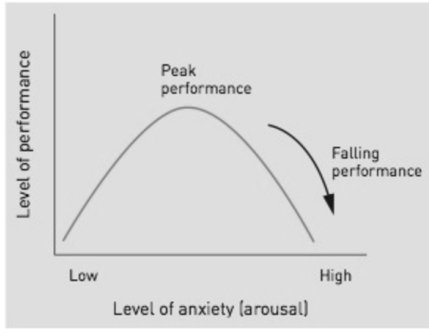


FIGURE 8.2 The Yerkes–Dodson Law predicts a falling level of performance when arousal (or anxiety) reaches a certain level.

INTRINSIC AND EXTRINSIC MOTIVATION

Intrinsic motivation refers to motivation arising from internal factors such as a child's natural feelings of curiosity, excitement, confidence and satisfaction when performing a task. This is the feeling described by Jodie in the opening story, when she explained her discovery of more interesting historical sources. Here, simply undertaking the task is its own reward for Jodie. Intrinsic motivation is the ultimate goal in education at every level. Students who enjoy what they are doing and who learn for the sake of learning are said to be intrinsically motivated (Ryan & Deci, 2000b).

intrinsic motivation
Motivation arising from internal sources, such as an individual's feelings of curiosity, excitement and satisfaction

In contrast, **extrinsic motivation** arises from external sources that can influence us to complete a task. For example, as seen in Chapter 5, behaviourists used the ideas of reinforcement to influence a person or animal to complete a task. This has emerged as a powerful (but controversial) means for teachers or parents to stimulate learning by using extrinsic motivators; that is, motivation arising from the use of external rewards or bribes such as food, praise, free time, money or points towards an activity (see the discussion of operant conditioning theory in Chapter 5, on page 193). These incentives are all external, in that they are separate from the individual and the task. Students who are extrinsically motivated use the task as a means to get something they want (such as praise), or as a means of avoiding something unpleasant (such as punishment or a loss of privileges). This raises a concern that 'extrinsic' motivation may be associated with 'surface' rather than 'deep' forms of learning (see Chapter 6).

extrinsic motivation
Motivation arising from the use of external rewards such as food or praise

Evidence suggests that intrinsic motivation decreases across primary and secondary years, while extrinsic motivation remains relatively steady. The decrease in intrinsic motivation is said to result from increasing pessimism among students about their own performance, decreasing relevance of school to their daily lives, and increasing emphasis by teachers and others within the culture of high schools on performance-based achievement (Deemer, 2004; Lepper, Corpus & Iyengar, 2005). As discussed in Chapter 5, there is a serious concern that too much of a focus on external sources of reinforcement (including things such as an emphasis on performance or grades) might lead to a loss of the student's intrinsic motivation (Ryan & Deci, 2000b). However, other evidence also suggests such a decline in intrinsic motivation is not inevitable. Factors such as the student's prior levels of intrinsic motivation can predict later levels of intrinsic motivation, while a cognitively stimulating home environment seems to protect some adolescents from declines in intrinsic motivation (Anderman & Mueller, 2010).

BOX 8.1 CLASSROOM LINKS

HOW DOES ANXIETY AFFECT LEARNERS?

Many children experience anxiety or fearfulness from time to time. Most children learn to cope with normal fears, but teachers and parents should be alert to the following symptoms that may indicate a child or student needs help:

- The child or student feels more anxious that other children of their age or other learners at their level.
- Their anxiety stops them participating in activities at school or in the social context.
- Their anxiety interferes with or prevents them from doing things other children of their age would normally be able to do.

Anxiety in young people can also manifest itself in physical symptoms such as stomach-aches, headaches, sleeplessness, and stomach upsets like diarrhoea. They can have problems concentrating in the classroom, and become irritable and very tired.

When children and adolescents become more anxious or experience intense feelings of anxiety, they may be diagnosed with an anxiety disorder for which treatment is available. It is estimated that about 2–9 per cent of Australian children and adolescents have an anxiety disorder.

At school, teachers can look out for the following signs of anxiety in their students:

- Student want their work to be perfect, and are dissatisfied with work to the extent that they may repetitively redo tasks or tear up tasks.
- The student is reluctant to ask for help, due to social anxiety; seeking too much reassurance from teachers can also be a sign of anxiety.
- They have problems joining in with other students – meaning students are fearful – or are reluctant to discuss things in class, go on school camps, or play games and sports.
- There are frequent requests to go to the sick bay, due to stomach upsets and other physical symptoms.
- They have a fear of test situations, meaning children do not perform well in tests; they may also be fearful of performing in front of peers.

How can teachers help?

Early assessment and treatment is important. If a teacher is concerned, they should contact the student's parents and seek advice. Teachers can seek advice from qualified professionals such as the school counsellor or student welfare officer, and they should be prepared to work with other professionals to devise a school-based program.

The following principles can guide your approach to helping children with anxiety disorders:

- Assist children to develop 'helpful' coping skills – reassure them that a problem may not be as bad as they think; help them see situations in another light. Social and emotional learning programs (such as those discussed in Chapter 4 and Chapter 14) can also be very helpful.
- Teach by example – model positive coping strategies to your students; remain calm and positive when students are anxious, as this gives them confidence and security.
- Avoid taking over – young people with anxiety may be happy to let people take over tasks for them (or get out of doing a task), but if adults take over for them it stops them learning and prevents the development of coping strategies.
- Encourage learners to 'have a go' – having a go and practising a task helps children know that they can cope; use plenty of praise and encouragement for every step they take.

Source: Adapted from KidsMatter (2015).

ACTIVITIES

1 How does anxiety affect you as a learner? What 'helpful' coping strategies have you learnt that you could model for students?
2 How would anxiety affect a student's motivation and engagement in school?
3 Can you think of some steps you could take to gradually help a child overcome anxiety for a task like public speaking? (See the KidsMatter weblink at the end of this chapter.)

AFFECT AND INTEREST

Apart from the understanding of anxiety and its effect on learning and performance, the role of **affect**, or emotion, has generally been neglected in motivational research (Meyer & Turner, 2006). As described in Chapter 4, psychologists use the terms 'affect' or 'affective states' to refer to emotional characteristics. Emotions include both teacher and student appraisals and responses to situations, and can comprise cognitive thoughts as well as physiological states (such as a feeling of butterflies in the stomach, or a rapid heart rate when we are anxious) (Meyer & Turner, 2006). In the last decade, the importance of emotion in learning has been re-examined (Ainley, 2006). In particular, the emotions that students experience in academic settings are significantly related to their motivation to learn, problem solving, goal setting and self-regulation abilities, while also contributing to negative engagement outcomes such as dropping out of school and poor academic performance (Pekrun & Stephens, 2012).

affect
A psychological term used to describe emotional states such as feelings and moods

There has also been a renewed focus on the role of **interest** in students' motivation and engagement in the classroom. Interest is both a cognitive and an affective state that has been described in many ways, but is usefully summarised by Renninger and Hidi (2011) as a critical motivational variable that guides attention, and is characterised by focused attention and/or engagement with certain objects or events. They even suggest that an interested person may become so absorbed in the object of their interest that they may not even be conscious or aware of this state. Interest has many implications for student engagement in the classroom; this is discussed in the second part of this chapter.

interest
A cognitive and affective state associated with a heightened state of arousal, leading to increased attention, concentration and persistence

THEORIES OF MOTIVATION

Some students, like Jodie, are highly motivated to learn and this continues throughout their years at school or university. Others, particularly adolescents, may feel that school has little relevance to their lives. They become increasingly bored and are generally uninterested in anything that happens in the classroom. Teachers recognise that there is tremendous variation in the level of energy and interest students bring to classroom activities.

Early explanations of motivation focused on instincts or innate patterns of activity (traits) (see, for example, James, 1890; McDougall, 1923). However, there were problems in explaining the relationship between innate processes and learning. Early theories often made no provision for the contribution of other factors – both internal factors (such as needs, goals and expectations) and external factors (such as classroom climates or rewards) – to student learning (Pintrich & Schunk, 1996).

Teachers may also explain the differing motivational levels among their students in ways that reflect their own personal philosophy of learning and teaching. Some teachers focus on the place of rewards and punishment in motivating students to learn. Others are more concerned with students' expectations of success, or the way in which they attribute failure. (Is it one's own fault or someone else's?) Factors that can also influence students' motivation to learn include their observation of peers achieving success or failure, their ability to regulate their own behaviour (for example, to finish homework on time or follow instructions in class) and their need for personal fulfilment.

BEHAVIOURAL EXPLANATIONS

According to the behaviourist view of learning, reinforcements can be given to increase desirable behaviours. When children are rewarded with praise and a gold star for doing their sums correctly, they look forward to the next mathematics lesson, anticipating further rewards. When Pavlov taught his dog to salivate to the sound of a bell (see Chapter 5), he was motivating the dog by associating a pleasant event (eating) with the bell ringing. Associations such as these are present whenever students anticipate some form of positive feedback or reward as an outcome of learning. For behaviourists, motivation is simply the product



Source: Goldfarey/Getty Images

FIGURE 8.3 Could bored students be motivated by extrinsic rewards?

of effective contingent reinforcement, so behaviourists emphasise the use of extrinsic reinforcement to stimulate students' task engagement. Reinforcement can take the form of praise, a smile, or a reward. Almost all teachers use extrinsic reinforcement in some form to motivate students, although they may not realise they are doing so and may not always use such reinforcement effectively (Brody, 1992).

One of the greatest debates of behavioural and cognitive research to emerge over the last century concerns the use of extrinsic reinforcement and rewards to induce learning. In behaviourist laboratory conditions or in specific learning interventions, extrinsic reinforcements and rewards can be used to train a new behaviour or skill. In classroom applications, such reinforcements are frequently used to manage classroom behaviour or increase motivation if the teacher feels the task itself doesn't motivate a student. Do extrinsic rewards work? Is there a risk that extrinsic forms of motivation might undermine the intrinsic drives of learners? The answer to both questions is a qualified 'Yes' (Reeve, 2006).

Extrinsic forms of motivation, particularly in the form of rewards, seem to 'work', at least on initial appearances, for one very simple reason – they make us feel good! Students get particularly excited when teachers introduce rewards into the classroom or if a reward is offered for the completion of a task. However, there is a major qualification to the assumption that extrinsic rewards or reinforcers lead to a permanent and stable change in a student's learning and motivation – when rewards are no longer offered for particular target behaviour, the effect of the reward declines and the behaviour returns to its former level (Reeve, 2006, p. 649). As such, careful use of reinforcement schedules and the gradual fading of rewards and prompts, as described in Chapter 5, is essential if teachers intend to use extrinsic reinforcers to modify behaviour.

Do extrinsic motivators reduce intrinsic motivation for other learning tasks? Although at least three decades of research has examined this question, behavioural theorists and motivational theorists tend to disagree about the virtues of both extrinsic and intrinsic motivation. Generally, researchers opposing the use of extrinsic motivators have found that intrinsic motivation can be undermined by the use of an extrinsic reward (for example, Ryan & Deci, 2000b).

These concerns seem to be supported by recent experimental research. A phenomena known as the 'undermining effect' or the 'overjustification effect' has been identified in experiments where participants are asked to complete an interesting activity and are given extrinsic rewards (such as money) in return for certain performance levels. Afterwards, these same participants are allowed to engage in any 'free choice' activity of their choosing. A number of studies have found that those who were rewarded spent significantly less time engaging in the free choice activity. Neuroimaging studies have shown that activity in key areas of the brain had declined, no longer supporting engagement in the task. It seems the reward had in fact reduced intrinsic motivation for the previously interesting activity or materials (Murayama, Matsumoto, Izuma & Matsumoto, 2010). In fact, similar types of studies have shown that extrinsic monetary rewards may enhance memory performance, but only when the materials or questions were boring! (See Murayama & Kuhbandner, 2011.)



THINK ABOUT

1. Why do you think the brain responds differently after rewards have been given for previously interesting or engaging activities? What could explain the 'undermining effect'?
2. Why do you think memory performance was enhanced only for 'boring' materials?

Behaviourists agree that it can be very unwise to use extrinsic rewards in the case of a student who is already motivated to perform at the desirable level, or to use material items or privileges for rewards in the absence of other forms of social approval (Landrum & Kauffman, 2006). Nonetheless, they maintain that judicious and very careful use of extrinsic reinforcers may be helpful when there is a complete absence of intrinsic motivation, and when the student behaviour is very difficult to manage. In fact, recent research looking at different *types* of extrinsic reinforcers tends to suggest that certain extrinsic reinforcers may be useful in fostering motivation if teachers apply them very carefully. Essentially, these researchers have distinguished between different types of extrinsic rewards: verbal rewards, tangible rewards, and expected or unexpected awards.

- *Verbal rewards* are things like verbal feedback or praise, also called positive feedback. Research identifies two forms of verbal rewards with differential outcomes: *contingent* and *non-contingent* verbal rewards. Contingent verbal rewards deliver contingent information related to the actual performance or task and are positively motivational; for example, 'You used that strategy really effectively to solve the problem'. Non-contingent verbal feedback statements are often used for managing or controlling behaviour (for example, 'You should keep working hard') whereby the controlling element of the statement undermines the intrinsic motivational effect (Deci, Koestner and Ryan, 2001). In a research study, Burnett and Mandell (2010) found that teachers are much less likely to use praise or verbal feedback about effort and ability (used 12 per cent of the time) compared with high use of generalised and vague non-contingent praise such as 'Good girl!' (77 per cent of the time).
- *Tangible rewards* include things such as trinkets or tokens (stickers or food), and early research identified that these undermined intrinsic motivation (for example, Wiersma, 1992). As discussed above in relation to monetary rewards, there is a concern that these type of rewards interfere with *learning processes*, forcing learners to attend to the reward more than to their work, sometimes taking easier task options, or cutting corners to gain the reward (Reeve, 2006). Research has found that tangible rewards *can* support intrinsic motivation if they are closely matched to the desired behaviour (that is, the reward is *contingent*). For example, in another relevant research study, Marinak and Gambrell (2008) conducted a reading intervention where students were given different types of rewards for good reading. Non-contingent rewards such as trinkets (bracelets, balls or key-chain tokens) were *less effective* in motivating students in comparison to highly contingent rewards such as books which were more effective as rewards for reading improvement.
- *Expected rewards* are those offered in advance of task completion; for example, 'If you achieve a certain level or grade, you will earn this prize or reward'. Various meta-analyses have identified negative effects. Deci, Koestner and Ryan (1999) found that expected tangible rewards undermined measures of intrinsic motivation, including interest in the task and free choice (the time spent on tasks after the reward was removed). This is also described and is evident in the experimental studies of monetary rewards discussed above. In contrast, researchers have found that *unexpected* rewards do not demonstrate the same negative effects on motivation (Reeve, 2006). In other words, unexpected rewards could possibly maintain a motivational purpose, but we would have to take care as teachers that these unexpected rewards do not inadvertently become expected by certain students because of their academic prowess or for other reasons.



Source: Getty Images/JGI/Jamie Grill

FIGURE 8.4 Simple tokens, such as star charts and stickers, might interfere with the learning process. Why?

THINK ABOUT

- Many teachers employ gold stars or sticker charts to reward students or encourage motivation. What type of extrinsic reinforcement is being used, and what are the likely consequences for student intrinsic motivation?
- Have you ever received an unexpected reward? Was it motivational?

SOCIAL-COGNITIVE EXPLANATIONS

As discussed in Chapters 4 and 6, Albert Bandura (1977) questioned the behaviourist emphasis on extrinsic sources of motivation, and instead saw motivation as a goal-directed behaviour that is closely linked to feelings of personal effectiveness or self-efficacy. This view of learning suggests that each individual possesses human agency and a capacity for self-regulation that affects their motivation and influences their personal engagement in activities (Bandura, 2001). Bandura's work has informed us that human beings, as agents of their own lives, have the capacity or forethought to organise and direct their lives and motivate themselves. They are also capable of self-regulatory behaviours such as setting goals, monitoring achievements, reflecting on their own behaviour and forming beliefs about their capability to exercise control over events in their lives. This pathway from goals to self-beliefs is illustrated in Figure 8.5.



FIGURE 8.5 Our capacity to set goals and self-regulate our behaviour (monitor progress) contributes to self-efficacy, motivation and learning.

Goals are one of several motivational processes associated with social-cognitive theories of learning and motivation. Social-cognitive theory, driven by the idea of triadic reciprocal causation (see Chapter 6), proposes that humans are constantly interacting with other environmental factors that also explain and shape their behaviour. Several motivational processes arising from this theory have been identified, as shown in Table 8.1.

Social-cognitive explanations of motivation consider our conscious and regulated cognitive processes, and also propose that these personal cognitive processes interact with and shape our behaviours. However, this theory also acknowledges that our behaviour influences our environment, while the environment, in turn, can influence our cognitive beliefs and behaviours. As we explore other humanist and cognitive views of motivation in this chapter, you will learn that these concepts of self-efficacy, goals, values, outcome expectations and so on appear in several cognitive motivational theories. Furthermore, these cognitive theories also recognise multiple sources of influence on individual motivation.

TABLE 8.1 Social cognitive processes and motivation and learning outcomes

SOCIAL-COGNITIVE PROCESS	MOTIVATION AND LEARNING OUTCOME
Goals	To enhance motivation, goals should be: • *specific* – a clear, achievable task or outcome identified • *proximal* – achievable in the near future; longer-term or more distant goals are not as motivating • *the right level of difficulty* – set against an appropriate standard and not too easy or too hard.
Self-evaluations	Self-evaluations and self-monitoring provide important feedback. Positive self-evaluations are very motivational, while also allowing us to redirect and maintain our attention. Self-evaluations must be realistic and based on relevant criteria.
Self-efficacy	Arises from self-evaluation of our performance on a task. The positive 'can do' sense of self-efficacy arises from mastery experiences. A poor sense of self-efficacy undermines future performance. Self-efficacy must be based on realistic self-evaluation against important and relevant criteria.
Outcome expectations	People form expectations based on personal experiences and observations of models; for example, 'If I make a study plan like Jodie, I might do better on tests'. Expectations can influence approaches to a task.
Value	The perceived importance or usefulness of the learning task. Learners are agents of their own values and hence motivated by what they value and deem important.
Social comparison	People can set performance standards by comparing themselves with other people; comparisons to people most similar to oneself are most effective for enhancing motivation and supporting a realistic self-efficacy.

Source: Adapted from Schunk (2012).

HUMANIST AND HUMAN NEEDS EXPLANATIONS

Humanist approaches to motivation are interesting not only because they help explain achievement and learning, but also because they consider students' welfare and wellbeing through a concern for basic human needs. Maslow (1954) perceived motivation in terms of a hierarchy of human needs (see Chapter 7) that can also be conceived as 'motives'. According to Maslow's model, once basic physiological needs have been satisfied, efforts are directed towards higher-level human needs associated with safety, love and belonging, and eventually self-esteem (see Figure 7.3 on page 266). Maslow called these deficit needs (or D-needs) and claimed that the challenges arising from them led to healthy self-esteem and motivation for further achievement and self-actualisation. Since, for most people, the highest state of self-actualisation is theoretically never fully attained, motivation to achieve the fullest development of talents and capacities is never satisfied, and continues throughout life.

Needs-based theories of motivation, including Deci and Ryan's (2000) **self-determination theory** of human needs, have been further developed. Self-determination theory is based on the premise that the human being is naturally inclined towards achieving a close integration of their own internal psychological make-up, and between themselves and their social world. In order to achieve this, three basic human needs must be satisfied:

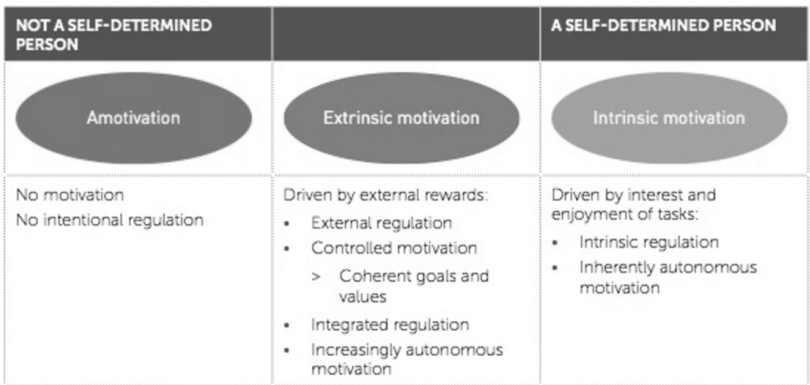
self-determination theory
People have a basic psychological need for autonomy, a sense of competence and relatedness to other people

- *Competence* – the psychological need to feel effective in interactions; the desire to exercise one's capabilities and master challenges
- *Autonomy* – an inner sense of an integrated self and an internal locus of causality; the desire to be determined by our own actions and not the forces of others

- *Relatedness* – the psychological need to feel emotionally connected and close to others; to form close bonds and attachments (Reeve, 2006; Ryan & Deci, 2000a).

These basic needs are believed to underpin our capacity for growth, and are critical for social development and wellbeing (Ryan & Deci, 2000a). If these needs are not met, our capacity for self-motivation and reaching our goals may be undermined.

Self-determination theory also has a major interest in extrinsic and intrinsic states of motivation. The main proponents of this theory, Deci and Ryan, are very active in the debate about extrinsic rewards noted previously. In accordance with self-determination theory, extrinsic motivation is not an ideal state for the human being. Rather, a truly self-determined person is said to be intrinsically motivated. This theory proposes that our capacity for self-determination can be viewed on a continuum ranging from a person who experiences amotivation (a complete absence of motivation) to a completely self-determined person who is intrinsically motivated (see Figure 8.6). In contrast, a person who is not fully self-determined is influenced by a range of external factors that can drive and motivate them. A self-determined person is said to be completely autonomous in their self-motivation, needing no external drivers.



Source: Adapted from Gagné and Deci (2005); Deci and Ryan (2000).

FIGURE 8.6 The self-determination continuum showing motivational approaches, self-regulation and sense of autonomy.

autonomy-supportive
Teacher behaviours that foster students' intrinsic motivational resources

Within the classroom setting, teachers can support self-determination and motivation by practising **autonomy-supportive** strategies that enable self-determination and the development of intrinsic motivation (Reeve, 2006). Autonomy-supportive teachers (see Box 8.2) foster an understanding relationship with their students in which they allow students to have personal choices and provide opportunities for decision making. They acknowledge students' feelings and allow for self-direction. In contrast, some teacher behaviours can crush student autonomy, including those that are controlling and offer extrinsic rewards, threats, deadlines and pressures to coerce performance (Ryan & Deci, 2000a).

You may be starting to notice that social-cognitive and humanistic approaches to motivation have many similarities, and some of the language or terms used overlap. These theories represent an important shift in motivational research that acknowledged not only cognitive processes that shape and direct behaviour, but many internal processes such as interest, self-regulation and value of the task that also shape student motivation. These ideas are further explored in the following cognitive theories of motivation.



BOX 8.2 CLASSROOM LINKS

AUTONOMY-SUPPORTIVE TEACHING STRATEGIES

Teachers can apply the principles of self-determination theory by using autonomy-supportive teaching strategies outlined in Table 8.2 (Reeve, 2006). The strategies reflect the philosophy of the theory, while the classroom actions suggest teacher behaviours that can support autonomy and self-determination.

TABLE 8.2 Autonomy-supportive classroom strategies

AUTONOMY-SUPPORTIVE STRATEGY	CLASSROOM ACTIONS
Nurture inner motivational resources	Coordinate instruction with students' preferences or interests; provide a sense of challenge and choice; avoid external regulators
Use informational, non-controlling language	Messages are informative and flexible, not rigid and controlling; use language to help students control and regulate their own learning, not to be coercive or threatening.
Communicate value, provide rationale	Explain the purpose and rationale of activities and tasks to students, especially when the task appears of little value to students; accept that teachers sometimes ask students to do things that seem to have little purpose.
Acknowledge and accept students' negative affect	Accept that students' negative affect can sometimes be a response to rigid and controlling language. Negative affect may be a genuine reaction to difficult or boring tasks; encourage discussion of affect.
Autonomy-supportive behaviours	• Listening carefully • Create opportunities for students to work in their own ways • Provide opportunities to talk • Arrange learning materials and seating patterns so students are active, not passive • Encourage effort and persistence • Acknowledge signs of mastery and improvement • Offer progress-enabling hints when students are stuck • Be responsive to students' questions and comments • Communicate clear acknowledgement of student perspectives.

Source: Adapted from Reeve (2006).

COGNITIVE EXPLANATIONS

Some of the most well-researched theories of motivation have arisen from cognitive explanations of motivation. These theories generally accept that children are innately active learners (that is, constructivist or social constructivist approaches), but the focus of this research is often on processes that help explain the link between cognitive processes and achievement or performance in school. Originally, McClelland, Atkinson, Clark and Lowell (1953) used the term 'achievement motivation' to refer to this process. Cognitive processes have since been extensively examined as sources of motivation (or lack of motivation) in schooling. Several of these theories will now be explored.

Achievement motivation theories

achievement motivation
The need to strive for success

approach success
A stable motivational tendency to strive for success by tackling moderately difficult tasks with a high expectation of success

avoid failure
A stable motivational tendency to avoid tasks because of a fear of failure and an expectancy for failure on tasks

John Atkinson (1957) and David McClelland (McClelland, Atkinson, Clark & Lowell, 1953) described the need for achievement, or **achievement motivation**, as a stable personality characteristic that drives some individuals to strive for success. Atkinson explained achievement motivation in terms of the learner's tendency to **approach success** or **avoid failure** in the learning task. The approach-success tendency is associated with students who have a high need for achievement and are motivated to become involved in an activity if they believe they will be successful. These students are moderate risk takers and tend to be attracted to tasks where the chances of success are 50-50, since there is a good chance they will be successful. They like to attempt a task, but not if they know there is a substantial risk of failure. Such students tend to hold mastery goals and are intrinsically motivated to learn.

However, students who have a need to avoid failure, rather than a need to achieve success, will look for tasks that are either very easy and have little risk of failure, or very difficult so that failure is not their fault (Atkinson, 1964). Students who cannot risk failure will avoid an activity when their anxiety about failure is greater than their need for success. The important point here is to recognise that students do not always try to be successful. For some students, and in some situations, the risk of attempting a difficult task can be too great as a result of an overwhelming need to avoid failure (Biggs & Moore, 1993; Galloway, Rogers, Armstrong & Leo, 1998).

Implicit theories of competence and ability

entity theory
A belief that intelligence and ability are fixed traits, and not malleable or easily changed

incremental theory
A belief that intelligence and ability are changeable states that are able to grow and develop

Carol Dweck and colleagues have shown that students may hold implicit theories about the nature of competence, ability or intelligence that can influence their achievement motivation. Two main theories of ability or intelligence have been identified in this research. Students with an **entity theory** of ability believe that intellectual ability is something that is fixed and unchangeable. Students with an **incremental theory** of intelligence believe that intellectual ability is something that can change over time, that it can be grown and developed (Yeager & Dweck, 2012). Children holding incremental views tend to believe that they can achieve success in an activity by trying and persevering. These students hold strong learning goals that tend to reflect mastery beliefs. In contrast, students holding entity beliefs tend to focus on their capacity to learn as an inherited trait or beyond their control, and hence the notion of effort or trying harder is viewed negatively (Dweck & Molden, 2005). In some cases, students believe that putting in effort simply validates their lack of ability in an area.

Dweck and colleagues also refer to these implicit theories as *mindsets* about our abilities. In a research study with Grade 7 students, they identified students with a fixed mindset (entity theory) about their ability. These students believed they could not change, that effort and trying were not worth it and made you look 'dumb'. Such students reported that if they didn't do well on a test, they would simply give up or even cheat on future tasks. In contrast, students with a growth mindset (incremental theory) believed they could grow and change, and reported that if they didn't do well on a test or task, they would work harder in class in the future and spend more time studying for tests (Blackwell, Trzesniewski & Dweck, 2007). Research by Dweck and colleagues has also shown that mindsets develop very early in life and are shaped by environmental conditions such as sources of feedback from parents of teachers. In particular, the use of praise by parents and teachers is strongly implicated in the type of belief mindsets formed by children or students.

Early research identified the 'praise problem' in Grade 5 students. Mueller and Dweck (1998) gave the students 10 questions from a fairly easy non-verbal IQ test (see Chapter 9). They split the students into two groups. One group received *intelligence praise* such as 'Wow, that's a really good score. You must be smart at this'. The other group received *process praise* such as 'Wow, that's a really good score. You must have tried really hard'. They found that those students praised for their intelligence slipped into a fixed mindset more easily. In subsequent trials, these students avoided challenging task options,

and their grades on another easy test actually declined in comparison to the earlier test. In contrast, those praised for process or effort wanted a harder task, showed more persistence, and did well on the next test. More recent research shows these effects start early in life. For example, mothers praise to their one- to three-year-old babies predicted the child's mindset and desire for challenges five years later (Gunderson et al., 2013), and mothers praise to 10-year-olds about their school work was predictive of students who held an entity view of their intelligence.

Dweck and colleagues now encourage parents and teachers to develop a growth mindset in their children and students. There are some simple steps and strategies teachers and parents can use to achieve this. It is also possible for any of us to use these strategies to develop our own growth mindset.

One step is to praise effort and processes – not abilities, intelligence or other fixed traits. Praise for the processes used emphasises strategies or skills the child should repeat, and motivates the child to try these in the future. Young people should also be explicitly taught about the brain and simple neuroscience. Students who learned that the 'brain is like a muscle'(the more you work it, the stronger it becomes), and were taught that learning prompts more neurons to grow, had significant improvements in performance and motivation (Blackwell, Trzesniewski, & Dweck, 2007). In addition, encourage students to seek challenges, not easy successes. Easy success can confirm for some students that effort is not needed, or they don't have to try hard. Learning from setbacks is a characteristic of growth mindsets and mastery-oriented learners.



THINK ABOUT

- It is also known that adults and teachers have mindsets about ability. What types of teacher classroom behaviours might reflect a fixed mindset of the teacher?

Expectancy-value beliefs

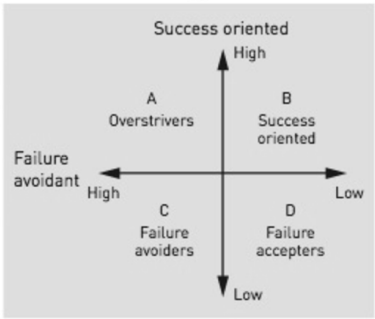
Other researchers have also explored motivation through achievement and competence theories. Expectancy-value theory considers learners' expectations of success and the value they give to that success (Eccles, 1983; Wigfield & Eccles, 2000). It is believed that a student's expectancy for success on a task interacts with their perceived value of the task, and this, in turn, influences the academic choices they make, the goals they set and ultimately their motivation. Expectancies are shaped by the person's expectation of succeeding or not doing well on a task. Values pertain to the value of the task to each individual. Four key task values have been identified:

1 *intrinsic value* – the personal enjoyment the student receives from doing that task
2 *utility value* – the importance of the activity to a future goal that the student may hold, such as attaining a qualification or advancing towards a career goal
3 *attainment value* – the importance of actually doing well on the task
4 *cost value* – the 'cost' or toll that involvement in the task may take on other physical or emotional resources, such as taking time away from other activities, or causing stress or anxiety.

It seems that the values of tasks are related to the initial drive to approach a task or choice of a task, but it is expectancies that are most strongly linked to motivation. This may be because expectancies are related to our beliefs about ability, as noted by Dweck. Wigfield and colleagues have also found that students' ability beliefs decline across the high school years (Wigfield et al., 2006). Students' intrinsic, attainment and utility values of tasks also decline across the years of schooling. These findings have strong implications for students' engagement in schooling and suggest that teachers must work hard to promote the value of tasks to learners, while also helping them set goals and build appropriate expectancies for success.

Self-worth theory of motivation

CourseMateExpress
Online resources
Go further: Learn about strategies for developing achievement motivation on this text's website.



Source: Adapted from Covington (1992).

FIGURE 8.7 The overlapping influences of students' needs to avoid failure and strive for success.

The original theory of achievement motivation was later adapted and integrated with a self-worth theory of motivation (Covington, 1992, 1997). The self-worth motivation theory was proposed by Beery (1975) to account for the role of self-worth in explaining students' need to avoid failure and hence protect their self-worth. Covington combined the approach-success and avoid-failure dimensions with the self-worth theory to explain the behaviours of learners when they are motivated by the need to protect their self-worth. Covington and colleagues proposed that all learners, except the most optimistic and success-oriented, are driven by a need to avoid failure (see Figure 8.7).

As shown in Figure 8.7, most learners are affected by the overlapping influences of a need for success *and* a need to avoid failure. This combination could lead to some students becoming *overstrivers*. Overstrivers work hard to ensure success as a means of avoiding failure. On the other hand, learners can become *failure avoiders*, an approach characterised by learners who are more concerned about avoiding failure than gaining success on a task. These learners might make excuses for poor performances, set themselves low standards, or even avoid studying in order to show that it was their lack of effort rather than lack of ability that led to failure. These learners seek to protect their self-perceptions of ability by avoiding any circumstances that might lead to failure (Covington & Omelich, 1991).

self-handicapping
Actions or choices an individual makes to prevent or hinder performance or achievement

defensive pessimism
A defensive or protective cognitive strategy to lower expectations and hence protect the sense of self when faced with negative outcomes

Australian researcher Andrew Martin has extensively studied the implications of students' achievement orientations. In particular, Martin and colleagues have focused on the strategies students employ when they are faced with the dual motives to approach success and avoid failure. One of these strategies is known as **self-handicapping**. These learners place obstacles or create impediments on the pathway to successful performance. These impediments allow the learner to make an excuse for failure in a way that does not deflate their sense of competence (Martin, Marsh & Debus, 2001). Classic self-handicapping strategies include procrastination, reducing effort or avoiding practice for an upcoming task or test (Martin, Marsh & Debus, 2001). These are the types of strategies that Ben suffered from in the opening story of this chapter. Another strategy is known as **defensive pessimism**. Defensive pessimists are thoughtful about the task at hand and their likely performance. They will defensively set lower goals and expectations on tasks that are easy for them to achieve. In this way, defensive pessimism can be protective, 'cushioning the person's failure' by setting safe and low standards against which they will be judged (Martin, Marsh & Debus, 2001, p. 587). Martin integrated many of these concepts into an explanatory framework known as the Student Motivation and Engagement Wheel (see Box 8.3). This conceptualisation of motivation and engagement is unique in that it integrates information from several theories of motivation. These include theories of achievement motivation, self-worth theory and attribution theory, as well as social-cognitive theory and other relevant motivational constructs.

CourseMateExpress
Online resources
Explore your own motivation and engagement wheel with the **Interactive Activity** on this text's website.

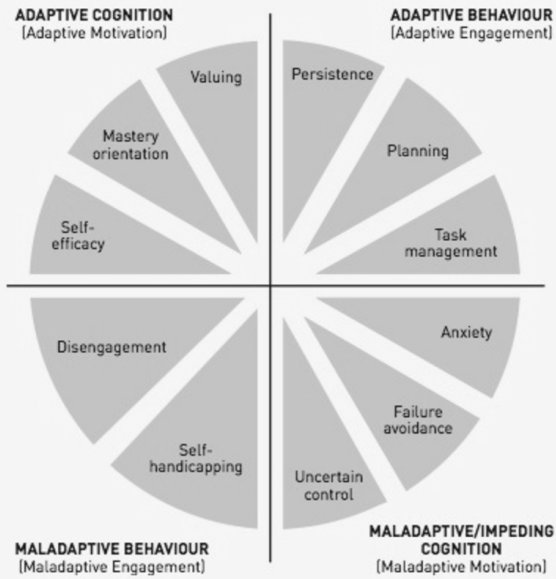
BOX 8.3 RESEARCH LINKS

THE STUDENT MOTIVATION AND ENGAGEMENT WHEEL

Andrew Martin (2003a, 2003b, 2007) evaluated a framework of student motivation known as the Student Motivation and Engagement Wheel (see Figure 8.8). The wheel describes the role of adaptive and maladaptive factors that support or hinder motivation. Martin's research investigated whether these motivational effects were associated with stages of schooling, or whether boys and girls were affected differently.

Boosters, guzzlers, mufflers and school achievement

Adaptive thoughts and behaviours were positively associated with higher achievement on school tests, and self-belief and persistence were associated with higher literacy and numeracy scores. Martin has referred to these as *boosters* of motivation. Maladaptive behaviours (also called *guzzlers* of motivation) include self-sabotage or self-handicapping behaviours that were associated with the lowest scores on school tests. Feelings of uncertain control, anxiety and failure avoidance tend to *muffle* motivation in some circumstances and generally reduce performance.



Source: Martin (2012). Copyright © 2012 by Springer. Reproduced with permission of Springer Science+Business Media.

FIGURE 8.8 The Student Motivation and Engagement Wheel.

Stages of schooling

Senior-school students performed best on measures of adaptive motivation boosters and lower on measures of maladaptive guzzlers. They experienced the highest levels of anxiety, however, which can potentially muffle motivation.

Middle-school students (mainly Year 9 students) scored significantly lower than other year groups on all types of adaptive boosters.

Junior-school students (mainly Year 7 students) scored higher than middle-school students on all boosters, but scored lower on indicators of control and had higher levels of failure avoidance and self-sabotaging strategies.

Gender effects

Girls reported significantly higher scores than boys in several types of adaptive cognitions, including the value of schooling, their focus on learning, and adaptive behaviours such as persistence, planning, monitoring and study-management skills. Girls reported higher anxiety scores while boys had higher scores of self-sabotage and self-handicapping.

Summary

Martin's motivation and engagement wheel is a useful way of explaining adaptive behaviours to students, and working towards reducing maladaptive sabotaging behaviours and anxiety-provoking situations.

ACTIVITIES

1 Try the motivation and engagement wheel for yourself. Are you higher on 'boosters', 'guzzlers' or 'mufflers'?
2 Why do you think Year 9 students have such low levels of adaptive boosters? (We will look more closely at adolescent engagement in the following section of this chapter.)
3 Can you think of a strategy or lesson plan where teachers could introduce these ideas to students?

Attribution theories

attribution theories
Theories concerned with the way in which an individual's explanations of success and failure influence subsequent motivation and behaviour

What happens when students like Jodie and Ben experience success or failure? How do they explain these different outcomes? **Attribution theories** are concerned with the way in which an individual explains success or failure, and how these explanations influence subsequent motivation and behaviour. Learners may attribute success or failure to different causes, depending on their beliefs about who or what 'controls' their success and failure. Jodie might say, 'I didn't do so well on the history essay because I focused on one source too heavily. I'll include more sources next time'. In contrast, if Ben doesn't do so well on his upcoming exams, he might say, 'Stupid lecturer always sets bad exams'. These types of statements about failure experiences highlight three important features of our explanations of success or failure.

- *Internal or external causes:* The factors to which a learner attributes success or failure may be internal or external to the learner. When learners consistently attribute success or failure to internal factors such as their own ability or effort, like Jodie, they are said to have an 'internal' **locus of control**. Those with an 'external' locus of control are more likely to attribute success or failure to external causes such as luck, task difficulty, or perhaps poor teaching, as Ben appears to be suggesting.

locus of control
A tendency to attribute success or failure to internal (controllable) or external (uncontrollable) factors

- *Stable or unstable causes:* The cause or reason that learners give for success or failure may be stable (such as their aptitude or ability) or unstable (such as their mood at the time of a test). Can you tell if Jodie and Ben's explanations reflect stable or unstable factors?
- *Controllable or uncontrollable causes:* The third element concerns the controllability of the factors influencing performance. This might involve the amount of effort expended on a task (controllable), or the degree of difficulty or quality of the examination questions (uncontrollable) (Weiner, 1992).

Students who have a high need to achieve tend to attribute their success or failure to their own internal factors, such as ability and hard work (in the case of success) or inadequate preparation and lack of effort (in the case of failure). Clearly, Jodie indicates a high need to achieve, but recognises inadequacies in her own essay writing. Students who are low achievers and need to avoid failure are likely to attribute their success or failure to factors external to themselves, such as 'luck' (in the case of success) or 'a very difficult exam paper' (in the case of failure). Attribution theory provides a framework for explaining these different responses.

But what is the function or outcome of these attributions? Weiner subsequently identified an important series of connections between our attributions and emotions that could further influence our future behaviours. For example:

> If a learner attributes success to internal attributes (e.g., high ability) → *pride*
> If a learner attributes failure to internal controllable causes (e.g., lack of effort) → *guilt or regret*
> If a learner attributes failure to internal uncontrollable causes (e.g., low ability) → *shame, embarrassment*
> Stable causes of failure (e.g., unfair teacher) → *hopelessness*
> Unstable causes of failure (e.g., bad luck) → *hope*

Source: Adapted from Weiner (2010).



THINK ABOUT

- Weiner's list of emotions above does not include feelings such as anger or blaming others for our failures. What type of attributional style might lead to such emotions?

Further research has indicated that a range of negative emotions such as anger can indeed arise from uncontrollable situations where the learner feels a sense of helplessness (for example, Pérez Nieto et al., 2000), or when students or adults are victimised or bullied (for example, Aquino, Douglas & Martinko, 2004).

The motivational impact of these different attributions is quite important to consider. Although attributing failure to unstable external causes such as bad luck could actually be quite protective, allowing the individual to protect their self-concept, attributing failure to stable internal causes such as ability and the subsequent emotions of shame could be quite damaging to motivation. Neither attribution is particularly adaptive. For example, it is not helpful to always attribute everything to good or bad luck, because this places no responsibility on the learner to expend effort or take responsibility for their learning. It may also be limiting if learners believe they lack the ability or are not 'smart enough' to do well, as this may be associated with the tendency of these learners to give up easily and avoid learning. Perhaps it is not surprising that internally oriented students are more likely than externally oriented students to be viewed positively by their teachers (Schraw & Aplin, 1998). Such teacher-related and classroom effects will be examined later in this chapter.

A key feature of the attribution model is its recognition of both cognitive and emotional influences on motivation. In particular, the attribution model links the impact of emotions with internal perceptions of causality, such as when students feel pride when they think a success is due to their own efforts. Bernard Weiner (1992) showed that students are most likely to feel satisfied when they reach goals they have set themselves, rather than when they reach goals set by others. Aspirations tend to be based on prior experiences, with people who have previously been successful having higher expectations, as well as trying harder and working longer, than those who have previously experienced failure.

There is considerable variation among students in the type of attributions they make. One of these variations is due to the age of the student. For example, there is evidence that younger children do not differentiate between ability and effort; they believe that the harder they try, the better they will do. They believe that working harder will increase their ability: 'Studying harder makes your brain bigger' (Harari & Covington, 1981, cited by Covington, 1998, p. 82). However, the belief that ability can be improved by increased effort gradually changes to a recognition that ability and effort are two different things, and a lack of ability can limit the effect of effort on changing one's chances of success (Nichols & Miller, 1983). This developmental trend was confirmed in a recent study in which younger children conflated the meaning of ability and effort, believing that smart students work hard, while older students recognised that ability and effort do not necessarily go hand in hand, with smart students not having to work as hard (Folmer et al., 2008). By the early years of adolescence, students begin to believe that ability is not only distinct from effort, but is also fixed (Covington, 1998).

There is also variation among groups in typical patterns of attribution, reflecting the contributions of culture and feedback from others. For example, females are more likely than males to attribute failure to ability, and success to luck (see Chapter 11). In a study that compared Chinese and Japanese students with American students, Stevenson and Lee (1990) found that the American students were more likely to attribute academic success to ability, while the Chinese and Japanese students tended to emphasise effort as the cause of success.

There is some evidence that students' attributions, particularly when they are maladaptive and negative, can be modified (see, for example, Borkowski, Weyhing & Carr, 1988; Foersterling, 1985). Attempts to modify attributions are known as 'attribution retraining approaches'. These methods have been used primarily in settings that involve students with special needs, and particularly in situations involving learnt helplessness. The focus of such interventions is to change the student's maladaptive attribution to a more helpful belief pattern. For example, instead of falling into frustration or anxiety, they are taught to retrace their steps to figure out where they went wrong in a problem, to concentrate on the task itself, and to attribute failures to things they can change, rather than stable factors such as a lack of ability (Brophy, 1998).



THINK ABOUT

1. Think about tests or assessments you have completed recently and consider the following scenarios. Write down your thoughts and feelings about why you performed in the way you did.
   a You earned a good grade.
   b You didn't do as well as you expected.
2. Return to the definitions of internal/external, stable/unstable and controllable attributions. Evaluate your responses against each of these criteria.
3. Now think about the motivational effect. How does your attributional response influence your study patterns, your belief in your own ability, and your hope of success in the next task?

Goal theories of motivation

Goal theories of motivation are also known as achievement goal theories and arose from early theories of achievement motivation. Goal theories are essentially concerned with two overarching goal structures that learners associate with tasks to be performed: mastery and performance. **Mastery goals** are closely related to the concept of intrinsic motivation and are widely viewed as the ultimate achievement goal, and associated with persistence and effort in academic tasks. In addition, students with mastery orientations are more likely to employ deeper thinking strategies associated with self-regulation and metacognition (Coutino, 2007; Elliot, McGregor & Gable, 1999; Vrugt & Oort, 2008). These students are less likely to engage in the self-handicapping strategies discussed earlier in this section, and are more likely to be motivated to move on to advanced studies in the subjects in which they experience a mastery orientation. However, **performance goals** have typically been viewed as a less-desirable approach to achievement. These learners are driven by the extrinsic goals of the task – that is, performing well and earning good grades – and may exhibit the avoidance strategies suggested earlier.

mastery goal
A personal objective to achieve mastery of a task or skill

performance goal
A personal objective to perform well in an area of achievement

performance-avoid goal
A personal objective to complete academic work in order to avoid appearing incompetent

performance-approach goal
A personal objective to perform well by demonstrating competence over others and outperforming classmates

The view that mastery goals are positive and performance goals are negative was challenged, however, by puzzling findings about learners with performance goals. In some research, performance goals were found to be quite adaptive, whereas in other research, performance goals did not lead to positive outcomes. This led to a focus on two separate types of goal dimensions known as **performance-avoid** and **performance-approach goals**. Performance-approach goals are seen as more adaptive than performance-avoid goals, in that learners who adopt approach goals are motivated by the desire to appear competent to others and show that they can outperform them. Performance-avoid learners are more concerned with avoiding the appearance of incompetence, and, in keeping with the problems discussed earlier, avoidance approaches are seen as less adaptive than approach orientations (Anderman & Wolters, 2006). Box 8.4 provides a case study of a learner who experienced performance avoidance. The researchers of this study concluded that student motivation was a complex system of personal and contextual factors.

BOX 8.4 CASE STUDY

CASE STUDY OF AVOIDANCE-GOAL ORIENTATION

Sami was among 21 students who took part in a longitudinal study of motivation conducted over grades 3–6. As part of the Science curriculum, Sami and the other students participated in inquiry-based units that continued over a four-year period. Topics covered energy, biology, human senses and water, and were supported through an Internet-based environment used for storing and sharing information, and a Virtual Web School. The science lessons involved project work, with the students working in small groups or alone. Students were expected to generate a research question, investigate the given topic, share information collaboratively with others, and complete the project. The teacher's role was to scaffold the students' efforts, commenting and encouraging them as appropriate.

Student motivational orientation was assessed with a questionnaire at the start of each unit, and profiles of student motivation were developed. The goal orientations measured in the questionnaire included performance goals ('I am particularly satisfied when I do better in school than others'), mastery goals ('The most important goal for me in school is to acquire new knowledge') and avoidance goals ('I am most satisfied with myself when I don't have to spend much energy on a school assignment') (Dowson & McInerney, 2004; Pintrich, 2000). Avoidance goals were seen as related to performance goals, but as having a negative effect on learning.

Sami's initial goal orientation was highest for mastery learning, but both performance and avoidance goals were high too, and this pattern remained relatively unchanged throughout the four-year study period. During lessons, Sami was often off-task, preferring to draw cartoons than work on his group's project. Collaboration with other students usually led to telling jokes and drawing pictures, though he would return to the task when prompted by the teacher. He would eventually become involved in the set task, but always needed concrete links to the activity before he could settle into work, when he would become deeply involved and enjoy the activity.

He continued this pattern until the final year when he continued to draw with his friends, but this time managed to combine his drawing with the set activity. The topic was now 'water', which they had already investigated through hands-on activities. The teacher watched Sami and his friends talking and drawing, but on investigation found that although they had drawn a detailed picture of men fighting with guns, the battle seemed to be taking place in a hydroelectric power plant that had been carefully drawn and included all necessary details.

The researchers concluded that motivation is a complex process that is affected by a complex system of both personal and contextual factors.

Source: Adapted from Veermans and Tapola (2004).

ACTIVITIES

1 Which features of Sami's behaviour indicate an avoidance orientation?
2 Can you think of any features of the classroom environment that might have led to Sami's avoidance? Consider social and personal factors too.
3 Which classroom strategies seemed to redirect Sami's goals and lead to deeper engagement with the task?

THINK ABOUT

- Consider your motivational goals. Can you identify with a mastery or performance orientation? Do you have different goals for different subjects or different learning situations?
- Are there good reasons for encouraging mastery goals among school-age learners? What benefit might this have?

The suggestion that performance-approach goals are an adaptive form of motivation has been a significant source of debate in the field of educational psychology. Midgley, Kaplan and Middleton (2001) questioned whether there is sufficient evidence to suggest that performance-approach goals are adaptive, pointing to examples of research that have shown inconsistent results and sometimes negative associations with deeper thinking processes and intrinsic motivation. Some research has also suggested that performance-approach and performance-avoid goals are associated with negative emotional states such as stress (Smith, Sinclair & Chapman, 2002). However, Harackiewicz and colleagues (for example, Harackiewicz et al., 2002) assert that performance-approach goals may indeed be quite beneficial for some learners under some conditions. They advocate that learners should adopt a mixed motivational disposition, and select goals that are appropriate for the situation. In reading-related tasks, for example, it may be more appropriate to have a mastery-goal orientation; however, when preparing for exams, it might be appropriate to have a performance-approach orientation. This suggestion is particularly pertinent in light of the fact that mastery-goal approaches are not consistently related to better performance outcomes (Anderman & Wolters, 2006). It seems that both mastery and performance-approach goals are positively associated with achievement (particularly identified in university learners) and perhaps it is possible for learners to hold both mastery and performance goals simultaneously (Graham & Weiner, 2012).

CourseMateExpress

Online resources
Watch a **video** showing children of different ages discussing how their teachers motivate and engage them.

Researchers have extended the approach and avoidance dimensions to mastery goals (Elliot & McGregor, 2001), but evidence about the mastery-avoidance goal has generally been slow to emerge (Van Yperen, Elliot & Anseel, 2009). Although mastery-approach goals seem intuitively obvious, reflecting a goal to do better and approach tasks positively, a mastery-avoidance approach is somewhat paradoxical in that the person desires mastery but may engage in negative behaviours to avoid doing worse than they have done before (Van Yperen, 2003). The destructive avoidance dimensions seems to conflict with the desire of the person to master the task, and hence these negative and preoccupying concerns also diminish intrinsic motivation (Van Yperen, 2003). Some evidence is beginning to emerge about the impact of mastery-avoidance goals in a range of areas. For example Van Yperen, Elliot and Anseel (2009) found that mastery-avoidance orientations had a negative effect on the capacity of participants to improve their performance. Today, it is generally accepted that motivational goals can be broken into approach and avoidance dimensions; however, the causes or full implications of mastery-avoidance goals has not been fully explained (Graham & Weiner, 2012).

SUMMARY OF MOTIVATION THEORIES

The different views of motivation vary considerably depending on the theoretical views and philosophical positions of the researchers. However, there are also many overlaps and commonalities in the theories described here. Many of the theories also make similar recommendations for practice, and this has significant implications for classroom practice and requires teachers to think carefully about the approaches they emphasise in their classrooms. Not all of these classroom practices may be feasible or practical in every classroom situation or context (Urdan & Turner, 2005). Table 8.3 summarises the different theoretical approaches to motivation discussed in this section, and Box 8.5 looks at their application in the classroom.

Thus far, this discussion of motivation has largely focused on motivation as an individual state. In the following section of this chapter, we turn to an examination of engagement, which suggests that broader pedagogical and classroom-related factors also shape the motivation and engagement of learners.

TABLE 8.3 Theories of motivation

THEORIES	BEHAVIOURAL	SOCIAL-COGNITIVE	HUMANIST AND HUMAN NEEDS	COGNITIVE
Major theorists	Skinner	Bandura	Maslow Ryan and Deci	Atkinson, Dweck, Weiner and many others
Major focus	Achievement of desired behaviour through external rewards and reinforcement	Learners have agency and capacity for self-regulation, leading to personal standards and a sense of self-efficacy	Satisfying basic needs; achieving self-actualisation and self-determination	Cognitive processes and emotions; achievement needs, and beliefs about causes of success and failure; goal setting
Classroom applications	Use of contingent rewards and punishment	Need to ensure students perceive a link between their efforts and success and build self-efficacy through a realistic sense of abilities	Need to be aware of students' needs inside and outside the classroom, and support student autonomy and self-determination	Need for teachers to be aware of beliefs about ability, and to provide accurate/credible feedback
Strengths	Can have positive impact on motivation when initial motivation is absent or tasks are boring	Increases independence and self-confidence, and holistically focuses on personal, behavioural and environmental influences	Identifies human needs that influence behaviour; school programs can address basic needs and teaching approaches can support student autonomy	Focuses on the individual's interpretation of learning situations and on perception of own ability as a cause of learning
Weaknesses	Can encourage surface learning for extrinsic rewards; may reduce intrinsic motivation	May be difficult to change students' negative self-beliefs; interventions may take time to take effect	Concept such as self-actualisation is difficult to define; problems in using autonomy strategies may challenge some teachers' sense of authority	Can be challenging to address internalised cognitive processes; some perspectives disagree on approaches (for example, goal theory)

STRENGTHS AND LIMITATIONS OF MOTIVATION THEORIES

Strengths

Motivational theories highlight the positive impact of motivation on students' achievement, self-confidence and independence as learners. Such theories also draw attention to the need for educators to recognise the range of student needs, including those associated with physical and personal wellbeing, with students' attributions of personal success and failure, and with students' perception of the links between effort and success. Recent motivational research has also identified a range of strategies and behaviours associated with motivational orientations that educators could identify and recognise in their students. Recognising these different motivational behaviours should provide educators with greater insight into students in their classrooms.

Limitations

Some applications of motivational theories may have a limiting impact on learners. These include the application of external reward systems, which may lead to extrinsic motivation, and a related concern that this form of motivation is associated with surface rather than deep learning approaches. As discussed, an emphasis on performance goals raises similar concerns, leading to disagreement among researchers about whether these types of goals should be encouraged. A further limitation in this body of research concerns a need for further investigation of contradictory or inconsistent results about the type of goals learners adopt. Finally, it is only recently that motivational research has closely considered the role of affect and interest in learning. As discussed in the following section, this neglect of these factors in classroom approaches to motivation may be to the detriment of students' motivation and engagement.



BOX 8.5 IMPLICATIONS FOR EDUCATORS

MOTIVATION IN THE CLASSROOM

CourseMateExpress

Online resources
Take a moment to consider your personal philosophy. You may wish to use the **Develop your Philosophy** tool on this text's website.

Behavioural approaches

To apply behavioural approaches to motivation in classroom settings, teachers need to:

- contingently reinforce students' achievements to ensure that desired behaviour is repeated
- remember that reinforcement to increase desired behaviour motivates further learning of this type
- recognise that student motivation is shaped by previous reinforcing experiences
- understand that concerns have been raised about overuse of external reinforcement that may undermine intrinsic motivation.

Social-cognitive approaches

The social-cognitive approach suggests that teachers need to:

- foster students' goal-directed behaviours and self-efficacy
- ensure that learners experience success, not just failure
- remember that self-evaluation is influenced by personal success and experience on tasks, by observing others' achievements, and by verbal feedback
- recognise that motivation is affected by learners' judgements about their own efficacy.

Humanist and human needs approaches

To apply humanist and needs perspectives in classrooms, teachers need to:

- become more concerned with the wider implications of student welfare, not just with students' education
- be aware that some students are more concerned with feelings of safety, belonging and self-esteem than with the demands of the school curriculum
- understand that students who feel a strong need for group belonging will experience difficulties and lack motivation to learn if a teacher acts in ways that conflict with group mores
- recognise that students with low autonomy will not be motivated to strive for higher levels of achievement (see Chapter 4)
- acknowledge that their own beliefs and values can have a major impact on student motivation
- know that teachers are more likely to be supportive of student motivation where there are clear learning goals, an emphasis on personal and social relationships, and a shared understanding of the student's goals.

Cognitive approaches

Implications of the cognitive view of motivation concern the need for teachers to:

- understand that internal cognitive processes can shape motivation
- accept that students are not always motivated to be successful, and that the risk of attempting to succeed may be overwhelmed by the need to avoid failure
- realise that motivating students by focusing on increasing mastery may develop more high-order learning skills than emphasising performance goals
- be aware that the value of tasks may not be the same for all learners, and might differ from the teacher's perception
- be aware of their own biases and how these might affect the way they attribute success and failure to individual students
- recognise that feedback given to students can have a significant impact on the ways they perceive their ability or form 'mindsets', and the attributions they make about their performance.

ENGAGEMENT IN LEARNING

One of the most challenging situations that teachers face is the paradoxical loss of engagement among otherwise motivated students. How can a student be motivated to do well in school but lose engagement at the same time? Moreover, why does this often occur during adolescence, a time when the school curriculum broadens and offers students greater subject choice? Engagement is a complex construct that can be described at the level of the individual, school or classroom. Definitions of engagement often focus very narrowly on a few broad behavioural indicators such as school participation often measured by attendance and absentee rates. As described at the beginning of this chapter, Fredericks, Blumenfield and Paris (2004) described engagement as incorporating features of the student's behaviour, emotion and cognition, as follows:

- *Behavioural engagement* is often quite a visible feature and can be seen in students' attendance, absences or drop-out rates, and also in day-to-day behaviours such as loss of attention, being disruptive or assignment submissions.
- *Emotional engagement* may also be quite visible and clear to teachers in students' expression of negative or positive affect, interest or boredom, and can also encompass much less visible emotional feelings associated with a sense of belonging and connectedness with the school.
- *Cognitive engagement* refers to the investment in learning made by the student and could include willingness to exert effort, self-regulation and motivational goals.

Engagement can also be described at the level of schooling itself, including contextual and school-based factors such as the nature of the task, the teacher–student relationships and the classroom climate (Ainley, 2004; Russell, Ainley & Frydenberg, 2005). Terms such as 'school belonging' and 'connectedness' are also used to describe engagement. Many other concepts, including student wellbeing, mental health, feelings of emotional safety, and resilience are similarly used in the study of engagement (see Resnick et al., 1997).

WHY IS ENGAGEMENT IMPORTANT?

Engagement is positively associated with a host of academic, emotional and social learning outcomes. Engaged students generally enjoy learning, put in more effort, and seem to persist when faced with challenges (Christenson, Reschly & Wylie, 2012). However engagement also appears to be particularly important in the discussion of school dropout, retention and participation in schooling (Christenson et al., 2008).

International studies have identified very large proportions of young people who become increasingly and chronically disengaged throughout schooling. In large national studies in the United States, as many as 66 per cent of high school students report daily boredom in high school classes. Of these students, 81 per cent felt material was not interesting, others wanted more contact and better relationships with teachers, and others felt materials were simply not relevant to life (Shernoff, 2012).

In Australia and New Zealand we do not have the same sources of national student survey data, but we do have other indicative data. In both countries, we know that school participation rates of Māori (New Zealand Ministry of Education, 2009b) and Aboriginal and Torres Strait Islander (ABS, 2011) youth are lower than for non-indigenous youth. Although this is a simplistic behavioural indictor of engagement, it does tell us that engagement may be more problematic for some students than others. We can paint a broad picture of Australian and New Zealand youth engagement from the international testing program known as the Programme for International Student Assessment (PISA) (OECD, 2013). This data revealed that Australian and New Zealand students do generally feel happy at school (80–83 per cent of students) and feel a sense of belonging at school (78 per cent) at similar levels to the OECD

average. Across all countries, students from disadvantaged backgrounds report lower levels of belonging. For all students internationally there was a worrying level of association between skipping classes and absenteeism from school, and mathematics achievement. Students who are absent from school or skip classes earn significantly lower math scores than other students. These score differences equate to a whole year of formal school learning.

It is widely accepted that engagement is dependent on context – quite simply, engagement can vary from one setting to another (Christenson, Reschly & Wylie, 2012). This suggests that many contextual factors, including teaching and learning opportunities, expectations & support, all have a role to play. It is the complexity of engagement that has fascinated researchers for the last 25 years, and many factors influence this complex state.

SCHOOL FACTORS THAT INFLUENCE ENGAGEMENT

For some time, research has identified declining levels of motivation across the school years (Shernoff, 2012). This is particularly problematic in the high school years and has been explored in many different ways.

One of the major theories to emerge in the last 25 years has been explained by expectancy-value theory researchers Eccles and Midgely (1989). While expectancy-value theory went some way to explaining a decline in motivation and valuing of schooling, the researchers were most interested in the sudden and rapid decline in school achievement and motivation during the transition to high school. Eccles and Midgley (1989) referred to this as a problem of 'stage/environment fit', noting that many high school classrooms may not suit the developmental stage of adolescence. This very important notion has been well supported by more than two decades of research. Generally, Eccles and colleagues have reported that students in the early years of high school become disaffected because of the mismatch between the needs of the adolescent and the type of environment they encounter in traditional high schools. For example, young adolescents report that teachers care less about them, are less friendly, grade them unfairly, provide less support and do not allow them the autonomy they need (Eccles et al., 1993a; Eccles et al., 1993b). This research on the high school environment seems to be supported by more recent international findings in the US (Shernoff, 2012), referred to at the beginning of this section.

Adopting a stage-environment fit model (discussed above), McNeely, Nonnemaker and Blum (2002) analysed data from the National Longitudinal Study of Adolescent Health, a study of more than 80 000 US students in grades 7–12. They identified four key features of schools that were associated with this feeling of connectedness to school:

1 positive classroom-management climates
2 participation in extracurricular activities
3 tolerant discipline policies
4 small school sizes.

Schools with positive classroom-management climates were characterised by teachers who showed empathy and emphasised student autonomy, allowing student self-management and decision making. These features illustrate the important intersection between classroom-level effects and individual-level effects, which suggests that schools must support teenagers' need for independence and autonomy.

This also relates to the importance of extracurricular activities for students in these schools. Participation in extracurricular activities is an individual behaviour, but the outcome of this behaviour is linked to school engagement. These students showed higher levels of connectedness to school – they did not skip classes and they earned higher grades.

Importantly, these schools did not employ punitive discipline policies and were more tolerant of student behaviours. The importance of this finding is discussed further in Chapter14 when we consider classroom-management practices.

However, in looking closely at Australian students in data from the Longitudinal Study of Australian Youth (LSAY), Gemici and Lu (2014) found little effect of school factors on the engagement of 15-year-olds. They found that school factors were outweighed by individual background factors such as self-concept, intentions to complete Year 12, socioeconomic status, family factors, working for fewer hours, being foreign-born and speaking another language at home. However, they did find that some school factors do influence positive engagement, including a positive perception of teacher quality, high academic achievement in the student body, and attendance at school outside large metropolitan areas. They caution, though, that the effect sizes of these factors were so small they are probably not relevant in any practical way. These authors concluded that looking at engagement in 15-year-olds is too late – 'the die has been cast'. They suggest that the greatest impact of school factors may well occur much earlier in the child's life.

In summary, this is a very brief account of school-level factors and engagement. It is important to remember that these findings only relate to the concept of engagement, and this is not to discount the importance of schools in other aspects of students' lives. For example, we do know from studies of resilient children and adults, who have survived very difficult life circumstances, that school is a very significant protective factor in their lives (Masten & Motti-Stefaniddi, 2009). The connection between these school factors and engagement is not easy to identify or unravel, but is perhaps best summarised by Blum (2005) in discussing the Wingspread Declaration on School Connections: 'We need to use what research and experience have taught us to create schools where students feel connected. We want high schoolers who are convinced that the adults with whom they interact care about them as individuals and care about their learning. These schools must establish high standards, challenge all students to reach their potential, and provide the support students need to succeed'.

CLASSROOM FACTORS THAT INFLUENCE ENGAGEMENT

Several of the factors identified in the above research relate to classroom factors that support student engagement. Teacher–student relationships largely exist in classroom contexts and, as discussed in Chapter 14, are very important to students' sense of wellbeing and belonging in school. It seems that positive teacher–student relationships are particularly important as students grow older. A recent meta-analysis of studies of engagement showed that the effect of positive teacher–student relationships on engagement was strongest in the secondary school years. In contrast, the effect of negative teacher–student relationships seemed to be higher in primary school grades (Roorda, Koomen, Spilt & Oort, 2011). It is possible that younger students are more affected by the lack of a close and warm relationship with teachers because they are still dependent on close adult attachments, whereas adolescents have extended close attachments with peers and friends. Overall, positive and negative teacher–student relationships had an effect on students of all age and grades, and had a greater effect on students who were academically at risk because of disadvantaged or minority status in schools. As such, we cannot overlook the importance of teacher relationships with students (both positive and negative) in primary and secondary classrooms. These effects are explored further in Chapter 14 when we examine the role of the teacher in establishing positive classroom climates.

Pedagogy and engagement

It is clear that the links between engagement and achievement are also found in classroom work and pedagogical activities, which are the overarching focus of classroom life. The link between classroom activities and engagement has been explored in a number of ways. Self-determination theorists, for example, believe that engagement is fostered by the development of student autonomy, and this includes giving students more voice and choice in classroom activities (see the autonomy-supportive strategies suggested earlier in this chapter). Goal theorists believe engagement is also closely related to the instructional goals teachers set in classrooms, examined in the next section.

Similarly, the study of *academically engaged time* considers the amount of measurable time students are actually participating and working on activities as a form of engagement. These studies support many of the conclusions of a range of motivational theories; for example, students spend most engaged time when:

- activities are interesting and viewed as important and relevant
- they are paying attention and on task for most of the period
- they experience a high level of success or accuracy with most of the tasks they complete (Gettinger & Walter, 2012).



BOX 8.6 CLASSROOM LINKS

PEDAGOGIES OF ENGAGEMENT

The Australian Science and Mathematics School in South Australia is a specialist school that aims to promote and retain student interest in maths and science. The school motto is 'Choose your own adventure'. It has specifically applied the principles of motivation, engagement and interest development to design a curriculum that is student-centred and based on deep learning principles. The following summary explains this pedagogical approach.

Real world curriculum: Guided by principles of inquiry learning (see Chapter 6), students study cutting-edge mathematical and scientific disciplines such as 'nanotechnology' and 'sustainable futures'. Real-world equipment and simulation devices allow students to experience technology in a 'hands on' environment. The school aims to foster deep engagement and sustained careers in maths and science.

Learning studies: All students from years 10–12 complete a learning studies program where they meet with the same teacher in a home group every day. These classes focus on building a sense of belonging and personal control of learning by posing 'fertile questions' such as 'How can I make the ASMS learning environment work for me?'.

Personal learning plans: Students take control and responsibility for their learning by developing a personal learning plan. They set personal and academic goals and devise strategies for reaching them.

Inquiry projects: Students can follow an area of individual interest on a specific independent study with support from a mentor teacher. This allows students to work at their own level and differentiates the curriculum for them.

ACTIVITIES

1 Which features of the school environment might contribute to behavioural, emotional and cognitive forms of engagement?
2 Visit the Australian Science and Mathematics School website (www.asms.sa.edu.au). What can you glean about the school's approach to students on this website? Would you want to attend this school?

In particular, some of the strategies identified include things like having students learn self-regulation and management by setting some of their own learning goals, and facilitating active involvement in learning whereby students are frequently involved in the questioning and feedback processes in the classrooms.

There are a number of pedagogical and assessment practices that can be directly or at least theoretically linked to student engagement. Some schools adopt a very strong focus on shaping an interesting and autonomy-supportive environment for their students, which emphasises pedagogical design and calls for a mature and supportive relationship between teachers and students. Box 8.6 illustrates the efforts of one school to create engaging pedagogies that support students in taking risks, and maintain a commitment to learning.

Classroom goals and engagement

Goal theories of motivation propose that students hold individual goal orientations, and these orientations will shape their level of engagement in a task (Anderman & Patrick, 2012). In addition, students form their own perceptions of classroom goal structures, through which they construct their own personal beliefs about the meaning and purpose of school or classroom tasks. For example, a mastery orientation would suggest that students perceive that learning and understanding is valued and improving is important. On the other hand, a perception of a performance-goal orientation in the classroom might include a perception that outperforming others is important. While these are individual student perceptions of the classroom environment, it is known that teachers play an important role in shaping them (Anderman & Patrick, 2012). As asserted by Russell, Ainley and Frydenberg (2005), the type of classroom-achievement goals adopted by the teacher (consciously or unconsciously) shape the motivational goals adopted by students. Classrooms convey messages about the importance of success – they can emphasise performance goals in the form of competition or outperforming other students, and they can also emphasise deeper learning strategies and mastery goals. Turner et al. (2002) found that students' perceptions of mastery goals in their classroom were positively associated with their perceptions of support from their teachers, suggesting that positive feelings about the emotional climate of the classroom went hand in hand with student perceptions of mastery goals in the classroom.

In later research, Patrick, Turner, Meyer and Midgley (2003) compared the climates of different classrooms and were able to identify three distinctive types: those associated with consistently positive climates, those associated with consistently negative climates, and those associated with ambiguous climates that showed a combination of supportive and non-supportive climates. The researchers noted a pattern in the type of climate a teacher set up in the classroom, and observation over time revealed that the level of teacher support demonstrated early in the school year was consistent throughout the school year. Higher levels of avoidant behaviours, disruptive behaviours and cheating were found in both negative and ambiguous classroom climates, showing that consistently positive classroom climates are essential for positive forms of motivation. This early research has been extended to student motivation for physical education, with researchers finding that only climates promoting mastery-approach goals increased students' intrinsic interest in physical education (Wang, Liu, Chatzisarantis & Lim, 2010).

Interest and engagement

Another approach to examining motivation and engagement in the classroom considers the importance of interest in learning. Put quite simply, this approach is based on the premise that 'students will engage with tasks they find interesting, challenging and important' (Russell, Ainley and Frydenberg, 2005). The concepts of individual and situational interest both explain sources of engagement in the classroom.

Individual interest is slow to develop over time because it reflects growing knowledge in a particular area of interest (Ainley, Hidi & Berndorff, 2002; Hidi & Harackiewicz, 2000). This type of interest is highly specific to individuals, but may nonetheless signal areas in which a teacher can connect with a student or connect other topics of learning to the student's individual interest. It also means that certain features or topics in school classes may capture the attention more than others (Ainley, Hidi & Berndorff, 2002).

Very young children show the development of individual interests and the capacity for surprisingly long periods of sustained attention when they are engaged in these interests. Take, for example, a child who can talk for some time about different types of dinosaurs or different types of ponies, despite the fact that the child has never seen a dinosaur or owned a pony. How does this level of knowledge develop? Individual interest is a unique process that leads to persistence and the independent seeking of knowledge about the particular topic of interest (Renninger, 1992; Renninger & Hidi, 2002). As such, individual interest areas may be a way to spur the development of otherwise 'boring' or quite abstract learning skills, such as the synthesis and analysis of information. This is exactly the type of strategy used in the school outlined in Box 8.6 (see page 322), when students were allowed to use individual interests to conduct research on a topic of their choice.

Situational interest reflects a psychological state that can be aroused by specific features of the environment. For example, research has shown that specific features of texts can arouse interest and are associated with increased comprehension and recall (Ainley, Hidi & Berndorff, 2002). Perhaps you can remember an example of such a text that triggered a particularly strong emotion or arousal in you, and thus is still remembered. Early research on interest (Hidi, 1990) identified the specific features of situations that can 'trigger' interest, such as the novelty or ambiguity created when learners first approach a topic. This notion of a trigger may be particularly important to educators because it suggests a way to develop interest in students who do not have pre-existing individual interests (Ainley, Hidi & Berndorff, 2002). Hidi and Renninger (2006) suggest a four-phase model to explain the development of interest in the classroom. As shown in Figure 8.9, a number of factors can 'trigger' situational interest and lead to longer-term, sustained individual interest. Research has indicated that situational interest can

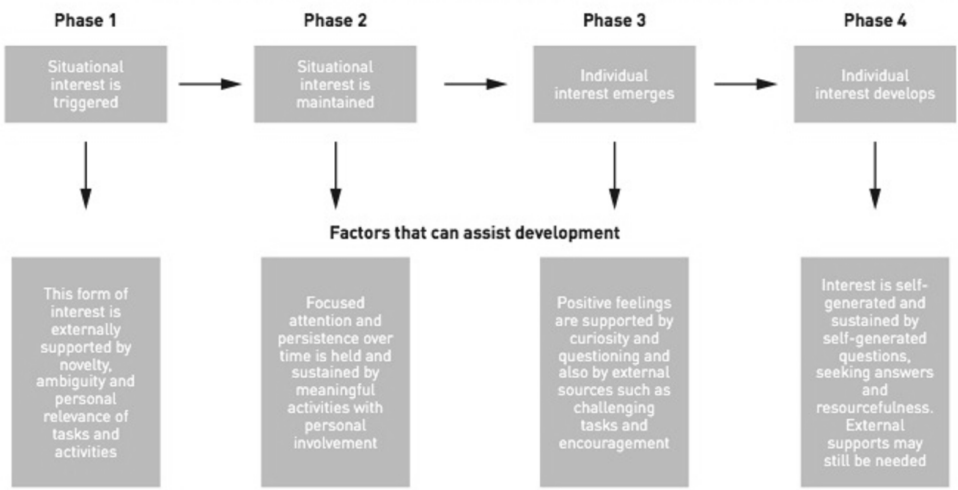


FIGURE 8.9 The development of interest in the classroom. Can you think of an example where your interest might have been 'triggered', leading to sustained individual interest in a topic?

be generated in three different ways: first, the presentation of course material may grab the students' attention (known as a triggered situational interest); second, the extent to which learning materials are engaging and enjoyable (known as a maintained feeling of situational interest); and third, whether or not the learner viewed the material as valuable and important (known as a maintained value feeling of situational interest) (Linnenbrink-Garcia et al., 2010). This draws teachers' attention to the fact that both contextual factors and internal beliefs contribute to situational interest and its maintenance over time.

It seems that many features of the classroom context and specific task content play a role in triggering situational interest. This is essential for teachers because not all students will come to school equipped with the background or knowledge to support interest and, of course, not all school topics will reflect the existing individual interests of students. Students may also play a role in triggering and shaping their own interest; for example, Sansone and colleagues (as cited in Ainley, 2006) have noted that university students can find ways to make boring tasks more interesting for themselves by using a range of strategies to focus and direct their attention. While Ben, whom we met at the start of the chapter, seems to have few of these strategies, his younger sister Jodie seems to be able to use her developing research skills to find interesting sources and materials that interest her.

In summary, the classroom context is the place where teachers have the capacity to shape students' motivational experiences and influence engagement by virtue of the lessons and tasks they set for students. For many teachers, this may be a challenging concept because we have our own levels of interest in what we teach, no doubt developed over many years of learning, and it may be hard to understand why students don't share the same interest. The challenge we face is to find ways to engage students in our classrooms, and the concepts of motivation and engagement give us ideas about how to do this. There is, however, an important caution in approaches that attempt to appeal to students with 'fun' or interesting materials. Interest and engagement may be fleeting when the novelty of these new materials or approaches wears off, and Dweck reminds us that learning should not simply be about success but also challenge. Ultimately, engaging pedagogies should provide meaningful ways to learn that have relevance to students' daily lives and lead to sustained interest and engagement.

SOCIAL FACTORS THAT INFLUENCE ENGAGEMENT

Peers and friends are of immense importance to children and adolescents. As discussed in Chapter 4, these relationships provide critical social and emotional supports. See Figure 8.10 for a summary by Juvonen, Espinoza and Knifsend (2012) of the links between peer relationships and engagement.



FIGURE 8.10 Relationships between peer relationships, belonging and engagement.
Source: Adapted from Juvonen, Espinoza and Knifsend (2012).

These authors propose that both peer relationships and belonging are linked to engagement. Peer relationships are also associated with feelings of belonging, while a sense of belonging in turn characterises student engagement in school (Juvonen, Espinoza and Knifsend, 2012).

Peer relationships, sense of belonging and engagement are underpinned by a range of social factors. Furlong et al. (2003) provided a useful summary of the social context of school engagement by distinguishing research findings in three main domains, which are developed and updated here:

1 *Social–emotional factors.* As explained in Chapter 4, students' relationships with peers and friends are associated with their adjustment to school and academic performance. Much of this influence comes about because of the affective or emotional climate created by these relationships. For example, a longitudinal study of children from kindergarten to Grade 5 found that peer rejection

was associated with declining classroom participation and school avoidance (Buhs, Ladd & Herald, 2006). Bellmore (2011) also found that peer rejection preceded lower grade-point average scores among children who were followed from Grade 4 to Grade 8 across the transition to high school. Generally, children without friends or satisfactory peer relations may suffer low levels of school engagement because of the distress experienced at school (Furlong et al., 2003). The opposite effect can be seen in good-quality friendships, when friends actually buffer and support early adolescents against distress during the transition to high school (Wentzel, McNamara, Barry & Caldwell, 2004).

2 *Academic motivation and success.* Wentzel's theory of motivation examines students' social goals alongside their academic goals (Wentzel, 1989, 1991, 1993), and has shown that students' pursuit of social goals is closely related to their pursuit of academic goals. For adolescents with friendships, Wentzel, McNamara, Barry and Caldwell (2004) found that their friends' tendency towards prosocial behavioural goals influenced the individual's tendency towards prosocial goals, leading to much better motivation and engagement in the early years of high school. Kindermann (1993, 2007) has consistently found that the natural peer groups children formed in schools are composed of children with similar motivational orientations, and that even when group memberships change (for example, a child leaves or joins the group), the group's motivational profile remains the same. Ryan (2000) also found that the peer group could influence changes in the students' intrinsic value for school (such as liking and enjoying school), as well as their value of achievement.

3 *Peer groups and social networks.* As identified above, children's natural peer groups reflect and influence their motivation and engagement. This process is explicitly acknowledged among students in that peer groups or 'cliques' come to be labelled and identified with certain motivational and engagement profiles, such as the 'nerds' who value educational achievement and obtain good grades, and the 'homeboys' or 'tough' group who reject academic values and show disengagement with school (Goto, 1997, as cited in Furlong et al., 2003).

The influence of the social context on motivation and engagement has significant implications for the teacher and the classroom climate. As explained by Russell, Ainley and Frydenberg (2005), teachers play an important role in establishing the mode of peer interaction in the classroom. For example, teacher–student relationships model and demonstrate respect (see Chapter 14), and the motivational climate may contribute to students' relations with one another depending on the type of classroom goals set. Competitive or performance-oriented goals might lead to healthy competition or rivalry between peers, but it has also been a factor in the poor fit between certain adolescents and the high school environment. As discussed in Chapter 7, cooperative and collaborative learning contexts serve to develop students' social skills and foster positive forms of interaction between students. Importantly, negative or hostile peer interactions have severe consequences for students' motivation, engagement and achievement in school (see also Chapter 4). Thus, the teacher has a critical role to play in creating a safe school environment and preventing bullying (see Chapter 14 for more information).

To summarise, motivation and engagement in school can be examined at the individual level in terms of motivational processes, but it is also important to consider the antecedent influences of the school, the classroom and social factors. As suggested by Furlong et al. (2003), these factors are the 'stages' from which engagement actually arises, and thus are particularly worthy areas for teachers to focus their attention on.

CONCLUDING COMMENTS

Motivation and engagement have been defined in different ways, but each construct represents a critical element in the learning–teaching process. Both elements have a powerful effect on children's progress at school and on their experiences in adult life. Motivation provides the energy, direction and maintenance

of behaviours, and is largely described as an individual-level variable. Engagement reflects various views of this energy in action, and can be viewed as a factor within the student, or as a factor within the wider culture and climate of schools and classrooms. The educators' task is to motivate learners to realise their potential by engaging them in intellectually challenging learning experiences that involve authentic and meaningful tasks. Educators must also provide the necessary support and stimulation to ensure that student engagement is maintained and enhanced, as situational interest may be fleeting. The failure to achieve these goals may reduce the chances of a learner developing a sense of mastery, belonging, and a desire to continue learning beyond the years of schooling.

CHAPTER REVIEW

- Motivation is an internal process that energises, directs and maintains behaviour over time. It can take the form of a state or trait, and can be stimulated externally or internally.
- Engagement is both an internal process described by behavioural, emotional and cognitive indicators, and one shaped by external processes found in school and classroom climates.
- Poor motivation frequently leads to low achievement at school and, for teachers, problems in classroom management.
- Poor engagement is associated with alienation from school, high rates of students dropping out and, arguably, poor performance in school.
- Motivation and engagement may be enhanced by addressing student behaviours or the features of school, classroom and social climates that influence engagement.
- Certain types of pedagogy, tasks and classroom climates are more facilitative of motivation and engagement than others.

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- a **self-check quiz**
- **crosswords**, **flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.

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QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1 Explain some of the theories of motivation and give an example of classroom practice that reflects each motivational theory.
2 Ask your classmates and any students you know to explain their concept of motivation and engagement in learning.
3 Explain the debate about the value of intrinsic and extrinsic motivation, or the value of mastery versus performance goals.
4 Within your own personal philosophy of teaching, what is your view of motivation and engagement? Do you think that learners should come to the classroom already motivated, interested and engaged? How will you respond to students who are less motivated and engaged?

KEY TERMS

achievement motivation
affect
anxiety
approach success
arousal
attribution theories
autonomy-supportive
avoid failure
defensive pessimism
engagement
entity theory
extrinsic motivation
incremental theory
interest
intrinsic motivation
locus of control
mastery goal
motivation
performance goal
performance-approach goal
performance-avoid goal
self-determination theory
self-handicapping
state
test anxiety
trait

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'MOTIVATION AND ENGAGEMENT' AND MATERIAL IN OTHER CHAPTERS

- Consider the effect of assessment and reporting practices (see Chapter 13) on students' motivation, particularly their development of mastery rather than performance goals.
- Compare the motivational emphases of the three approaches to learning and teaching described in Module II (Chapters 5, 6 and 7).
- Consider the role of motivation in effective classroom management (see Chapter 14).

FURTHER RESEARCH

RECOMMENDED READING

Alderman, M. K. (2008).*Motivation for achievement: Possibilities for teaching and learning.* New York: Routledge.
Fredricks, J., Blumenfield, P. & Paris, A. (2004). School engagement: Potential of the concept and state of the evidence. *Review of Educational Research, 74*(1), pp. 59–109.
Russell, J., Ainley, M. & Frydenberg, E. (2005). *Schooling issues digest: student motivation and engagement*.

RECOMMENDED WEBSITES

KidsMatter. Learn more about how anxiety problems and other issues can affect student engagement and wellbeing in school: www.kidsmatter.edu.au/families/mental-health-difficulties/anxiety/anxiety-how-anxiety-problems-affect-children
MINE – My Interests Now for Engagement Project. Watch this emerging research project on measuring student interest. http://myinterestnow.com
Self-determination theory. Learn more about Ryan and Deci's view of human needs and motivation: www.selfdeterminationtheory.org

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

- achievement motivation
- anxiety
- authentic pedagogy
- engagement
- extrinsic motivation
- goal theory
- intrinsic motivation
- mastery goals
- motivation
- performance goals
- school
- school belonging.

Combining these terms with words such as 'schools', 'students', 'learners' or 'adolescents' (as in 'engagement and school') will limit your search to material related to schools and young students.

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

Chapter 9

INTELLIGENCE

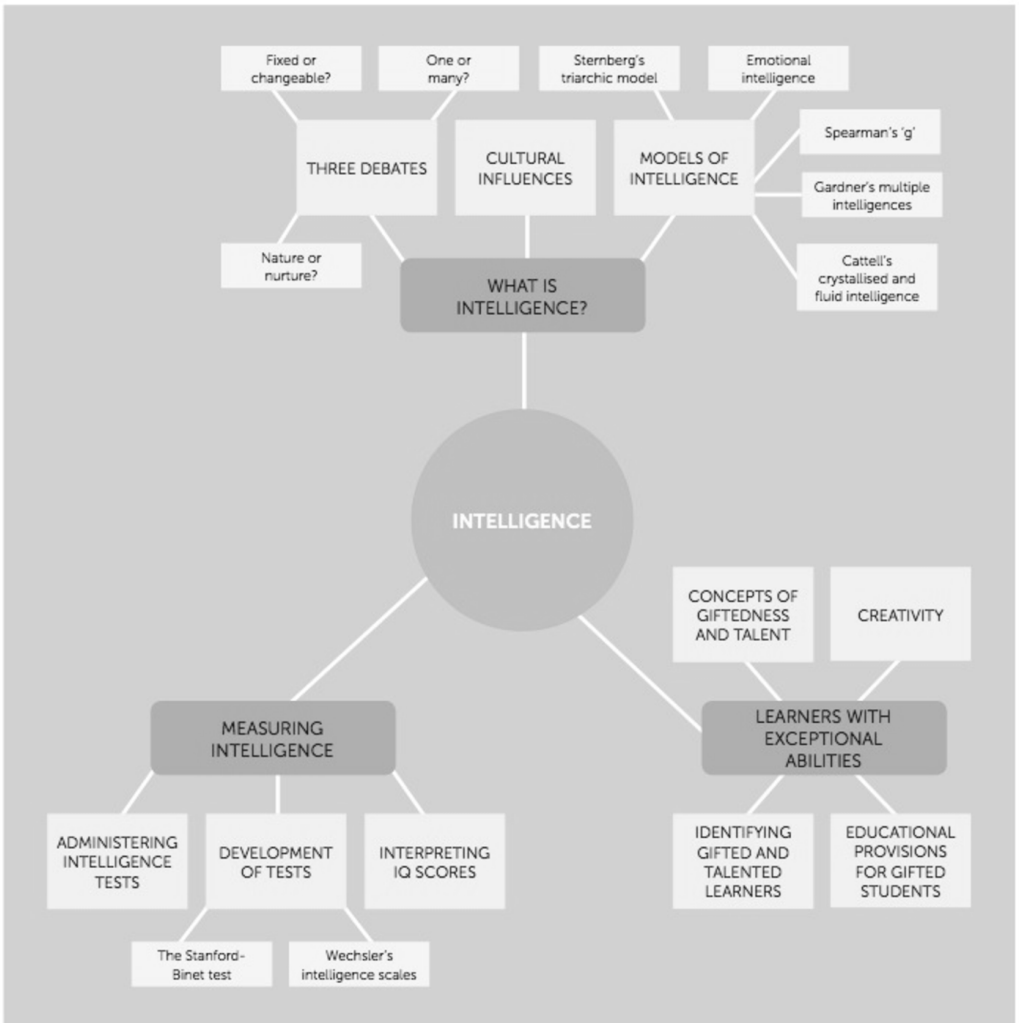

FIGURE 9.1 Chapter 9 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- What is intelligence? What characterises intelligent behaviour?
- What are some models of intelligence proposed in scientific studies of intellectual ability?
- What are some ways in which contemporary models of intelligence are applied in classrooms?
- As a teacher, what will your approach to intelligence be?
- How can educators ensure that students with exceptional gifts, talents and creative abilities realise their full potential?

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INTRODUCTION

Joanne spent the first eight years of her life with her diplomat parents in two countries overseas, with the result that on returning to Australia in Year 4, she had learnt to speak three languages fluently, and was literate in one of them, but couldn't recite the English alphabet. Her teacher called her mother in to see her, explaining, 'I like to meet with the parents of all our backward pupils'. Later that year, there was a state-wide IQ (intelligence quotient) testing program, and the teacher was surprised to find that Joanne had scored in the top 2 per cent. As a result, she went into a gifted program in an 'opportunity class'.

Intelligence is something people make judgements about from many types of evidence. The judgements teachers make, and their assumptions about intelligence, influence their practices and the ways in which they interact with individual students (Sternberg, 2007). For example, consider some of the following questions: How should gifted children or students needing special educational programs (see Chapter 10) be identified? How does a student's schooling interact with his or her intelligence? Can schooling make someone more intelligent, or does an individual's level of intelligence determine what teachers can teach them? Your position, particularly on this last question, will influence how you teach. This chapter explores definitions of intelligence and applications of various models of intelligence in schools. Issues associated with identifying and educating highly gifted, talented and creative children are also explored.

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Online resources
Explore your own view of intelligence with the **Interactive Activity** on this text's website.

WHAT IS INTELLIGENCE?

What is meant when someone is described as 'smart', 'bright', 'clever' or 'intelligent'? It is easy to assume that these terms mean much the same to everyone. But is this so? Think about what is meant by a word such as 'masculine'. Everyone can identify examples of masculinity in daily life, although it can be very difficult for people to pinpoint the specific characteristics that make one person appear 'masculine' and another to lack these qualities. Moreover, perceptions of masculinity differ across social groups and over time. Think of the muscular curves of the famous statue of *David* in comparison with the image of an Elizabethan fop or a Japanese sumo wrestler (see Figure 9.2). Concepts of intelligence are similar. The term **intelligence** can commonly be taken to mean a general aptitude and capacity for understanding and learning, but different people mean different things when they talk about intelligence, as a result of historical and cultural factors.

intelligence
A general aptitude and capacity for understanding and learning



Source: Alamy © The Art Gallery Collection.



Source: Alamy © Jeffery Titcomb.

FIGURE 9.2 Which figure best represents masculinity?

In everyday usage, intelligence is usually conceived as a mental ability that is present in individuals in differing amounts: 'Jill is clever; Arnold is a bit dumb'. Words such as 'bright', 'brilliant', 'smart' or 'wise' are used to refer to examples of human activity thought to be indicative of high ability or intelligence. For most people, intelligence is valued in terms of 'the more, the better'. Some views of intelligence even seem to imply that it has a physical existence in the human skull. However, few people can give a definition of intelligence, although most can cite examples of intelligent behaviour. More interestingly, as suggested earlier, definitions and examples given differ from individual to individual, from culture to culture, and across time. See Table 9.1 for a comparison of ideas of intelligence across a number of cultures.

TABLE 9.1 Cultural variations in implicit theories of intelligence

WESTERN NOTIONS	JAPANESE NOTIONS	TAIWANESE NOTIONS	KENYAN NOTIONS
• Practical problem solving • Social competence • Verbal ability	• Task efficiency • Positive social competence • Receptive social competence	• General cognition • Interpersonal intelligence • Intrapersonal intelligence • Intellectual self-assertion • Intellectual self-effacement	• Understanding how to handle real-life problems • Initiative • Respect • Knowledge and skills

Source: Compiled from data reported in Sternberg (2007); Azuma and Kashiwagi (1987).

THINK ABOUT

- Think about what it might mean in a classroom if students and their families have a different concept of intelligence from yours. What would you do?

CULTURAL INFLUENCES ON INTELLIGENCE

The idea of intelligence as mental agility or mental speed is a very Western notion. In some non-Western cultures, speed of thinking and finding solutions to problems are not regarded as particularly important attributes (Biesheuvel, 1969). In such cultures, wisdom can mean the ability to listen, observe, reflect, learn from others, and think through the short- and long-term consequences of an action. Those growing up in communities with such beliefs would be unlikely to give quick, accurate responses to questions in a standard Western intelligence test.

The skills valued by particular societies are likely to represent the skills that are useful in that society (think about this in terms of Vygotsky's sociocultural theory described in Chapter 3). For example, in some Pacific island communities where the skills of navigation (the ability to read the waves, clouds and stars) are regarded as indicative of intelligence, mental agility in a Western sense is irrelevant. Grigorenko et al. (2001) described the concepts of intelligence held by the Luo people living on the shores of Lake Victoria in western Kenya as comprising four attributes: *rieko* or smartness, knowledge, ability, competence and power; *luoro* or social qualities such as respect and care for others, obedience, diligence and readiness to share; *paro* or the thinking involved in problem solving and caring for others; and

winjo or comprehending and understanding. For Luo children, teachers and parents, the four attributes of intelligence are interrelated and all are used by the Luo people in judging intelligence in others. However, only the concept of *rieko* was associated (positively) with Luo children's scores on a Western test of intelligence and with tests of achievement in English and mathematics. Westerners would base their judgement of the intelligence of Luo children on Western ideas of smartness, knowledge and ability rather than the broader Luo concept that included social qualities and the practical thinking skills needed for success in a Luo community. Grigorenko et al. (2001) concluded that children viewed as intelligent in a Luo community might be judged as 'lacking intelligence' from a Western perspective. Indeed, Luo concepts of intelligence seem to be closer to emerging concepts of practical intelligence (discussed later in this chapter) than to more traditional Western ideas. However, it is likely that, as in other parts of Africa (Booth, 2002), increasing contact with Western ideas and educational practices among the Luo will result in gradual incorporation of Western ideas about intelligence into Luo thinking.

Sternberg (2002, 2003, 2007, 2012) has distinguished between academic intelligence, measured by conventional tests of general mental abilities and academic performance, and 'practical intelligence' or 'successful intelligence', measured in terms of everyday skills as identified by the Luo people. Other examples of culturally based variation in intelligence and intellectual development have been reported in a comparison of mental processing in Greek and Chinese school students, which describes the strength of the Chinese students' performance in visual/spatial tasks (for example, a paper-and-pencil maze test) in comparison with the performance of Greek children (Demetriou et al., 2005). The superior performance of Chinese students is attributed to their experiences when learning the Chinese logographic writing system. Chinese students studying in Australian universities demonstrate well-developed skills in manipulating information, analysing figures, reasoning and memory (fluid intelligence), but appear to demonstrate more limited abilities in critical analysis (integrative thinking and reflective judgement). However, these limitations in performance may simply reflect difficulties in studying within a second language rather than any lack of critical-thinking skills within Chinese culture or differences in perceptions of intelligence (Paton, 2005; Shi, 2004).

In technologically developed societies, intelligence is generally seen as involving high levels of competence in literacy, numeracy and, increasingly, technological skills. Children are expected to acquire such skills from an early age. The paper-and-pencil tasks used in Western-based intelligence tests are typical of the instructions that children encounter at school and at home. However, there are cultural variations within developed societies too. Okagaki and Sternberg (1993) found in the USA that Latino parents placed more emphasis on social competence, while Asian and Anglo parents emphasised cognitive skills. Fletcher and Hattie (2011) suggested that Western societies are experiencing a shift in what is valued as intelligence, from knowledge to problem solving and pattern finding. Clearly, the way we conceptualise an abstract idea such as 'intelligence' is strongly influenced by cultural and social factors.

MODELS OF INTELLIGENCE

There are also disagreements among psychologists as to the concept, structure and origins of intelligence, and these have led to a number of different models of intelligence. Three enduring debates have implications for the relationship of intelligence and education, and influence teachers' practices. They are centred on these questions:

- Is intelligence one thing or many?
- Is intelligence fixed or changeable?
- Is intelligence an innate capacity, or does it derive from a child's experiences in their environment?

ONE THING OR MANY?

People often appear to do well on a range of intelligence-test tasks (such as verbal reasoning, abstract and visual reasoning, vocabulary knowledge and sentence comprehension), while others do poorly, and these results would seem to suggest the existence of a general mental capacity, or '*g*'. If intelligence is one overarching capacity, then it could be measured and individuals identified as having varying levels of intelligence. This is the view that is attached to the notion of IQ. It also tends to be the way in which we talk about intelligence – as a singular capacity that people have to varying degrees.

However, closer examination of test results often reveals a consistent pattern in individual responses to different types of items in a test. One person might answer most of the items involving vocabulary, general comprehension, arithmetic and reasoning correctly, but have more difficulty in completing mazes, copying block designs or arranging pictures to tell a story. Another might struggle to get any correct answers on the test, achieving the best scores in digit span (repeating a sequence of digits) and coding (pairing symbols and digits using a key). These different response patterns suggest that intelligence comprises not only a general, overarching mental capacity, but also some specific abilities. The debate continues about whether these specific abilities are connected, or whether they are, in fact, quite separate intelligences.

The debate is not just academic – it has implications for applications of intelligence and intelligence testing in particular. If intelligence is a single thing, it could be measured, and used to identify individuals needing support or enrichment in schools. If it consists of a number of dimensions, these could also be measured to identify an individual's strengths and weaknesses, and support or enrichment could be specifically targeted. Models of intelligence that describe intelligence as multiple things are taken up by teachers to differentiate the curriculum – that is, to provide experiences that are likely to develop and allow students to display a number of intelligences, rather than just one (see the sections on Gardner's theory, on page 336, and Sternberg's theory, on page 339).

Spearman and '*g*'

general mental ability (*g*)
Basic intellectual capacity

Charles Spearman (1904, 1927), an English psychologist, was among those who supported the concept of intelligence as comprising a **general mental ability**, or '*g*'. He argued that some people are highly intelligent because they are 'well endowed with *g*', while others are less intelligent because they are 'low in *g*' (Howe, 1997, p. 27). However, Spearman also observed that there is often considerable variability in how individuals perform on the different types of items used in intelligence tests (such as naming objects, recalling strings of letters and mentally manipulating three-dimensional shapes). One person may be particularly gifted in language-related activities and poor in recalling lists of digits, while another can visualise three-dimensional shapes easily but cannot name objects quickly. Spearman explained these individual variations in terms of **specific mental abilities** (or '*s*') that are overlaid by the general mental ability of the individual. General intelligence, or *g*, reflects the speed and efficiency of the brain's processing or 'mental energy' (Cianciolo & Sternberg, 2004, p. 3), while *s* represents the specific mental abilities tapped by particular tasks.

specific mental abilities (*s*)
A collection of distinct intellectual abilities

Spearman's ideas are sometimes described as a 'two-factor theory of intelligence' – the two factors comprising *g*, or general mental ability, and *s*, or the specific mental abilities tapped by different items in an intelligence test (see Box 9.7 on page 349).

Recent research on the structure of intelligence supports Spearman's notion of *g* (Deary, 2012). It accounts for approximately half of the variance in intelligence tests. Debate continues over the structure of the abilities that make up *g*, and that sit beyond it.

Cattell's crystallised and fluid intelligence

crystallised intelligence
Culturally based, fact-oriented knowledge gained through experience

A further view of the concept of intelligence as *g* was proposed by R. B. Cattell (1987), who divided it into two parts: **crystallised intelligence**, involving culturally based, fact-oriented knowledge gained

through experience; and **fluid intelligence**, or non-verbal abilities or mental efficiency associated with manipulation of information, seeing complex relationships and solving problems. Crystallised abilities are demonstrated in tests of word knowledge and general information, while fluid abilities, which decline with age, are evident in problem solving, and non-verbal tasks such as digit-symbol substitution and spatial visualisation. The association between fluid abilities and maturation (ageing) explains the common observation that 'as people age they may get wiser but less sharp' (Kay, 2005, p. 10). Carroll (1993) demonstrated that results from intelligence tests support this model of intelligence, with tests of individual abilities falling broadly into the two groups of crystallised or fluid intelligence. These two factors are correlated, suggesting the existence of *g* as an overarching factor. The resulting model has been termed the 'three stratum model of intelligence', with individual abilities at the first level, crystallised and fluid intelligence at the second level along with memory factors and sensory modalities such as visual or auditory, and *g* at the third; Figure 9.3 illustrates this model. The debate about the structure of intelligence continues, with further models being proposed and tested. (See Hunt, 2011, for a discussion of some of these.)

fluid intelligence Non-verbal abilities associated with manipulation of information, seeing complex relationships and solving problems

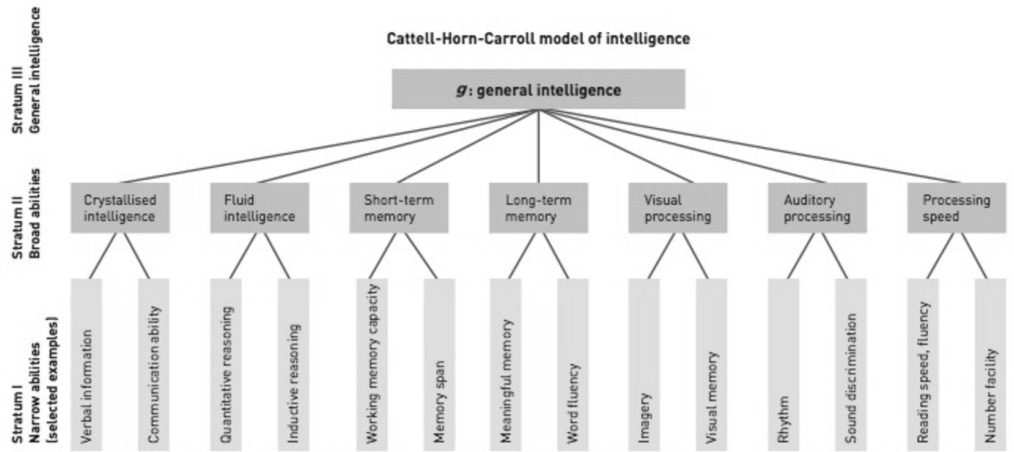

FIGURE 9.3 Under *g*, at least 16 broad and more than 80 narrow abilities have been identified. A selection of these is shown here.

IS INTELLIGENCE FIXED OR CHANGEABLE?

Do you think of intelligence as something someone has and which cannot be changed, or as something that develops as part of cognition? About 40 per cent of adults believe ability is fixed and unchangeable, and 40 per cent believe it can grow and develop (about 20 per cent of people are unsure or undecided) (Dweck & Molden, 2005). Your answer to this question will influence how you view students in your classroom, and how you view your own teaching. For example, if intelligence is fixed, then what you do as a teacher will need to work around the constraints of the levels of intelligence of your students: you should adapt your teaching to take into account their levels of ability. If intelligence develops, however, then part of your role as a teacher will be to develop intelligence in your students. You might adapt your teaching to fit their current level of intelligence (ability to use and apply knowledge), but you will also be seeking to extend their intelligence so that they can use and apply their knowledge in increasingly sophisticated ways. These views of intelligence also influence students' learning and motivation, as we saw in Chapter 8. Although traditionally, particularly in intelligence testing, intelligence has been viewed as fairly stable from early adolescence, Nisbett et al. (2012) identify a number of environmental factors such as schooling that influence it, as we will see later in this chapter.

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Online resources
Take a moment to consider your philosophy of learning and teaching. You may wish to use the **Develop your philosophy** tool on this text's CourseMate website.

A number of current theorists, such as Gardner and Sternberg, argue that intelligence is changeable, and that the work of schools should be not just to teach content, but also to develop students' intelligence. These researchers broadened the use of knowledge about intelligence from identifying students with varying levels of intelligence (the psychometric approach) to nurturing intelligence. Intelligence is viewed not so much as something students come to school with, but as something to be developed by the school.

Gardner's theory of multiple intelligences

multiple intelligences (MI) Eight or more domains of intellectual functioning

Howard Gardner's (1983) model of intelligence extended traditional ideas about intelligence to include a wider range of abilities, or **multiple intelligences (MI)**. Gardner dismissed traditional intelligence tests, arguing that they are based on a narrow view of human intelligence that is dominated by Western ideas. He also argued against the notion of *g* and that people with high *g* are equally able across all areas. According to Gardner, intelligence comprises a set of separate intelligences, each of which is specialised for acquiring knowledge and solving problems in different areas of cognitive activity. He identified at least eight domains of intellectual functioning, each of which he argued was quite distinct, in that how we perform in one area is quite separate from how we perform in another. Interestingly, the intelligences identified by Gardner represent distinct areas within our cultural experience, and include language, music, mathematical comprehension and reasoning, spatial awareness, physical movement and social understanding (see Box 9.1).

BOX 9.1 RESEARCH LINKS

GARDNER'S THEORY OF MULTIPLE INTELLIGENCES

Gardner (1983) identified eight distinct domains, or areas, within his model of multiple intelligences.

In 1999, Gardner considered the possibility of two more domains: 'spiritual intelligence' and 'existential intelligence', but cautioned that they did not fulfil sufficient criteria to be counted as full intelligences. Researchers continue to collect data on these and other potential intelligences not yet confirmed.

TABLE 9.2 Gardner's eight domains of intelligence

DOMAIN (AREA) OF INTELLIGENCE	DESCRIPTION OF CONTENT	EXAMPLES OF OCCUPATION	REPRESENTATIVE INDIVIDUALS
Linguistic	Ability to perceive or generate spoken and written language	• poet • lawyer • writer	T. S. Eliot, Judith Wright, Henry Lawson, Patrick White
Musical	Sensitivity to pitch, rhythm and timbre; the ability to create, communicate and understand meaning in sound; the ability to discern sound patterns	• musician • music critic • mechanic	Igor Stravinsky, Percy Grainger, Dame Kiri Te Kanawa, Paul McCartney
Logical-mathematical	Use and appreciation of numerical, causal, abstract or logical relations	• mathematician • scientist • engineer	Albert Einstein, Howard Florey, Douglas Mawson, Frank Macfarlane Burnet, Peter Doherty
Spatial	Ability to perceive visual and spatial information, and to transform or modify this information and recreate visual images	• visual artist • draftsperson • navigator	Pablo Picasso, Albert Namatjira, Frida Kahlo, Kay Cottee

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DOMAIN (AREA) OF INTELLIGENCE	DESCRIPTION OF CONTENT	EXAMPLES OF OCCUPATION	REPRESENTATIVE INDIVIDUALS
Bodily-kinaesthetic	Control of all or parts of one's body to solve problems or create products	• dancer • athlete • hiker	Martha Graham, Vaslaw Nijinsky, Ian Thorpe, Cathy Freeman, Sir Edmund Hillary
Intrapersonal	Capacity to form a mental model of oneself and use the model to make informed decisions about possible actions	• psychoanalyst • psychologist	Sigmund Freud, Melanie Klein, B. F. Skinner
Interpersonal	Capacity to recognise, distinguish between and influence in desired ways others' feelings, beliefs and intentions	• religious leader • politician	Martin Luther King, Nelson Mandela, Mahatma Gandhi
Naturalist	Ability to understand and work effectively in the natural world	• biologist • zoologist • naturalist	Charles Darwin, Jane Goodall, David Attenborough

Source: Adapted from Gardner (1993, 1999); Granott and Gardner (1994, p. 174); McGrath (2005); Torff and Gardner (1999, pp. 143–4).

ACTIVITIES

1 Can you identify a range of intelligences that you possess?
2 How did you identify your intelligences? What indicators did you look for?
3 How would you identify intelligences among the students in your class?
4 Do you notice any cultural bias in the examples of people provided in Gardner's list of intelligences? Can you substitute examples of historic or current figures from within your own country and culture?

Gardner drew on case studies of individuals with highly developed abilities in one area, but weaker abilities in others, as evidence that intelligence can exist variably in different domains (see Box 9.1 for some of the famous people Gardner referred to as those intelligent in each domain). He also referred to examples of brain damage from stroke or accident that affect just one domain, but not others, as evidence for separate intelligences. Others have challenged his methods and conclusions (see Box 9.2).

Gardner's ideas remind us that teachers should be aware of students' strengths that could help them to do well in at least one of the intellectual domains. Moreover, teaching programs need to be varied in response to the different strengths of students, rather than expecting them to do everything in the same way. For example, within an English lesson, the personal area can be tapped by asking questions about how a particular character might be feeling or what he or she is thinking at a particular point in the story. Similarly, students' musical talents can be highlighted during the dramatisation of the story. Gardner also reminds teachers to take a broad approach to instruction, rather than focusing exclusively on the academic domain. They also need to remember that exceptional talents are the products not only of natural ability or high levels of intelligence in a particular domain, but also of some type of formal training. Great artists may have outstanding capacities in the spatial domain, but they also need 'formal and informal experiences in the disciplines of the visual arts' (Gardner, Hatch & Torff, 1997, p. 262).

BOX 9.2 RESEARCH LINKS

THINKING CRITICALLY ABOUT GARDNER'S THEORY OF INTELLIGENCE

Gardner's theory is an example of an area in which psychologists and educators have different views. This is not to say that either educators or psychologists are necessarily right or wrong, but issues of relevance to psychologists (such as how intelligence is defined, or structured) can be different from those of relevance to educators (such as how we think about and nurture students' abilities).

A number of psychologists working in the area of intelligence have been critical of Gardner's theory, particularly the notion that the intelligences are independent of one another (for example, Brody, 1992; Sternberg, 2003). They argue that his evidence in support of separate intelligences, taken from studies of savants and people with brain damage, does not take into account the changes in the brain that occur as a result of damage, and so are weak indicators. Studies of how the brain works show that in most tasks, we draw on a number of areas at once (see Chapter 2), which is provided as evidence of intelligence as singular rather than multiple. This is something Gardner (1983) also acknowledged – he said that in most tasks, we use a number of intelligences. Others have questioned whether the eight intelligences Gardner describes are all really 'intelligence' (Sattler, 2001). Psychometric studies likewise do not support the theory, showing evidence for a '*g*' that links various abilities (Castejon, Perez & Gilar, 2010; Visser, Ashton & Vernon, 2006). Measurement of the intelligences has been difficult to develop, given the broad and sometimes vague description of some of the intelligences (Furnham, 2009), although Gardner (2006) has stated that he is not interested in measurement of intelligence in the traditional way – that was, in fact, one of the issues his theory contests.

Educators, however, have taken up Gardner's theory, seeing its application to differentiation of the curriculum for their students (for example, McGrath, 2005). It connects with their own experience in classrooms of a wide range of abilities across domains. Its wider view of intelligence also appeals to teachers' desire to see and nurture potential in all children.

Gifted education, discussed later in this chapter, is one area in which educators have applied Gardner's theory, both to identify gifted students who might not be identified by traditional intelligence tests, and to extend the range of ways in which students can develop and display their skills and knowledge. There are also schools and classrooms that have been designed around the eight intelligences. Once again, however, there has been little evidence published of the results of such programs.

ACTIVITIES

1. Think about the evidence that you would require before applying a strategy or theory. Would it be acceptance by the author's peers or by your own peers, the degree to which it fits your own experience, or some other criteria?
2. In the introduction to this book, we suggested some tests of evidence. Return to them and decide how they relate to Gardner's theory and its application in classrooms.

Emotional intelligence

Following from Gardner's extended notions of intelligence, a number of writers have argued for the categorisation of a range of abilities as intelligences. These include 'personal intelligence', 'social intelligence' and 'emotional intelligence', as forms of intelligence (Mayer, Caruso, Panter & Salovey, 2012). According to Mayer, Roberts and Barsade (2008, p. 511), **emotional intelligence** is defined as 'an ability to reason about emotions and the capacity to use emotions and emotional knowledge to enhance thought'. It involves the skills of reflectively regulating emotions, understanding emotions, assimilating emotion in thought, and perceiving and expressing emotion.

emotional intelligence The ability to recognise and understand emotions, and to use emotional information to enhance thought

Daniel Goleman brought the concept of emotional intelligence to popular attention with the publication of a bestselling book, *Emotional intelligence*, in 1995. In it, Goleman argued that emotional intelligence (including such skills as empathy, delayed gratification, impulse control and persistence) is at least as important in guiding behaviour as the cognitive skills tapped by traditional measures of intelligence. Furthermore, Goleman suggested that emotional competence can be taught to children and adults.

CourseMateExpress
Online resources
Go further: See examples of items from an emotional intelligence test via the link on this text's website.

In Chapter 4, we examined the development of emotion and its importance to cognition and social interaction. The question is whether these skills constitute 'intelligence' or something else. Research into emotional intelligence has been hampered by the lack of a clear definition of the concept, and by difficulties in its measurement (Mayer, Roberts & Barsade, 2008; Pfeiffer, 2001), but studies have shown emotional intelligence to have positive correlations with verbal and non-verbal intelligence (Kong, 2014; Mayer, Roberts & Barsade, 2008), academic achievement (Barchard, 2003; Fine et al., 2003; Izard et al., 2001; Mayer, Roberts & Barsade, 2008), self-esteem, sociability and life satisfaction (Mayer, Roberts & Barsade, 2008; Mayer, Salovey & Caruso, 2000). The relationship between academic learning and social-emotional intelligence has led to school-based interventions designed to improve school performance by enhancing competencies such as the ability to manage emotions, solve problems and work effectively with others (Payton et al., 2008). There is some evidence that these strategies are effective for improving academic and social skills, and reducing problem behaviours, non-attendance, school alienation and school drop-out rates (Durlak et al., 2011) (see also Chapter 7). Intelligence does not operate independently of emotion, motivation or environment. Whether or not emotions are aspects of intelligence itself, they should be considered as important to the operation of intelligent behaviour. Chapter 4 describes emotional development, and Chapter 8 discusses motivation in detail. Social and emotional learning are discussed in Chapter 7.

STERNBERG'S TRIARCHIC MODEL OF SUCCESSFUL INTELLIGENCE

One of the most prolific writers about intelligence is Robert Sternberg (1985, 1997, 2002, 2003, 2005) (see Box 9.3). Like Gardner, Sternberg rejected the traditional idea of intelligence as a relatively narrow set of abilities closely associated with academic learning. He argued that the concept of *g*, or general mental ability, does not take account of the idea that intelligence is multifaceted and influenced by context. However, whereas Gardner is primarily interested in the *content* of the different intelligences he has identified (for example, linguistic, mathematical, musical and spatial), Sternberg is more interested in the *application* of these intelligences. He has argued that individuals who are more intelligent display their abilities through their ability to learn and process information very rapidly. Such people are also able to respond appropriately in novel situations, and to adapt to the demands of everyday life by modifying their needs and changing their goals when necessary. Sternberg's theory is called the **triarchic model of successful intelligence** because he defined intelligence in terms of successful behaviour. It is also referred to as the triarchic model of intelligence because in it, he identified three key aspects of intelligent behaviour (Sternberg, 1997, p. 344):

triarchic model of successful intelligence
Intelligence defined as thinking (analytic), responding to new experiences (creative) and coping with everyday situations (practical)

- *Analytic*. The mental aspects of an individual's cognitive activity, as in information-processing skills and metacognition (see Chapter 6). Examples include the critical dissection of ideas by a literary reviewer or mathematician.
- *Creative*. An individual's ability to respond to events in the light of previous experience. This is often evident in responses to unusual or novel situations, or in learning new skills. Examples include the accomplishments of poets, composers or engineers.
- *Practical*. How an individual copes with everyday environments, as in the adaptation of existing skills in response to the demands of particular situations. Examples include the applied skills and expertise of a computer operator, a nurse or a carpenter.

BOX 9.3 ABOUT ROBERT STERNBERG

Robert Sternberg (1949–) was born in New Jersey, on the US east coast. He was a bright student who became interested in intelligence and intelligence testing when, as a Grade 6 student, he was forced to retake an intelligence test with students in Grade 5. Sternberg recalled in 1995 that his poor results (due to nerves) on that intelligence test resulted in his teachers having low expectations about what he could achieve at school, which led to him to try and please his teachers by meeting those expectations (Plucker, 2005). When he overcame his test anxiety and did well on an intelligence test, teachers' expectations for him increased and he began to do well at school. In Grade 7 he designed the Sternberg Test of Mental Ability for a science project and administered the test to his classmates along with the Stanford–Binet Intelligence Scale, using a copy he had found in the local library.

Later, while at college, Sternberg had summer jobs working at the Educational Testing Service in Princeton, which produced many of the standardised tests used in schools throughout the world. He went to Yale University as an undergraduate and majored in psychology, graduating in 1972 with a BA summa cum laude (the US equivalent to first-class honours), and gaining a PhD at Stanford University in 1975.

Sternberg has been awarded many honours in the field of psychology, including the Distinguished Scientist Award for an Early Career Contribution to Psychology. His major research interests are intelligence, creativity, wisdom, thinking styles, learning and teaching, love and hate. He is Professor of Human Development at Cornell University.



Source: Courtesy of Professor Robert Sternberg

FIGURE 9.4
Sternberg's ideas about intelligence challenge existing ideas about the relationship between intellectual abilities and learning and teaching.

Sternberg (1997, p. 359) discussed how the triarchic theory might be applied in curriculum areas such as literature, mathematics, history, biology and art. He suggested that when teaching and evaluating learning, one might emphasise:

- *analytical* abilities – by asking students to compare and contrast, analyse, evaluate, critique, explain why, explain what caused …, or evaluate what is assumed by …
- *creative* abilities – by asking students to create, invent, design, imagine, imagine what you would do if …, show how you would …, suppose that …, say what would happen if …
- *practical* abilities – by asking students to apply, show how you can use …, implement, demonstrate how …

Sternberg also distinguishes between academic intelligence, measured by traditional tests of general or fluid and crystallised intelligence, and successful intelligence (the ability to succeed in life in terms of personal goals and life experiences) or practical intelligence (competence in everyday life as measured by tests of tacit or real-world knowledge and understanding) (Sternberg, 2005, 2014).

Sternberg noted that most instruction and evaluation in schools is concerned with what students know. Teachers tend to focus on instructions: 'Who said …?', 'Summarise …', 'Who did …?', 'What happened?', 'How did it happen?', 'Repeat back' and 'Describe …'. In pointing out the limitations of this type of questioning, Sternberg reminded us that although what you know is important, knowing how to use what you know is even more important (Sternberg, 1997, p. 360).

IS INTELLIGENCE MAINLY INFLUENCED BY NATURE OR NURTURE?

nature–nurture debate Controversy over the relative influence that inherent characteristics and environmental factors have on development

What is the origin of intelligence in humans? Is it a product of genetic inheritance, or is it an outcome of environmental factors such as the way parents talk to infants, the types of toys available in the home, experiences at school or socioeconomic status? Which has primacy: 'nature' or 'nurture'? This question is often referred to as the 'hereditary versus environment' or **nature–nurture debate** (mentioned in

Chapter 2). This debate over the relative influence on human development of inherited characteristics (nature) and the role of environmental factors (nurture) has a long history. It has implications for one of the questions discussed previously – whether intelligence is fixed or changeable – and for teachers' practices, as discussed in that section.

'Natural experiments' involving twins living with and apart from their natural families, and families that include both natural and adopted children, have been used to measure the relative influence of genetic and environmental factors on intellectual development. Comparison of the general cognitive abilities of parents and both biological and adopted children living with their own family and apart suggest that the association between parents and their natural children is higher than that between parents and their adopted children. During the early childhood years, the influence of the shared environment is high. However, this environmental influence diminishes as children (adopted children in particular) reach adolescence, perhaps because children have more control over their environment as they mature (Petrill, Pike, Price & Plomin, 2004).

For adopted children, the age at which adoption occurs and the number of years spent in the adoptive home appear to influence general cognitive ability. The influence of environmental factors increases when a child is placed in an adoptive home at an early age and remains with those parents in that home over a number of years (Petrill & Kirby, 2004).

Research fuelling the nature–nurture debate has been highly influenced by the Human Genome Project, a massive research program based in the USA (Bodmer & McKie, 1997). Researchers from all over the world are involved in this project, which has resulted in rapid increases in our understanding of genes and how they work. The goal of the project is to improve our knowledge of human genes by mapping them to DNA sequences – the long, ladder-like molecules that store genetic information in cells. Finding specific genes related to intelligence has proven to be highly complex, with little variance in cognitive ability explained by genetic markers (Nisbett et al., 2012). This probably reflects the contribution of multiple genes to cognitive abilities, the complexity of the construct of intelligence, and the complex relationship between genes and environment in contributing to intelligence.

As we recognise that both nature and nurture contribute to intelligence, it is evident that intelligence is not fixed, but influenced by experience throughout life. Adult scores decrease with ageing, and training in skills such as working memory and executive function can improve scores on intelligence tests (Nisbett et al., 2012).

The heritability of intelligence

Clearly, 'the true heritability of intelligence in human populations is almost certainly above zero' (Howe, 1997, p. 122). Indeed, there is evidence that in relation to general cognitive ability, the abilities of biological parents and their children are closely linked. Studies of twins, DNA and adoption studies all show the importance of genetics to intelligence (Plomin & Deary, 2015). The degree of association increases steadily from infancy, when the level of similarity is less than 20 per cent, to as much as 80 per cent by late adulthood (Plomin & Deary, 2015). Epigenetic studies examine the interaction of genes and environment, and have shown ways in which environment can influence the expression of genes in intelligence as well as in other areas of human development (Bowes, Grace & Hayes, 2012). Intellectual development is also dependent on a number of non-genetic factors, such as the environmental factors detailed below, and the degree of variance that is explained by heritability or environment varies for individuals from different socioeconomic-status (SES) groups (Nisbett, 2014) and different age groups (Deary, Spinath & Bates, 2006). Nisbett (2014) reported that most variation for people from higher-SES backgrounds is explained by genes, whereas most variation for people from lower-SES backgrounds is explained by environmental factors. He explained that the environments of people from high-SES backgrounds are likely to be supportive of intelligence and to show little variation between one another,

so genes explain variance more than environment does. The environments of those from low-SES families, in contrast, may vary from highly supportive to disruptive and chaotic, leaving a stronger role for environment to explain variance in intelligence.

While these findings are about explanations rather than causes, they also highlight the importance of environment to intelligence. There are consistently reported differences in the relative contributions of heredity and environment to intelligence for different age groups, as mentioned above, with the role of environment decreasing and that of heredity increasing with age (Plomin & Deary, 2015; Trzaskowski, Yang, Visscher & Plomin, 2014).

Environmental effects

Negative effects on intelligence are easier to find than positive ones (Hunt, 2011). Environmental factors that have been shown to influence intelligence include prolonged malnutrition, alcohol, lead, chronic stress and brain injury. There are also correlations between SES and intelligence, as mentioned above (see also von Stumm & Plomin, 2015), which have multiple environmental explanations, including quality of the home environment, the amount of language in the home, and stress. SES is considered in more detail in Chapter 11.

On the positive side (and as we would hope as educators), schooling affects intelligence (Nisbett et al., 2012). Comparisons of children who attended and did not attend school prior to the Second World War show higher IQ scores for the former group. Children who miss a year of school show a drop in IQ, and children generally experience a drop in IQ over the summer holiday, particularly if their home environments are low in enrichment (Nisbett, 2014). In another study cited by Nisbett et al. (2012), an increase in years of compulsory schooling in Norway produced substantial gains in IQ for the population (Brinch & Galloway, 2011). This prompts the question, 'What are the aspects of schooling that make the most difference to an individual's intelligence?'

Hunt (2011) proposed the challenge hypothesis, which states: 'Intelligence is developed by engaging in cognitively challenging activities. Environments vary in the extent to which they support such challenges, and individuals vary in the extent to which they seek them out' (p. 26). He argued that genetics may constrain the range of intelligence that can develop, and that physical environments can also constrain it through negative effects, such as have been listed above. At the same time, intelligence potential can be realised by interacting with the social environment. The two factors that vary in his hypothesis above – environmental support for cognitive challenges, and individual engagement with challenges – both lie within the influence of educators and, together with the constraining factors, they explain individual differences in intelligence.



THINK ABOUT

- How will you support cognitive challenges in your classroom? How could you encourage learners to engage with these activities?

STRENGTHS AND LIMITATIONS OF MODELS OF INTELLIGENCE

Strengths

One of the main strengths of the different models of intelligence proposed by Spearman, Gardner, Sternberg, and Cattell and Carroll is that they provide us with ways of conceptualising intelligence. The different models also provide guidelines for collecting evidence on intelligence in activities as diverse as

reasoning, problem solving, dance, music and art. They draw attention to the need for educators to cater for children's different needs and interests.

Limitations

Limitations of these models include a lack of empirical research-based evidence to support the specific abilities identified as comprising intelligence, a lack of clarity in the way these abilities are defined, and a lack of agreement about which of the different models of intelligence is the most useful for educators.

Table 9.3 summarises the strengths and limitations of the models of intelligence proposed by Spearman, Gardner, Sternberg, and Cattell and Carroll. Box 9.4 briefly discusses the implications of these models for classroom practice.

TABLE 9.3 Summary of models of intelligence

THEORIST	CONCEPT OF INTELLIGENCE	MEASUREMENT	STRENGTHS	LIMITATIONS
Spearman	General mental ability (*g*) plus specific mental abilities (*s*)	Single intelligence score	Intelligence score a useful predictor of school performance	Doubts that intelligence is a single general mental ability
Cattell, extended by Carroll	General mental ability (*g*) plus secondary abilities (crystallised and fluid intelligence, memory factors, sensory modalities), plus primary abilities measured by individual test items	Battery of test items relating to the various levels	Accounts for variability across individual factors as well as correlations between scores on different tests. Test scores provide a useful profile of an individual's strengths and weaknesses	Has not been successfully replicated in factor analysis studies
Gardner	A set of separate, specialised, multiple intelligences	Individual tests designed to tap a specific intelligence	Helpful in drawing attention to the need to understand and nurture children's special talents	Are Gardner's intelligences just special talents?
Sternberg	A triarchic model of intelligence comprising analytic, creative and practical aspects	Specific tests designed to tap each aspect	Emphasises the practical aspects of intellectual skills and their application in everyday life	Can Sternberg's model be applied successfully to classroom practice?



THINK ABOUT

- Can you think of both inherited traits and everyday experiences within your own background that had an impact on your own intellectual development?
- Of the different models of intelligence covered so far, which is closest to your personal concept of intelligence?
- Can you recall factors in your own life that influenced your ideas about the nature of intelligence?



BOX 9.4 IMPLICATIONS FOR EDUCATORS

MODELS OF INTELLIGENCE IN THE CLASSROOM

The models of intelligence discussed in this chapter visualise intelligence as a complex, multifaceted cluster of abilities associated with every aspect of human activity, not just academic learning. This has major implications for classroom practice, and indicates that:

- school curricula should be broadened to cover the range of activities represented in profiles of student abilities and interests
- teachers should consider matching student abilities to the forms of instruction and assessment used in the classroom, as there is evidence that such matching leads to improvements in student performance (see, for example, Sternberg, 1997; Sternberg, Torff & Grigorenko, 1998)
- teachers need to be aware of each child's particular abilities and ensure that appropriate experiences are provided to promote each child's potential (such experiences can be derived from a particular model of intelligence or from any program that provides a varied curriculum).

MEASURING INTELLIGENCE

Can we measure intelligence? People generally think of intelligence as a score on an IQ test, so if you ask a person what they know about intelligence, they usually tell you something about IQ scores. But what is an 'IQ score'? Such scores are no longer used very much in school systems, but they provide a valuable insight into the history and development of intelligence measurement.

At the beginning of the 20th century, as the principle of universal education became more widely accepted, it became apparent that many children of school age could not cope within the regular school system. There was something 'different' about these children when compared with their peers: intelligence tests seemed to provide a means for identifying and explaining these differences.

THE STANFORD–BINET TEST

The first effective tests of intelligence were devised by Alfred Binet (see Box 9.5) and his colleague Theodore Simon. The tests were designed to measure general mental ability, and were used to screen children in order to identify those who were thought to be capable of benefiting from school education, and those who needed extra help (Brody, 1992) (see also Chapter 10).

Binet and Simon developed a test involving 30 items that tapped (measured) practical knowledge and skills. Test items required children to name objects in pictures, define words, repeat a set of digits, copy a simple shape, tell the time on an analogue clock, and cut a shape from a piece of folded paper and tell what the shape would be when unfolded. The test was standardised (that is, the test's norms, procedures and scoring were established) using 50 children who were judged to be of 'normal' intelligence and 45 people who were judged as having varying degrees of intellectual impairment. In 1916, Lewis Terman at Stanford University adapted and renamed Binet and Simon's test for use in the USA. The revised test came to be known as the Stanford–Binet Intelligence Scale, and it continues to be widely used in the assessment of children (aged from two years) and adults.

intelligence quotient (IQ) A score on an intelligence test that permits an individual's performance to be compared with the average performance on the test

The original meaning of **intelligence quotient (IQ)**, as developed by psychometricians such as Binet, was 'mental age divided by chronological age multiplied by 100'. If you are 10 years of age, but perform on an intelligence test at the mental age of 12, you have an IQ of 120. This is how the original IQ score was calculated. The procedure is satisfactory when applied to children's scores (although people sometimes make the mistake of assuming that a 10-year-old with an IQ of 120 will behave like a

BOX 9.5 ABOUT ALFRED BINET

Alfred Binet (1857–1911) was born in Nice, France, the only child of an artist mother and a physician father. Binet's parents divorced when the boy was very young and the child was raised by his mother. Initially, Binet studied law in Paris, and in 1878 completed his law degree. By this time, he had become interested in following the family tradition of studying medicine, but his interest in psychology increased and he began to read widely in the field, eventually abandoning his medical studies (Imhoff, 2000). One of Binet's first interests in intelligence involved measuring the volume of people's skulls as a means of measuring intelligence. After collecting data on skull size from several hundred children, he found the differences in skull size were very slight, and the measurements unreliable (Gould, 1981). He subsequently abandoned 'craniology'.

By this time, Binet had two daughters (Madeleine and Alice, born in 1885 and 1887) and, like Piaget, he became interested in their development and in the concept of intelligence and its measurement. After studying attention span in his daughters, Binet devised a set of activities to tap the diverse range of 'thinking' abilities that, it was hypothesised, constituted 'intelligence'. The tasks and puzzles Binet created covered everyday reasoning and comprehension problems such as counting coins, pointing to parts of the body and naming items in a picture. Learnt skills, such as reading, were not included. Binet was aware that age was a major determinant of children's capacity to complete tasks, and so included in each set of tasks were examples appropriate for children at different age levels. Children able to complete tasks that could be done by most children of the same chronological age were judged to have 'normal' intelligence. However, children who failed tasks that most children of their chronological age could do, or who completed more tasks than expected for their age, were judged respectively as 'backward' or 'advanced'. From these tests, Binet developed the concept of 'mental age'. The concept continues to be used, and provides a basis for the concept of 'intelligence quotient', or IQ, which was eventually defined as:

$$\frac{\text{mental age}}{\text{chronological age}} \times 100$$

Binet argued that intelligence was not wholly innate, since it was strongly affected by the individual's experiences. In developing a set of tasks to measure intelligence, he tried to devise tasks that would tap common sense, everyday knowledge or practical understanding, rather than knowledge that had been acquired through formal instruction. He was very concerned that his test might be used to rank students in terms of their 'mental worth' (Gould, 1981, p. 152). He did not want the test to be used to label particular children 'dull' or 'stupid', because he feared such labels would become self-fulfilling prophecies. In later years, Binet developed a series of exercises designed to raise the intelligence of children with intellectual disabilities.


Source: National Library of Medicine

FIGURE 9.5
Binet's interest in children, and particularly those with intellectual disabilities, led to him devising an intelligence test that became a model for subsequent tests.

12-year-old). However, the formula is only applicable when a child's ability to answer questions on an IQ test (that is, their **mental age**) continues to increase steadily with their chronological age. The concept of mental age cannot be used to determine adults' test results because intelligence does not continue to increase during adulthood in the same way it does over the childhood years. A different method of calculating IQ is needed.

mental age
The chronological age that typically corresponds with a particular performance level on an intelligence test

WECHSLER'S INTELLIGENCE SCALES

In 1939, David Wechsler proposed the **deviation IQ**, a solution to the problem of calculating adult IQs. He proposed that IQ should be determined in terms of the number of correct items someone scored on a test (that is, the test score) in relation to the expected average score obtained by people of the same age; that is, 'actual test score divided by expected test score and multiplied by 100'. The deviation IQ is

deviation IQ
An IQ score that compares an individual's performance on a test with the expected average performance of someone in the same age group

a measure of how far a particular test score is above or below the mean (or average) score of the relevant age cohort. It provides a method for rank-ordering individuals in terms of their performance on a test.

To collect the information needed to establish mean scores for different age groups, Wechsler's intelligence tests (such as the Wechsler Adult Intelligence Scale [WAIS], the Wechsler Intelligence Scale for Children – Version V [WISC-V], and the Wechsler Preschool and Primary Scale of Intelligence Fourth Edition [WPPSI-IV]) were administered to very large samples of adults and children. These samples were carefully selected to be representative of demographic characteristics such as age, gender and social class. Information derived from the representative group of adults and children (called the 'standardisation sample'), such as scores that would be expected for individuals of a certain age and gender, are provided in the test manual and are used by psychologists when interpreting individual scores.

ADMINISTERING INTELLIGENCE TESTS

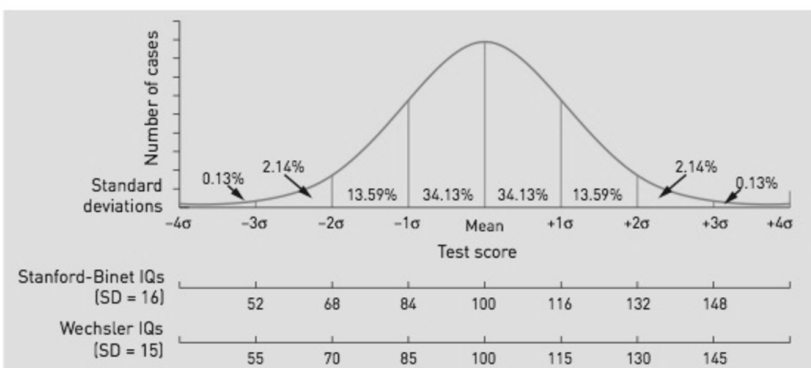
Tests such as the Stanford–Binet Intelligence Scale and the WAIS, WISC-V and WPPSI-IV are administered individually, in a one-to-one situation, by a trained psychologist. Other tests of intelligence, such as the Draw a Person Test (Goodenough, 1926; Naglieri, 1988) and the Peabody Picture Vocabulary Test, Fourth Edition (PPVT-4), can be administered to children individually or in groups by an experienced teacher or other professional. Tests administered individually usually include an array of verbal tasks that involve answering questions by giving information or pointing, and performance tasks that involve sorting, matching or arranging blocks, beads or geometric shapes. Group tests are limited to 'paper-and-pencil' tasks. Tests administered individually are more expensive to use than group tests, but have higher reliability (that is, the same response is obtained on successive occasions) and validity (that is, the tests measure what they are designed to measure). Group tests are mainly used for screening purposes, to identify exceptionally gifted students or those who may need extra help as a result of intellectual disability. See Chapter 13 for more on tests and assessment procedures.

frequency distribution The number of times each score occurs in a range of possible scores

INTERPRETING IQ SCORES

normal distribution (bell-shaped curve) A representation of test scores, showing their natural tendency to cluster around the middle (mean) of the distribution and taper off at either side

Most intelligence tests are designed to have a mean score of 100, with a 'standard deviation' of approximately 15 or 16 (see Figure 9.6). The **frequency distribution**, or number of times each score occurs, is usually represented as a **bell-shaped curve** (or **normal distribution**). The IQ score of a person gives an indication of that individual's position, in relation to others, on a distribution of IQ scores; that is, where their score is located on the bell-shaped curve.



Source: Sattler (2001, p. 17, Figure 2.1)

FIGURE 9.6 The normal curve shows the tendency for most scores to cluster around the middle or mean test score, with smaller numbers of scores at either end of the curve.

Notice that across the base of the normal curve in Figure 9.6, the scaling is in terms of 'standard deviation' units. The **standard deviation (SD)** is a measure of how much scores differ, on average, from the mean. For example, on a test with 25 questions, each worth 1 point, scores from two groups of eight students may have the same mean (10) but one set of scores might be spread out across the range of possible scores (9, 12, 10, 15, 21, 2, 7, 4), while the other set might cluster together (7, 8, 14, 10, 9, 12, 13, 7). The SD (of 6) in scores for students in the first group is much larger than the SD (of 3) in scores for students in the second group, reflecting greater spread or variability in the scores of the first group compared with those of the second. Intelligence tests such as the Stanford–Binet Intelligence Scale have a mean of 100; thus, two-thirds (68 per cent) of scores obtained from the population used to standardise the tests fall between one SD below (84) and one SD above (116) that mean. Students with an IQ of 84 on a Stanford–Binet Intelligence Scale have therefore performed better on the test than almost 16 per cent of their age group, whereas those with an IQ of 116 have performed better on the test than more than 84 per cent of their age group. Experience in using IQ test results in schools has shown that this range (that is, one SD below and one SD above the mean) represents roughly the range of scores for children who can progress satisfactorily in the regular school system. The scores of students who are gifted and talented usually fall within the top 2 per cent of the normal distribution curve – that is, these students have an IQ of more than 130 on the Wechsler scale (Braggett, 2002, p. 292) – while the scores of students with mild and moderate-to-severe intellectual disabilities typically have scores falling in the bottom 2 per cent of the curve, in the range below 70 points (Elkins, 2002, p. 80), and these students may require a high level of additional support at school (see Chapter 10).

standard deviation (SD)
A measure of how much test scores vary from the mean of the sample

When IQ test results are used in making decisions about the specialised needs of individual students, care needs to be taken to avoid the impact of factors such as *test bias*, by which particular students are disadvantaged because of age, gender, language or cultural background by factors associated with the content of the test and interpretation of test results. While many psychological tests were normed in the USA, the WISC-IV Australian edition and WPPSI-IV Australian and New Zealand Standardised edition use local norms. An example of an age- and culturally biased test item is cited by Cianciolo and Sternberg (2004, pp. 131–2): 'Harry Potter is to Voldemort as Ronald Reagan is to (a) California; (b) President; (c) John Hinckley; or (d) Reaganomics'. (Voldemort tried to kill Harry Potter and John Hinckley tried to kill Ronald Reagan.) Older people who have not read one of the Harry Potter books and those unfamiliar with American history would probably fail this question.

Another problem arising in the use of intelligence tests over time concerns the steady rise in IQ scores over the 20th century as individuals perform better on the tests over time. Termed 'the Flynn Effect' (Flynn, 1998, 2007; see Box 9.6), these changes in performance became evident when the tests were 're-normed', a process that is usually done every 15 to 20 years when test items are given to large samples and the mean is reset to a score of 100. If performance on the test rises between one norming and the next, the mean of the new revision of the test will be higher than previously, making the test more difficult. This effect is likely to have a significant impact on those who perform very poorly on the test: 'As IQ norms age, fewer students receive MR [mental retardation] services, but when a newly normed test is introduced, the number of students eligible for these services will increase' (Kanaya, Scullin & Ceci, 2003, p. 781). When eligibility for special programs is dependent on IQ test scores, factors such as the Flynn Effect can have a major impact on both individuals (access to programs where access is determined by an IQ score) and governments (the cost of providing programs to more students) (Flynn, 2000; Kanaya, Scullin & Ceci, 2003).

BOX 9.6 RESEARCH LINKS

THE FLYNN EFFECT: ARE PEOPLE GETTING SMARTER?

Flynn (1987; Nisbett et al., 2012) revealed that widespread intelligence testing in the developed world over the past 100 years demonstrates a cohort effect – scores for each generation (approximately 30 years) are higher than for the last, with gains of about 3 IQ points each decade. In the developing world, nations that are in the process of modernising, such as Kenya, Caribbean nations, South Korea and Argentina, are likewise showing rapid gains in IQ test scores (Flynn, 2012; Meisenberg & Woodley, 2013). Interestingly, gains in a number of Western nations appear to have tailed off and even reversed in some cases over the past decade (Dutton & Lynn, 2013; Flynn, 2013).

Tests of fluid intelligence (problem solving, abstract reasoning) show greater gains than those of crystallised intelligence (cultural knowledge, such as vocabulary and arithmetic). Gignac (2015) found that there were no gains in working memory or short-term memory capacity over 85 years when the Flynn Effect was observed, despite the fact that fluid intelligence and working memory capacity are closely related. This adds to the complexity and puzzle of the Flynn Effect.

What might contribute to these gains in IQ over time?

Test taking. It may be that we are more accustomed to being tested in the modern era, and that this familiarity with the test items, or the kinds of questions they ask, contributes to better scores. This is not supported by the evidence, however, as scores on other kinds of tests (such as assessments of taught knowledge and skills in schools) have remained stable over time (Flynn, 2007). Furthermore, if this were the case, the correlation between IQ score and other factors such as educational achievement or income would have decreased over time, but this has not occurred.

Health. Improvements in health and nutrition have been proposed as one explanation, although the evidence for this is mixed. It would be expected to make a difference to those of low socioeconomic status, and to make less difference in developed nations as time goes on, but this is not consistently the case.

Education. In some countries, gains were greater for the lower half of the population tested. This might suggest that universal education, and increased years of schooling, were factors. However, there are other developed nations where these patterns were not observed, but which have nonetheless had increases in school attendance over the period. Flynn (2007) and Fletcher and Hattie (2011) have suggested that the focus of education has shifted towards scientific reasoning and pattern-finding, which supports the kinds of skills measured in intelligence tests.

Modernity. Flynn (2013) argues that modernity of societies is the ultimate cause of the patterns of results that are seen in the developing world (which is still experiencing modernity, and so seeing gains in IQ scores) and the developed world (which has already achieved the IQ gains from modernity over the last century, so gains have slowed, stopped or reversed). Modernity itself influences IQ largely through a range of environmental forces such as improved diet, education, leisure and parenting practices. Nisbett et al. (2012) propose that more cognitively demanding employment and leisure activities may contribute to the increase.

ACTIVITIES

1 Can you explain the Flynn Effect? How do you account for the various patterns of data?
2 What role does education play in the development of intelligence?

Many older people will remember being given a group intelligence test at school, but younger people are less likely to recall such an experience. Most schools in countries such as Australia and New Zealand phased out IQ testing in the early 1980s. Before that time, children were routinely tested in grades 4 and 6 (ages 9–10 and 11–12 years respectively). Since the 1980s, intelligence tests have generally been used only in special circumstances, such as for entry to a program for gifted students or for the identification of students who need some form of special help in the classroom.

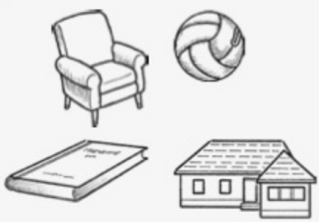
Box 9.7 shows some typical items you might expect to find in an intelligence test.

BOX 9.7 RESEARCH LINKS

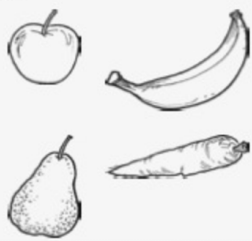
TYPICAL ITEMS IN INTELLIGENCE TESTS

Tests of intelligence typically include items tapping a variety of skills:

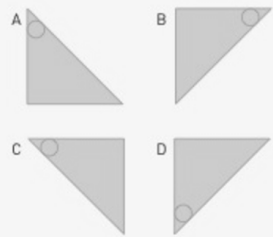
- *general knowledge* – 'How many days are there in a leap year?'
- *verbal knowledge* (see below) – 'Which picture shows furniture?'



- *logical reasoning* – 'Three sisters were walking downstairs. Jen came downstairs first. The youngest sister followed her. Sue followed Jude. Sue is the middle sister. Who is the oldest?'
- *abstract thinking* (see below) – 'Which of these things does not belong with the others?'



- *number patterns* – 'Which is the next number? 4, 5, 7, 10, ...'
- *spatial visualisation* (see below) – 'Which is a rotation of A?'



Some tests try to limit 'test bias' by avoiding verbal components in visual and performance items. Items may require the individual to complete a pattern, draw a figure, put a puzzle together or sequence some pictures.

ACTIVITIES

Think about the examples of IQ test items presented above.

1 Can you identify examples of each of the item types that are likely to be subject to test bias, in terms of age, gender, language or cultural background?
2 Give examples of items that are free of bias.

What intelligence tests do not measure

There are a number of skills that influence intelligence and intelligent behaviour, but which are not directly measured by traditional intelligence tests. This was the issue that led Sternberg to develop an alternative model of intelligence, as described above. The first of these abilities is learning. Tests examine current knowledge or skill, but not the ability of participants to develop these over time. In fact, tests are constructed to prevent testees from learning in the process of taking the test – a feature of tests called 'item independence' (Hunt, 2011). Learning is undoubtedly a feature of intelligent people, and one of the outcomes that intelligence scores are designed to predict, but is not directly measured.

The second ability is creativity, which is addressed in greater detail later in this chapter. There are strong correlations between creativity and scores on intelligence tests, and scores on these tests have been shown to predict creative output in life (Lubinski, Benbow, Webb & Bleske-Rechek, 2006), although there are generally not items in intelligence tests that tap creativity itself.

The third set of skills is variously described (Hunt, 2011; Nisbett et al., 2012), and includes persistence, impulse control, intellectual engagement, conscientiousness and self-discipline. They are generally linked to motivation. Once again, these skills influence intelligence, but they tend to be excluded from intelligence testing in order to improve the validity and reliability of test results.



THINK ABOUT

- How could you maximise students' thinking abilities for particular tasks, focusing on some of the capacities described here?

Each of these abilities is clearly related to intelligence, but they are difficult to test with the kinds of instruments used for traditional intelligence testing. Alternative methods are required, and these tend not to meet the requirements of psychometric testing. We should also note that, although not directly assessed, each of these skills correlates with scores on traditional tests of intelligence (Hunt, 2011).

STRENGTHS AND LIMITATIONS OF INTELLIGENCE TESTS

Strengths

Intelligence tests are useful for identifying students who may be at risk of problems in learning as a result of impaired intellectual abilities, and for planning appropriate educational programs for such students. Intelligence tests may also be useful for identifying students who are intellectually gifted, particularly those who are underachieving.

Limitations

Limitations to the use of intelligence tests are associated with questions concerning the reliability and validity of scores derived from group tests in particular. Tests may also have limited use as a result of the restricted range of skills measured. There is also a risk that information about an individual student's performance on an intelligence test will lead to expectations about that particular student's future level of achievement, which may have an adverse effect on achievement and self-concept. At a broader level, there is a risk that intelligence tests will have a negative impact on curriculum when children are required to undertake learning tasks that are designed to prepare them for 'taking the test', with the resulting neglect of more interesting and useful activities.

Some issues that need to be considered by educators when using information from intelligence tests are outlined in Box 9.8.



BOX 9.8 IMPLICATIONS FOR EDUCATORS

ISSUES TO CONSIDER WHEN USING INTELLIGENCE TEST SCORES

When considering information derived from intelligence tests, teachers need to be aware of the following:

- Knowledge of students' scores on an intelligence test can lead to unconscious expectations about some students' future progress.
- Scores from intelligence tests are influenced by inherited and environmental factors.
- Data derived from intelligence tests administered individually to children by trained examiners have higher levels of reliability and validity than scores from intelligence tests administered to children in groups.
- Information from intelligence tests can be useful in identifying students who may need extra help or a special program, and also students who are intellectually gifted and talented.
- Teachers need to know how to interpret scores derived from intelligence tests.

LEARNERS WITH EXCEPTIONAL ABILITIES

Josh entered kindergarten with advanced mathematical and reading abilities, at approximately Year 5 level. His teachers were faced with the question of whether to accelerate his studies, or to enrich the kindergarten curriculum for him, so that he could study with same-age peers.



THINK ABOUT

- What would you do if you were Josh's teacher?
- What information would you and his parents require to help you make the decision?

One outcome of the focus on developing effective tools for measuring intelligence has been an interest in individuals who score at the extreme ends of the IQ distribution; that is, those who score very low on an IQ test and those who perform in the very high range. Because of the developmental and learning difficulties experienced by children who are at the very low end of the continuum, considerable attention has been paid to this group, particularly by those working in the field of special-needs education (see Chapter 10). However, interest has also focused on children at the other end of the continuum, whose scores on tests of intelligence and ability are markedly higher than those of their peers. Such children are often labelled as 'gifted', 'talented' or 'creative'. Other terms used include 'high ability', 'genius' and 'prodigy'. However, in some contexts, these children are described as 'underachievers', 'educationally disadvantaged' or having 'special needs' on the grounds that schools fail to provide the programs such children need to ensure that they achieve their full potential (see Moore, Ford & Milner, 2005). Gross (1993, p. 35) claimed that 'the majority of academically gifted students underachieve significantly in the regular classroom and many are seriously de-motivated by the time they have passed through the first few years of elementary school'.

So who are these academically gifted children, and how should they be educated? Box 9.9 offers some case studies.

BOX 9.9 CASE STUDY

CASE STUDIES OF GIFTED STUDENTS

Case study 1

Michael has both endearing and aggravating behaviours in the classroom. He may appear slow and deliberate at times, especially when quick answers are being sought to low-level questions. He sometimes seems to make too much of what was a simple question. He runs on his own time lines, which means there are times when he gets frustrated because he has to put a project down and turn to the next subject. He is usually very systematic and logical, which can make him very uncomfortable when a teacher tries to encourage him to be creative. He is not a willing risk taker and wants structure in many cases when long-term assignments are given. When questions are asked in class, Michael can be annoying at times when he so consistently rewords the question before answering. It is very hard to find enough extra assignments to keep him busy in subjects such as mathematics and science, where generally the class is being taught the facts of that content area. He appears to sop up information as quickly as it can be offered.

Michael scores very highly on almost every aptitude and achievement test, and will usually have very high grades. Yet he may be a serious underachiever because he is not being offered enough content or enough complexity to that content, nor has compacting of his curriculum taken place. Anywhere from three to six years of Michael's school life may be spent without learning a single new idea or concept. The only characteristic that may keep Michael from pure disillusionment with school may be his own perseverance and patience, waiting for the day when school will be 'hard and fun'.

Case study 2

Jamal is a constant hand raiser and totally focused when social studies or history classes are in session. He knows every answer to the teacher's questions in those classes. He has read every children's book and a great many adult books on Australia's participation in the Second World War, in particular. No matter what the subject in social studies, he can find some way to relate it to something he has just read about the war. Jamal probably knows more about that period of history than his teachers do. Jamal gets so excited in discussions, however, that he often forgets to let other children have a chance to answer. He will shout out answers and forget to raise his hand. It is very important to him to let the teacher and his peers know what he knows.

Unfortunately, Jamal does not have the same love or skill for mathematics. His test scores are consistently below grade level and he displays no interest in working hard to improve that area. More than one of his teachers suspects that if there were a way to relate basic maths facts to wartime events, he would learn maths easily. Jamal was not considered for the gifted program at his school, despite the fact that many of the enrichment activities planned involved history. His classroom teacher would not let him be considered because of his poor performance in maths class. Jamal was, of course, highly disappointed.

The major reason Jamal will likely continue to go along with the system in years to come will be his natural love of learning and the cognitive support for his talent area, which he receives at home and from the occasional teacher at school, who will value the very specialised gift Jamal possesses. We can only hope that those teachers don't appear too many years apart as Jamal progresses through school.

Case study 3

Chwee is flamboyant in her dress, really into the vampire look currently, but great to be around. Her excitement when she thinks of an idea is contagious, as is her sense of humour. Her school performance is spotty, to say the least. In classes where the teacher recognises and respects her fine, original mind, she outdoes herself in the quality and quantity of her work. But in

>>

classes where 'no exceptions are made', where assignments are rigid and deadlines are enforced, Chwee refuses to produce and does fail. This happens regularly within every subject area in high school. She failed the Rhetoric class, but aced the Creative Writing class. Geometry was a whiz for Chwee, but Maths Analysis represented another low grade for her. One can almost predict in which classes Chwee will do poorly by which teacher she is assigned.

As a result, Chwee's general skill levels are poor and there is some question about whether she will be able to get into university at all. Unlike Jamal, she has no specialised talent area at present, and for her to be able to fully use her high degree of originality, she must become an 'expert' in some area. (That is what some researchers, such as David Feldman and David Perkins, have suggested.) Without that, her creativity will probably never be fully utilised. She may end up being like the creative garbage collector who fashioned unusual junk sculptures that were featured on a television series on creativity several years ago.

There is no doubt that Chwee will be happy in adulthood; she has the natural flexibility to rearrange events for her own comfort. However, it will be a severe loss for our society if Chwee's creativity is not channelled into finding solutions and reformulating the problems that we have been grappling with for years, such as cures for cancer, prevention of ecological destruction, replenishing the ozone layer in the stratosphere, and providing food for the underdeveloped nations of the world.

Source: Vialle and Rogers (2009). Copyright © 2009 by Wilma Vialle. Used by permission.

ACTIVITIES

1 Identify the particular gifts or talents of the three students described here.
2 What difficulties do their particular gifts present for the teacher and for them as students?
3 What strategies might teachers use to identify giftedness and unusual talents or creativity in their students? Are the same strategies appropriate for finding gifted students who are underachieving, or who speak languages other than English?
4 Are you familiar with any special provision that is made for students with unusual or special gifts and talents? How effective are these arrangements for the students involved?

You may find useful information for answering these questions in Table 9.4 (see page 357).

CONCEPTS OF GIFTEDNESS AND TALENT

The term **gifted** has traditionally been used to refer to individuals with high general intellectual ability (Detterman, 1993). More recently, the term has referred to students who demonstrate the potential to achieve at a level that is considerably superior to their age-peers in one or more areas of achievement (intellectual, creative, socioemotional and physical domains), while **talent** is defined as significantly superior achievement in one or more areas of performance (Gagné, 2003). Appropriate opportunities, application, practice, and teaching and learning all contribute to the translation of a gift (the potential) into a talent (the achievement, which is a realisation of the potential).

gifted
Significantly superior potential to achieve in one or more domains

talent
Significantly superior performance in one or more domains

Giftedness is partly innate, but it is generally accepted that it is also influenced by external contributing factors, such as a stimulating home background, a supportive school environment, sympathetic teachers, and good role models and mentors, together with hard work, coaching and practice, that interact with personal characteristics such as motivation, confidence, self-esteem, perseverance and personality (Braggett & Bailey, 2005, pp. 365–6; Renzulli, 2013). It is estimated that up to 60 per cent of gifted students underachieve at school (Gross, 1993), often leaving school early. Factors associated with this high level of (often 'invisible') underachievement are both intrapersonal (for example, lack of motivation, low self-esteem, poor health, and learning and language difficulties) and environmental (for

example, disadvantaged socioeconomic background, minority cultural group, low teacher expectations and inappropriate or ineffective teaching practices) (Moore, Ford & Milner, 2005; NSW Department of Education and Training, 2004).

Attributes that are frequently (but not universally) present in gifted and talented students include:

- *language and literacy-related skills* – a large, advanced vocabulary for their age; the ability to discuss complex ideas and concepts; enjoyment of reading; and the ability to use two or more languages
- *cognitive and problem-solving skills* – speedy information processing; quick mastery and recall of factual information; the ability to work independently, to be self-critical, and to strive for perfection; an interest and concern for world problems; the ability to apply learning and knowledge from one situation to another; and the ability to grasp relationships and principles, and to draw sound generalisations. Monro (2013) reviewed neurological research revealing that gifted students develop more elaborated and differentiated networks of knowledge, which may explain some of these skills. He argued this allows them to go beyond what is taught to develop new theories, connections and ideas
- *independence and broad interests and activities* – the ability to work independently, to be self-critical, and to strive for perfection; an interest and concern for world problems; initiation of their own activities and absorption in them, with little external motivation; wide interests, often in art, music and drama; and the ability to relate well to older students and adults, and enjoy learning from them (NSW Board of Studies, 2001, p. 7).

Renzulli (1978, 2002, 2013), in the three-ring conception of giftedness, described the behaviour of gifted individuals in terms of three interacting sets of traits:

1 *above-average ability* – including both general ability such as memory and word fluency, which remain stable over time, and specific ability or the capacity to apply knowledge and skills to solve problems
2 *high levels of task commitment* – including self-confidence, capacity for high interest level, hard work, determination and setting high standards in a particular area
3 *high levels of creativity* – openness to new experiences, curiosity, willingness to take risks, and fluency, flexibility and originality of thought.

Hence in Renzulli's view, the identification of gifted students must go beyond intelligence test or academic achievement test scores and look also at non-cognitive factors. It will also vary for different situations and tasks, and in different people.

Schools are responsible for identifying gifted students, including those who underachieve as a result of cultural difference, disability and low socioeconomic background, and for providing them with the experiences and resources that will ensure that their potential for outstanding performance is realised.

IDENTIFYING GIFTED AND TALENTED LEARNERS

Intelligence tests, such as those developed by Binet and Wechsler, have traditionally been used to identify children who are gifted – who were defined as those who are in the top 2 per cent on a distribution of IQ scores (or IQ 130+) for their age group. Indeed, very high general intelligence continues to be seen as one characteristic of gifted children (for example, ACARA, 2012b), and tests of general ability are still used in many school systems to identify such students, alongside other tools (for example, ERO, 2008; South Australia Department of Education and Child Development, 2012).

As a result of changes in concepts of intelligence through the increasing level of interest in the multifaceted theories of intelligence proposed by Cattell (1987), Gardner (1983) and Sternberg (1988), there is growing acceptance of much broader concepts of giftedness than simply a high IQ score. For

example, it is now generally accepted that a gifted or talented individual can excel in any of a number of different areas of performance. A child may score poorly on a test involving expressive language and, as a result, gain a low IQ score, but at the same time, have exceptional visual or auditory skills not tapped by traditional intelligence tests. Gardner (1997) suggested that children should have the freedom to allow their talents to develop in whatever ways they can.

The Gifted Education Research, Resource and Information Centre of the University of NSW (GERRIC) produced a professional development package for teachers in collaboration with DEEWR (which in 2013 split into the Department of Education and the Department of Employment), which is available online. The authors of Module 2 in the package, C. Merrick and R. Targett, suggest the following characteristics that teachers can use to identify gifted students. Each characteristic may have positive and negative behaviours associated with it. For example, being highly curious may mean a student asks lots of questions, but it may also mean they could be easily diverted from a task. The characteristics are:

- highly curious
- abstract thinker
- flexible thinker
- clever use of humour
- superior vocabulary
- advanced reading
- fast learner, retention of knowledge
- long attention span
- independent
- high level of responsibility and commitment
- strong feelings and opinions
- strong sense of justice
- original and creative
- high energy level
- immersion learner

Source: Gross (2005).

The identification of gifted and talented students works best when it can draw on both formal, standardised test results, and informal nominations from parents and teachers, based on their own judgements of a student's ability developed from observations and work samples over an extended period of time. In identifying gifted and talented students, it is particularly important to be mindful of gifted students from groups who may have been overlooked in the past. This may include students who are currently underachieving, those from different cultural and/or language backgrounds, those who are 'twice- or multi-exceptional' (that is, who have other identified needs), and those from lower socioeconomic backgrounds (New Zealand Ministry of Education, 2012).

EDUCATIONAL PROGRAMS AND PROVISIONS FOR GIFTED STUDENTS

Selective secondary schools and special opportunity classrooms (OC) in primary schools have been a feature of the provision for gifted students in some Australian States, such as New South Wales, since the 1930s. Special primary classes were also established in Tasmania and Western

CourseMateExpress
Online resources
Watch a **video** on this text's website in which gifted students talk about their extension science class.

acceleration
Allowing students to move faster through the education system

curriculum differentiation
Modification of instruction, materials and assessment procedures to match learner needs

Australia, but were later discontinued (Senate Select Committee, 1988). Until 1988, there was little formal recognition of gifted students in New Zealand, although the New Zealand Government subsequently introduced policies and programs designed to extend and challenge students who are gifted and talented (Riley, 2001, 2002), and the New Zealand curriculum acknowledges the needs of gifted and talented students (New Zealand Ministry of Education, 2012), as does the Australian curriculum (ACARA, 2012b). Some form of **acceleration** (or allowing students to move faster through the education system) and **curriculum differentiation** (or modification of instruction, materials and assessment procedures to match learner needs) is provided in Australia and New Zealand to support gifted and talented students (see Box 9.10).

Acceleration, either in a particular subject, or across a grade, is well supported as a strategy for gifted students, with evidence in the research literature of both academic and social and emotional benefits for these students (Plucker & Callahan, 2014). Monro (2013) argued that differentiation of instruction is important given the different learning processes employed by gifted students. Specifically, he argued that the neurological findings that gifted students have advanced metacognitive abilities, a greater working memory capacity, ability to integrate knowledge from different parts of the brain, and ability to develop theories should be taken into account by teachers in their approach to teaching their gifted students. Cohen (2011, pp. 135–6) identified the following six principles from research on teaching gifted students:

1 Focus on the unique pattern of strengths of each student.
2 Group students by interests or abilities, at least part of the time.
3 Move as far and as fast in the basic skills as possible.
4 Enrich individual interests.
5 Offer mediation, counselling, mentoring and facilitation.
6 Provide the tools for lifelong learning..



BOX 9.10 CLASSROOM LINKS

ACCELERATION AND CURRICULUM DIFFERENTIATION

Acceleration and curriculum differentiation involve both the enrichment and the extension of students' experiences, knowledge and skills (VanTassel-Baska, 2005). These provisions involve programs and services at the school and classroom levels, with students themselves given opportunities to plan and manage their own learning, and teachers assisting students in their decision making.

A major initiation in the field of gifted education in Australia was commissioned in response to the findings of a report prepared by the Senate Employment, Workplace Relations, Small Business and Education Reference Committee (2001). Arising from this report, GERRIC was commissioned to develop the Gifted Education Professional Development Package (Gross, 2005), covering the needs of teachers working at all levels (early childhood, primary and secondary) and in a variety of locations and situations (urban, rural, in a classroom, whole school, small group, one-to-one, in administration or undertaking professional development). Examples of enrichment, extension and acceleration strategies for differentiating the curriculum are set out in Table 9.4.

>>

TABLE 9.4 Strategies for acceleration and curriculum differentiation

ENRICHMENT ACTIVITIES	EXTENSION ACTIVITIES	ACCELERATION STRATEGIES
Broadens the range of experiences for all students. It is particularly important for students who experience educational disadvantage as a result of their language, or cultural or socioeconomic background: • excursions • competitions • debates and public speaking • clubs or electives • guest speakers and outside experts • use of ICT (information communication technology; see Chapter 12)	Encourages expansion of knowledge and skills in the regular classroom and can be provided through inquiry-based, open-ended instruction, flexible grouping and on-site learning centres using negotiated curriculum contracts, peer tutoring and community mentors: • learning centres • challenge centres • parallel programming • contracts and Individual Education Plan (IEP) • mentors • peer teaching • camps • use of ICT and virtual instruction Other within-class activities include: • problem-based learning • higher-level questioning techniques • assessment differentiation • quality teaching • access to advanced learning opportunities outside the school, including courses offered by tertiary institutions through ICT	Enables gifted students to participate in learning experiences based on their own performance level, usually with older students. It may involve grade-level acceleration and content acceleration (curriculum flexibility): • early entry to formal school, or secondary school • within-class ability grouping • cross-setting and cross-grading • vertical and family grouping • exemption from knowledge and skills already demonstrated • placement at higher level within classroom, school, across primary, secondary or post-school options for specific content areas (for example, mathematics and physics) • year skipping or placement at higher year level • whole-group acceleration where whole class is given fast-paced learning

Source: Adapted from VanTassel-Baska (2005, pp. 91–6); Riley et al. (2004, p. 191); Western Australia Department of Education (2015, p. 14).

ACTIVITIES

1 Think about a class that you are familiar with. If you were the teacher in this class, would you try to identify any gifted or talented students? How would you do this? Give reasons for your answers.
2 How would you provide for the specific needs of the students you identify? Give reasons for your answer.
3 Do you anticipate any difficulties in the identification and implementation of a program for the gifted and talented students you identify? How might these difficulties be overcome?

CREATIVITY

Ideas of creativity and giftedness are sometimes combined (for example, Gagné, 1993) with an assumption that creative people are gifted with particular creative skills and capacities – or in Renzulli's view, described earlier (see page 354), that part of giftedness is creativity. However, we now recognise that there are commonalities between the factors involved in gifted 'elite' thinkers or artists, and those in the development of creative thinking in the general population (Amabile & Pillemer, 2012). Although early views of creativity tended to focus on select creative individuals (and products), more recent views recognise that we can all be creative in everyday life (see, for example, Beghetto & Kaufman, 2007).

According to Sternberg (2003, pp. 325–6), **creativity** refers to novel thinking that leads to the production of innovative and valuable ideas. Most definitions of creativity involve the combined dimensions of novelty and utility. That is, something is judged as creative if it is both new and useful for its context. Creativity, under this definition, is judged by what is produced. Tests of creativity measure people's ability to produce novel and appropriate solutions to various questions, problems or situations (for example, see Torrance, 1988).

creativity
The ability to think in novel ways to produce innovative and valuable ideas

Sternberg (2012) pointed out that creativity is also a process, or indeed, as he put it, 'habitually respond(ing) to problems in fresh and novel ways' (p. 3). The Australian and New Zealand curricula link to this view in talking about creative *thinking*. In this view, creative thinking may be seen across domains, as well as its results in products within a specific domain (Beghetto & Plucker, 2006).

Current theories of creativity also recognise a number of components contributing to it, including both individual and social-environmental factors (Amabile & Pillemer, 2012; Sternberg, 2012).

Individual factors include:

- Intelligence – This is necessary but not sufficient for creativity to result (Jauk, Benedek, Dunst & Neubauer, 2013).
- Thinking skills – Both divergent and convergent thinking are needed to ensure novelty and appropriateness/evaluation.
- Knowledge and expertise
- Personality – Willingness to take risks, perseverance, self efficacy (Sternberg, 2012).
- Intrinsic motivation (Amabile & Pillemer, 2012) or task-focused motivation (see Chapter 8 for more on motivation) – In some situations, extrinsic motivation can be helpful, particularly in encouraging persistence in the face of difficulty, although Amabile's work has shown the need to take care that it does not undermine the intrinsic motivation that is essential to the creative process.
- Self-efficacy / self-belief.

Social-environmental factors include:

- stimulation from people as well as materials
- support from adults and peers, as well as from the broader culture (Sternberg, 2012)
- actions of significant others that influence intrinsic versus extrinsic motivation (Amabile & Pillemer, 2012).

Supporting creativity in the classroom

Creative (and critical) thinking is a general capability in the Australian curriculum, and in the New Zealand curriculum, students are encouraged to value 'innovation, inquiry, and curiosity, by thinking critically, creatively, and reflectively' (New Zealand Ministry of Education, 2007). How can teachers support creativity in their classrooms? Kampylis and Berki (2014) stressed that creative thinking can be supported in all curriculum areas. Davies et al. (2012) reviewed research on this question from education settings across the range from early childhood to secondary schools, and identified aspects in three main groups: learning environment, learning relationships, and pedagogy, as detailed below.

Kampylis and Berki (2014) summarised characteristics of classrooms that support creative thinking, with considerable overlap with Davies et al.'s findings. Their paper also contains a number of practical suggestions on how teachers can apply these principles from research.

- Learning environment:
  - > Physical environments that have flexible, open spaces
  - > Consideration of light, colour, sound, air flow and materials as well as furniture arrangement to encourage collaboration (Kampylis & Berki, 2014); see Figure 9.7
  - > Taking students outside the classroom encourages collaboration and ownership of the space; this may be to structured places such as museums and art galleries, as well as informal spaces and outdoor settings
- Learning relationships:
  - > Opportunities for collaboration with peers. Collaboration is confirmed in a number of studies as contributing to creativity – Sawyer and DeZutter (2009) describe creativity as arising from distributed (group) learning situations

- Regular teacher–student dialogue about their work
- Mutual respect, and supportive relationships between teachers and students

- Pedagogy:
  - Tasks that are authentic and worthwhile. This element was also identified by Kampylis and Berki (2014), and in the Queensland longitudinal study of productive pedagogies (see Box 7.6 on page 273)
  - Novelty in activities, materials and resources stimulates creative thinking. Kampylis and Berki (2014) point out that ICTs, used well (see Chapter 12), provide opportunities for this stimulation, as well as opportunities for other aspects of pedagogy in this list such as collaboration, student direction, play-based learning, flexible time, and opportunities to explore and imagine. Of course, these things depend on how ICTs are used
  - Balance of structure and freedom that supports risk taking. Encouraging risk taking and acceptance of mistakes was also identified by Kampylis and Berki (2014) as important to developing creative thinking. They point out that risk taking is essential to the creative process, and that mistakes should be accepted as inevitable along the way
  - Formative assessment practices (see Chapter 13) can foster creativity by shifting the role of assessor to the student themselves and providing regular feedback on how they are progressing
  - Multiple opportunities for students to initiate their own activities and make choices
  - Opportunities to explore and imagine, also identified by Beghetto and Kaufman, (2014)
  - Play-based learning for students in all age groups
  - Flexible time: students able to work at own pace, and have time to immerse themselves in an activity
  - Teachers model creative thinking
  - Beghetto and Kaufman (2014) added to this the importance of teaching students 'creative metacognition' – the ability to recognise when creativity is appropriate and when it is not – as well as teachers explicitly teaching for creative thinking, and encouraging intrinsic motivation.



Source: Andrew Holt/Getty Images

FIGURE 9.7 Learning environments can support creativity by encouraging collaboration and exploration, and by stimulating ideas.

STRENGTHS AND LIMITATIONS OF PROGRAMS FOR GIFTED, TALENTED AND CREATIVE STUDENTS

Strengths

Policies and programs designed to cater for students who are exceptionally gifted, talented or creative help to ensure that such students' needs are recognised, and that opportunities are provided for their unusual abilities to be realised. Without such provision, there is a risk that these students will underachieve and fail to reach their full potential. The introduction of gifted education policies and programs in all schools will provide all students with the opportunities, resources and encouragement needed to reach higher levels of performance than would be expected within more traditional general education settings (Renzulli, 2005).

Limitations

Limitations associated with programs for students with exceptional abilities concern uncertainty about the type of programs that are most effective for students in this group. Questions that need to be asked include whether or not the regular curriculum should be enriched, or whether students should be allowed to progress more quickly than usual through the regular school grades. There is also uncertainty about how special programs should be delivered. Should students with exceptional abilities be gathered into a group with a specialised program and a highly trained teacher, or should their needs be provided for within the regular classroom? Without the involvement of teachers with policymakers in planning initiatives for gifted students, or the provision of necessary resources, materials and teacher training, the effectiveness of efforts to change schools may be limited (Renzulli, 2005).

Box 9.11 outlines some strategies for fostering student ability in the classroom.



BOX 9.11 IMPLICATIONS FOR EDUCATORS

STRATEGIES FOR FOSTERING STUDENT ABILITY IN YOUR CLASSROOM

It is now generally accepted that schools need to provide opportunities within the curriculum to enable the outstanding abilities and talents of a small number of students to emerge. The responsibilities for teachers in achieving this goal include:

- becoming familiar with the characteristics of giftedness
- using appropriate methods for identifying students who are gifted, including those who are underachieving and those from groups disadvantaged as a result of their language, cultural and socioeconomic backgrounds
- liaising with parents and carers regarding the characteristics of giftedness, the identification of gifted children, the importance of providing encouragement and a stimulating and supportive home environment, and becoming informed about options available to support the children's development
- enlisting support from specialists
- seeking specialist advice and resources to help in the provision of a differentiated curriculum in terms of learning experiences, teaching practices and teacher expectations, so that content, learning processes and student tasks reflect differing levels of student knowledge, skills, interests and learning styles
- challenging students who are gifted through curriculum activities that require depth of study, complexity of thinking, high-level skills development and/or creative thinking (Queensland Department of Education and the Arts, 2005, p. 2.).

Cautionary note: when teaching students who have special learning needs associated with giftedness and special talents, it is important that they be allowed (and assisted) to work more quickly or more deeply on set tasks or on activities associated with their own interests (Braggett, 2002). However, teachers need to avoid giving students who complete set work quickly 'more of the same' or 'busy work', since this will be seen by these students as a punishment rather than a reward. Similarly, being asked to help other students, or to read while the rest of the class catches up, can become boring and a waste of time when it happens too often (Cohen, 2011; Coote, 2000).



THINK ABOUT

- What, if any, strategies were used in the schools you attended to identify and assist students who were gifted and talented? How effective were these strategies?
- If you were teaching a class that included one or two exceptionally gifted students, what would you do to support these students?
- What steps would you take to ensure that underachieving gifted students were identified and supported?

CONCLUDING COMMENTS

Intelligence has been conceptualised differently in various cultures, and by different psychologists. The model of intelligence you adopt as a teacher will influence such practices as how you perceive and interact with your students, your approach to and use of testing information, the grouping of students, differentiation of teaching, and procedures for identifying gifted students or students requiring special education assistance. Intelligence provides potential for learning that can be realised if appropriate opportunities are provided within educational programs. Educators must also provide the necessary support and stimulation to ensure that unusual or exceptional gifts and talents are realised and expressed. Failure to achieve these goals leaves the whole community poorer.

CHAPTER REVIEW

- Intelligence is described as a complex, multifaceted cluster of abilities that have a major impact on all aspects of human activity, but particularly on learning at school.
- Early models of intelligence include Spearman's general mental capacity (*g*), plus specific mental abilities (*s*), and Cattell and Carroll's three-stratum model of intelligence, Gardner's multiple intelligences and Sternberg's triarchic model.
- Teaching programs based on Cattell's, Gardner's and Sternberg's models of intelligence need to provide a range of academic and non-academic experiences.
- Tests and other assessment procedures designed to measure intelligence need to reflect diverse areas of human experience.
- There is debate about the extent to which intellectual abilities are the product of inherited characteristics or environmental influences; whether intelligence is one thing or many; and the extent to which intelligence can be taught.
- Giftedness is seen as a potential for exceptional development and achievement, and is considered to be innate in some children.
- Talent and creativity involve high levels of achievement in areas that are culturally valued, and are a product of personal and environmental factors. Their realisation is associated with a strong motivation to excel, as well as mastery of relevant knowledge and skills.

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- a **self-check quiz**
- **crosswords**, **flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.

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QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1 List some of the characteristics that are usually included in Western definitions of intelligence. Give examples of characteristics that might be used in a non-Western definition.
2 How would you define an intelligent person? How important is academic intelligence? What about practical intelligence?
3 What are your views on the following debates? Plot your position on the arrows below. Compare your views with those of a friend. Consider how your views on intelligence will influence your teaching and your attitude to students.

intelligence is a single ability, applied across all tasks	intelligence is composed of many abilities, and is different for different tasks
intelligence is innate, something we are all born with to a particular degree	intelligence is a function of a person's environment and life experiences
intelligence is fixed	intelligence is changeable

4 Think of a skilled task you are familiar with (for example, cooking a fruit cake, playing basketball, playing the piano, playing a video game, or negotiating conflict between two children). Identify the particular skills involved in this task. Would you categorise them as intelligences?
5 Present a case for why emotional intelligence should be included as part of the school curriculum. Consider the opposite case.
6 Consider Sternberg's argument that teachers should focus on how students use what they know rather than on knowing content. What was the focus when you were at school? What about at university? How should teachers balance knowledge of content, knowledge of thinking skills, and knowledge of how to apply content and thinking in practical situations?
7 Draw a concept map of the factors contributing to, and resulting from, intelligence.
8 What is the difference between talent, giftedness and creativity? How could you identify these in the classroom?
9 Return to the 'Think about' question on page 351. How would you respond, having reviewed the section on children with exceptional abilities?

KEY TERMS

acceleration
creativity
crystallised intelligence
curriculum differentiation
deviation IQ
emotional intelligence
fluid intelligence
frequency distribution
general mental ability (*g*)
gifted
intelligence
intelligence quotient (IQ)
mental age
multiple intelligences (MI)
nature–nurture debate
normal distribution (bell-shaped curve)
specific mental abilities (*s*)
standard deviation (SD)
talent
triarchic model of successful intelligence

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'INTELLIGENCE' AND MATERIAL IN OTHER CHAPTERS

- Consider how the particular assessment type used might affect the measurement of intelligence or creativity. Refer to Chapter 13, which describes a range of assessment tools, and try designing a different kind of intelligence 'test' using a different assessment tool.
- How might students' special needs (Chapter 10), sociocultural background (Chapter 11) or motivation (Chapter 8) influence the recognition of their abilities and/or intelligence?

FURTHER RESEARCH

RECOMMENDED READING

Cianciolo, A. T. & Sternberg, R. J. (2004). *Intelligence: A brief history*. Malden, MA: Blackwell.

Davies, D., Jindal-Snape, D., Collier, C., Digby, R., Hay, P. & Howe, A. (2013). Creative learning environments in education: A systematic literature review. *Thinking Skills and Creativity, 8*, 80–91.

Gross, M. (2005). *The gifted education professional development package*. Sydney: Gifted Education Research, Resource and Information Centre (GERRIC). Retrieved from https://education.arts.unsw.edu.au/about-us/gerric/resources/pd-package/

Hunt, E. (2011). *Intelligence*. Cambridge: Cambridge University Press.

McAlpine, D. & Moltzen, R. (Eds). (2005). *Gifted and talented: New Zealand perspectives*. Palmerston North: Kanuka Grove Press.

Nisbett, R. E., Aronson, J., Blair, C., Dickens, W., Flynn, J., Halpern, D. F. & Turkheimer, E. (2012). Intelligence: New findings and theoretical developments. *American Psychologist, 67*(2), 130–59.

Plucker, J. A. & Callahan, C. M. (2014). Research on giftedness and gifted education: Status of the field and considerations for the future. *Exceptional Children, 80*(4), 390–406.

RECOMMENDED WEBSITES

To learn more about ability testing and resources for teaching students who are gifted and talented, visit the following sites:

NSW Association for Gifted & Talented Children: www.nswagtc.org.au

Victorian Department of Education & Training: Gifted and talented education: www.education.vic.gov.au/school/parents/secondary/Pages/gifted.aspx

Western Australia Department of Education: Gifted and talented: www.det.wa.edu.au/curriculumsupport/giftedandtalented/detcms/portal/

Queensland Department of Education and Training: http://education.qld.gov.au

NSW Public Schools: www.schools.nsw.edu.au

New Zealand Ministry of Education: http://gifted.tki.org.nz/For-schools-and-teachers

Te Kete Ipurangi – The Online Learning Centre: www.tki.org.nz

UNSW Gifted Education Research, Resource and Information Centre: https://education.arts.unsw.edu.au/about-us/gerric/

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

- Binet
- creativity
- emotional intelligence
- gifted AND talented
- intelligence
- intelligence test
- multiple intelligences
- nature–nurture
- triarchic model of intelligence.

Combining these terms with words such as 'schools', 'students', 'learners' or 'adolescents' (as in 'engagement and school') will limit your search to material related to schools and young students.

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

Chapter 10

DIVERSE LEARNERS AND EDUCATION

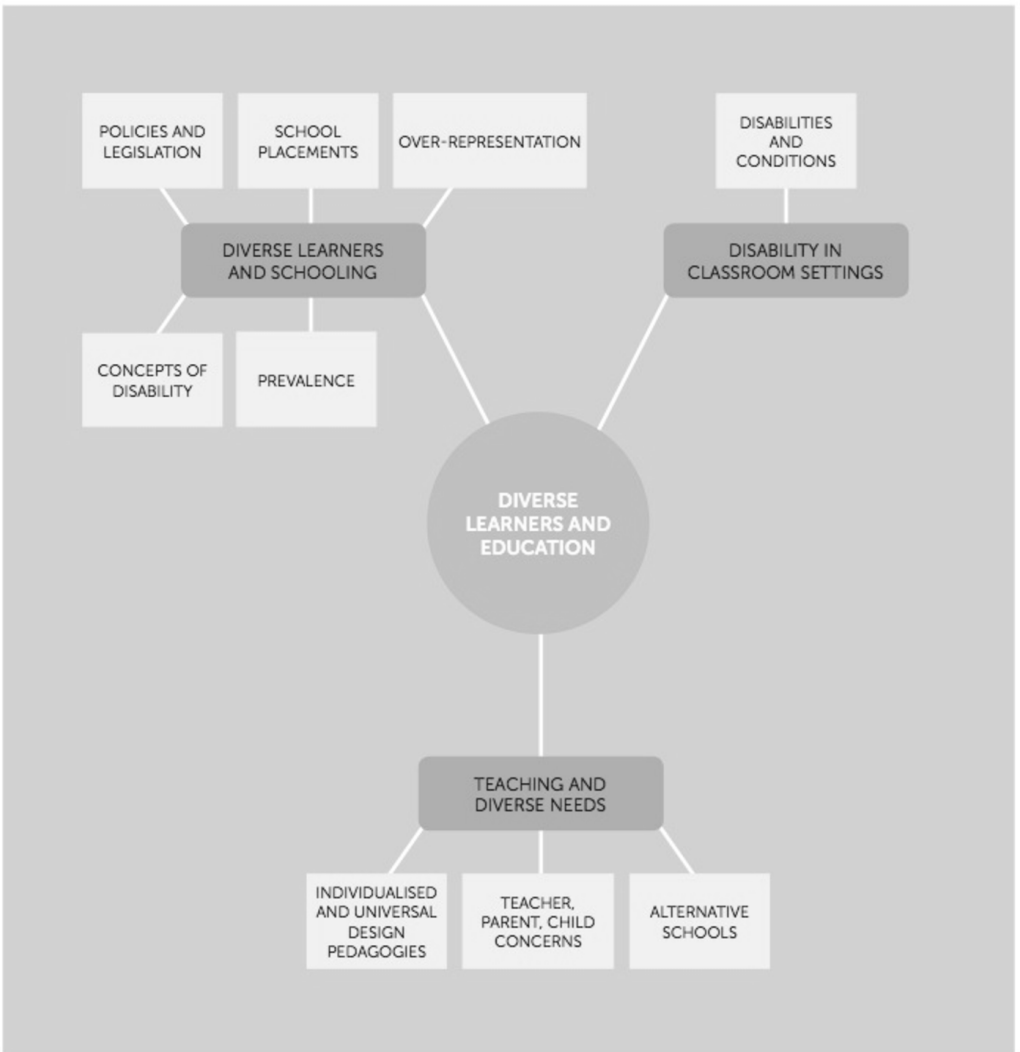

FIGURE 10.1 Chapter 10 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- Can you explain the term 'inclusive education'?
- What changes have occurred over time in the language used to refer to disability? Why did these changes occur?
- What standards or policies relate to the provision of education to students with disabilities?
- What are your obligations as an educator under these standards and policies?
- What is meant by a 'non-categorical' approach, and why is this important?
- Which teaching strategies are the most effective for supporting students with a disability in an inclusive class?
- What are the main concerns of teachers about the inclusion of students with a disability in a regular classroom?

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INTRODUCTION

Anna is excited and in a rush to get changed into her work clothes for her vocational education placement. Once a week, Anna leaves school after lunch and attends a work-experience placement in a local animal shelter. She loves working with animals and dreams of being a vet or working in a veterinary hospital. She is 16 years old and has a mild intellectual disability, leading to some difficulties with independent problem-solving skills – she can get a little frustrated and lose her temper if she can't solve problems quickly.

Anna is ready to catch the local bus directly to the animal shelter. Her teacher checks she has her multi-ride bus ticket ready and asks, 'How many rides do you have left on that ticket Anna?' 'Two', she replies. 'What day do you need to buy a new one?' the teacher asks. The support teacher is encouraging Anna to learn to use public transport and assume more responsibility for everyday life skills, such as making simple plans like working out on which day of the week she needs to buy a new bus ticket.

On arriving at the shelter, the manager greets Anna warmly and reminds her they have a meeting as the first task of the afternoon. Anna heads straight to the staffroom, puts her bag in a locker and collects her schedule from the clipboard on the locker. She has been working with the small animals for the last month, but she knows today is job rotation day and she will be assigned to the large animal area, working with horses and other large animals. The manager is working closely with Anna's support team at the school to help Anna learn to follow simple routines and lists of tasks. They use pictorial diagrams to help her remember how many cups of pellets to feed the horses, and sequence charts with minimal text and clear language can help her remember procedures. Coping with change, following routines and learning to solve simple problems are key goals in Anna's individual education plan. Anna intends to stay at school and has been offered paid weekend shifts at the animal shelter.

Anna is participating in a school-to-work program that marks an important transition in the lives of many young people, but is especially important for young people like Anna. Although students like Anna have similar hopes and dreams as most other students, they may not have the same educational options or ability to go to university and study a course such as veterinary science. Nonetheless, respecting Anna's vocational interests has been of vital importance to her parents and teachers, and they are pleased the animal shelter placement has worked so well.

When Anna approached the middle years of high school, she told her parents and teachers that she wanted to leave school. Like many students with learning difficulties, she had become discouraged and disengaged. In the junior years of high school, she was bullied and picked on by peers when she was withdrawn from the classroom for a special reading program. Her literacy and maths skills are still relatively weak. With her teachers' encouragement, Anna decided to stay at school and participate in an integrated work-placement program. She studies modified maths and English units, and her numeracy and literacy skills are still improving. She also plays netball once a week at a local sports club with some of the girls from the school team, and now has a supportive group of friends.

The lives of students like Anna who have any sort of additional learning needs have changed dramatically in recent decades. Unfortunately, the treatment of persons with disabilities in schooling (and other areas of life) has often been associated with marginalised and discriminatory processes. Today, students like Anna have a wider range of schooling options available to them, and most students with disabilities are now included in regular schools alongside their peers.

This chapter begins by exploring the concept of diversity in education and the more recent concept of inclusion. The second part of this chapter explores the concept of disability and considers the teaching and learning implications associated with having a disability in school today. Finally, this chapter examines the notion of effective education for all learners, and factors that can affect the delivery of inclusive education. This chapter is not intended to reflect the curriculum-based pedagogical content of a typical special-education textbook. Rather, it provides an introduction to the education and support requirements of learners with special needs in regular classrooms, and some key links to educational psychology concepts you have studied in this book.

DIVERSE LEARNERS AND SCHOOLING

Today, classrooms are heterogeneous, made up of a diversity of learners. This has not always been the case. In the past, learners with intellectual disabilities, like Anna, may have been automatically excluded from regular schools and placed in special schools or classes. Students with disabilities are one group of diverse learners, but a variety of students may have additional learning support needs due to any number of factors, such as English as a second language, or the cultural, social or economic conditions of their lives. Like Anna, many of these students would also have been excluded or marginalised in school in the past, and some argue that certain types of learners from some cultural groups or socioeconomic backgrounds are still disproportionately excluded from school today. This is explored later in this chapter. Most classrooms will have several students who have been diagnosed with a disability or have multiple diversity factors affecting their lives.

inclusive education The programs and services provided in most education systems to address the needs of all students in regular schools, regardless of ability or disability

special education The system of programs and services provided in most education systems for children who have difficulties in school for a variety of reasons and who need additional support

The term **inclusive education** refers to the programs and services provided to address the needs of any students requiring additional support, and arise from a specific philosophical position. This term arises from an international movement and acceptance of the view that these students have a right to participate fully in their community (Foreman & Arthur-Kelly, 2014). This includes the right to attend their local neighbourhood schools, be accommodated in regular classes, and have their learning needs addressed. Terms like **special education** are also used to refer to the system of programs and services provided for children who have difficulties in school, but this term is falling into disuse. In part, this may be because the term 'special' raises philosophical concerns about its inclusiveness, and it may be associated with the historical use of 'special' schools where children with disabilities were routinely segregated from other students.

The principles of inclusive education were first adopted by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1994 at the Salamanca World Conference on Special Needs Education, held in Salamanca, Spain. This declaration of support for inclusive education is now known

as the Salamanca Declaration and was supported by more than 90 countries. The statement of inclusion has been restated at successive world conferences and refers to 'all children regardless of their physical, intellectual, social, emotional, linguistic or other conditions', including 'disabled and gifted children, children from remote or nomadic populations, children from linguistic, ethnic or cultural minorities and children from other disadvantaged or marginalised groups' (UNESCO, 1994). This chapter is largely focused on children with learning needs arising from disability or other conditions that affect learning and participation in school, but we also acknowledge that most of the principles addressed here apply to diverse learners too.

Australia and New Zealand are signatories to the United Nations Convention on the Rights of Persons with Disabilities (2006), which makes explicit reference to inclusive education. In this convention, governments from around the world were invited to give priority to:

- make education systems inclusive
- adopt the principle of inclusive education as a matter of policy or law
- establish strategies to plan, monitor and evaluate educational provision for special needs students
- invest in early identification and intervention strategies, and ensure that adequate teacher education programs are available (Elkins, 2005, p. 12).

However, despite the philosophical notion of inclusion, there is widespread debate about the extent of inclusion actually experienced by children. This was summed up by Graham and Slee (2007), who noted that 'to include is not necessarily to be inclusive' (p. 278). Misunderstanding of what it means to be 'inclusive' and misappropriation of the term inclusion are just some of the reasons why inclusion may not be practised to the extent requested in international conventions and declarations (Cologon, 2013).

POLICIES AND LEGISLATION

Today in Australia and New Zealand, programs and services for children with disabilities or additional learning needs are provided in both public and private school systems. Legislative Acts within Australia (*Disability Discrimination Act 1992*) and New Zealand (*Education Act 1989* and *Human Rights Act 1994*) provide a context for allowing people with disabilities to access educational services without discrimination or prejudice. In Australia, the Disability Standards for Education 2005 provides specific standards and guidelines for the provision of education to people with disabilities. These standards provide a legal 'standard' and obligation on the part of the educational provider to ensure that:

- the education provider must take reasonable steps to ensure courses and programs are designed is such a way that a person with a disability can participate in the program on the same basis as a student without a disability and without experiencing discrimination
- the educational provider must consult with the student or an associate of the student (for example, family) about how the disability affects the student's ability to participate in learning experiences
- in light of this information, the educational provider must decide if an adjustment is necessary, and if so, make a reasonable adjustment to ensure the person with a disability can participate in learning on the same basis as a person without a disability (Commonwealth of Australia, Attorney-Generals Department, 2005).

This relatively recent legislative change relates to educational provision in all sectors of education, including universities, though terms such as 'reasonable adjustment' may be open to interpretation and debate as to what sort of adjustments are 'reasonable'. This federal Act also exists alongside various policies in specific States and Territories and, as a result, there are variations in the way special education services are provided across Australia. To learn more about special educational policies in different States and Territories, refer to Foreman and Arthur-Kelly (2014).

SCHOOL PLACEMENTS FOR DIVERSE LEARNERS

In practice, most school systems provide a range of educational services and resources to support the learning needs of students. The aim is to educate students in what is called the **least restrictive environment (LRE)**, which means a setting that is as close as possible to that experienced by children who do not have disabilities. For example, a jail or locked institution would be considered the most restrictive environments – unfortunately, in the past, many persons with disabilities were housed in large, locked residential institutions, with fewer rights and privileges than today's jails (Foreman & Arthur-Kelly, 2014). A local community school attended by all children, however, would be considered the least restrictive environment, or much less restrictive. Today, the term 'least restrictive environment' can still be applied to consider which educational services represent the least restrictive placement for a young person. The LRE can be viewed as a continuum ranging from the least restrictive environment in regular classrooms to the most restrictive environment in segregated special schools or classes. Examples of highly restrictive schools include school suspension centres for excluded students, schools for students with emotional and behavioural conditions who have been excluded from regular schools, and schools located within juvenile justice facilities.

least restrictive environment (LRE)
The setting that is as close as possible to that experienced by children who do not have disabilities

CourseMateExpress
Online resources
Explore an example of least restrictive environment with the **Interactive Activity** on this text's website.

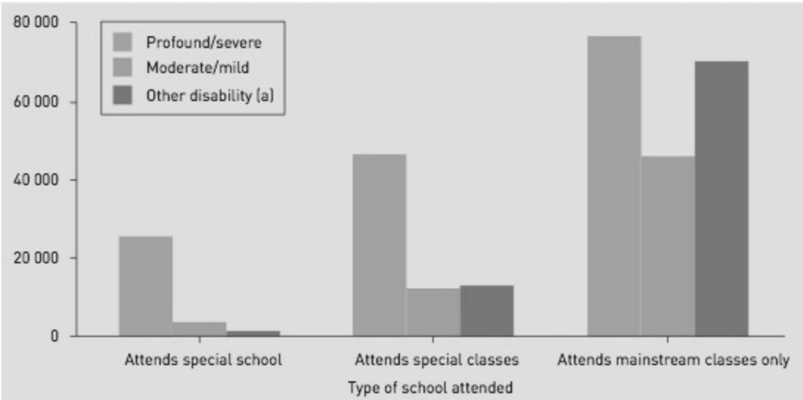
Students may also experience an environment that is part way along this continuum in a partial form of inclusion, whereby they attend a special class or support unit attached to the regular school but have a part-time placement in a regular class. These students may have higher or very specific support needs. For example, a child may need some form of health or medical attention during the school day, and will generally return to a support unit for such treatments. Special classes may provide highly individualised programming, but the student may still participate in regular classes where they need fewer adjustments to the curriculum, such as visual arts or physical education, for example.

Today, in many developed educational regions around the world, students with disabilities are experiencing a higher degree of participation in school than ever before. In Australian data (ABS, 2009a), we can see a marked change in participation rates for children with disabilities, such that children with disabilities had higher participation rates (82.1 per cent) than children without disabilities (77 per cent). This is due to the higher proportion of students with disabilities (like Anna) staying at school longer.

However, it is important to note that there is considerable variation in the placement and level of inclusion experienced by some students in schools today. As we will explore later in this chapter, certain types of students with conditions leading to emotional or behavioural difficulties are being excluded from regular schools at higher rates than in previous years. Sometimes the school placement of a child with a disability might reflect differences in the preferences of students and their families; not all students with disabilities want to attend a regular school, and some may choose to attend a more specialised school. The ABS (2009a) survey data also assessed the type of school placement for children with disability in Australia (see Figure 10.2). This survey noted placements in special schools, placements within special classes in regular schools, and placements in **mainstream** classes. 'Mainstream' is a term that refers to the most culturally typical or 'normal' placement of a school-age child, and indicates the child is attending a regular primary or high school.

mainstream
The normal or typical school placement for a schoolchild in a regular school

Figure 10.2 also indicates the level of restriction caused by the disabling condition, including profound/severe restrictions, moderate/mild restrictions and 'other disability', which refers to children with only schooling-related restrictions or those with no restrictions at all. We can see that by far the greatest proportion of students with all condition types attend mainstream classes in regular schools. We can also see that children in the most restrictive type of school placements in special schools or classes generally had the most profound or severe restrictions.



Source: 'Disability status of children in school', from ABS Survey of Disability, Ageing and Carers. Published by Australian Bureau of Statistics. © 2009.

FIGURE 10.2 Number of children with disability at school by type of school attended and disability status.

PREVALENCE OF DISABILITY AND LEARNING SUPPORT NEEDS

The ABS (2009a) estimates there were approximately 292 600 schoolchildren with a disability in Australia in 2009. Almost one in 10 boys in school had a disability, and one in 16 girls in school also had a disability. A greater proportion of primary school students had a disability (9.1 per cent) compared with secondary school students (7.4 per cent). There was a consistent drop in the prevalence of disabilities in all school student age groups. However, a significant proportion of students with disabilities (61.4 per cent) still experienced significant difficulty at school, as detailed in Box 10.1.

OVER-REPRESENTATION AND DISCRIMINATION

In contrast to the discussion of inclusion in school we might also ask questions about why certain types of students are excluded from mainstream schools and over-represented in these statistics and special school placements. One of the earliest concerns about the practice of special education raised the possibility that students from certain backgrounds were over-represented in special education classes (generally referring to completely or partially segregated school placements). In a seminal paper, Dunn (1968), a forefather of the **mainstreaming** movement, exposed the over-representation of African American and other minority children in special education classrooms in the United States. These children were particularly likely to come from poor, inner-city, working-class communities. The social injustice of this over-representation was particularly borne out in what Dunn described as the very poor educational opportunities provided to students in segregated special education classes, and the reduced opportunities for future life experiences of employment and higher education.

mainstreaming
The process of educating children with special needs in regular classrooms rather than in segregated classes or schools

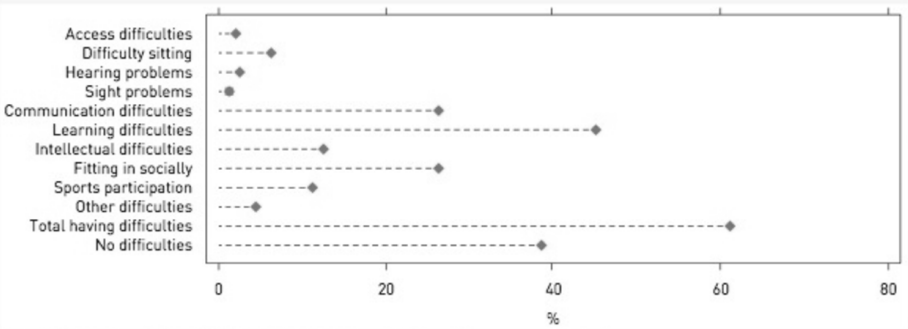
Unfortunately, such over-representation and claims of discrimination persist. Similar studies have noted the over-representation of minority youth in special education in Australia. De Plevitz (2006) points out that Indigenous youth are significantly more likely to be over-represented in special education and juvenile justice facilities in Australia. The Australian Human Rights Commission (2008) noted a significant overlap between intellectual disability, mental health concerns and the incarceration of Indigenous youth. Incarcerated Indigenous youth are four to five times more likely than the general population to have an intellectual disability. They also have far higher rates of illiteracy and poorer school outcomes than the general population. In New Zealand, Pasifika and Māori youth are more likely

BOX 10.1 RESEARCH LINKS

DISABILITY AND DIFFICULTY AT SCHOOL

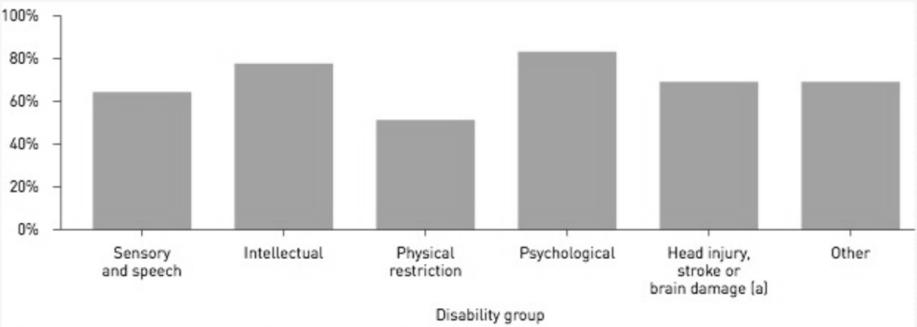
The ABS Survey of Disability, Ageing and Carers 2009 found that over 60 per cent of children with disabilities reported some type of difficulty at school. A broad range of indicators were used to assess the types of difficulties a child might experience, including learning, communication, social or sporting participation difficulties. Figure 10.3 illustrates the type of difficulty experienced by children aged five to 20 years while at school.

The survey also revealed that it is the children with the most profound/severe restrictions who experience the most significant difficulties. Figure 10.4 breaks this down into broad disability categories.



Source: 'Children with disability (5-20 years), by type of difficulty experienced at school', from ABS Survey of Disability, Ageing and Carers. Published by Australian Bureau of Statistics, © 2009.

FIGURE 10.3 Type of difficulties experienced by children at school, aged 5–20 years.



(a) People with a head injury, stroke or brain damage are counted twice – in this group and the group that has resulted from the brain damage

Source: 'Children with disability experiencing difficulty at school', by disability group from ABS Survey of Disability, Ageing and Carers. Published by Australian Bureau of Statistics, © 2009.

FIGURE 10.4 Percentage of children experiencing difficulty at school, by disability type.

ACTIVITIES

Examine the figures above and note differences in the pattern of results.

1 What are the top three most common types of difficulties reported (see Figure 10. 3)?
2 Which disability categories result in the most difficulties at school (see Figure 10.4)? What type of difficulties from the list in Figure 10.3 do you think these students are likely to experience?
3 Referring to the Disability Standards for Education 2005 (see page 367), how would you go about identifying the type of learning difficulties actually experienced by these students?

to be 'stood down', suspended or expelled from school, while Māori students have the highest rates of expulsion (New Zealand Ministry of Education, 2011b). In the United States today, African American and minority youth continue to be over-represented in special education classes. The intersection between race and social class remains a persistent factor in that learners from special education classes who were also from higher socioeconomic backgrounds were more likely to gain employment upon graduating from high school (Blanchett, 2010).

Children who experience multiple risk factors and those from minority backgrounds are over-represented in special education programs for a variety of reasons. Discrimination or harsher treatment of students from minority backgrounds is one factor to consider, while questions must also be asked about why so many indigenous and minority youth suffer poor school engagement around the world. As discussed in Chapter 14, some minority children experience disadvantage due to lowered teacher expectations and poor-quality teacher–student relationships. It is conceivable that minority children with a disability experience a 'double disadvantage', when low socioeconomic background or membership of a minority group is accompanied by a disability such as mild intellectual impairment or a mental health concern. A child may experience further disadvantage if the effects of their disability are further compounded by low teacher expectations or discrimination.

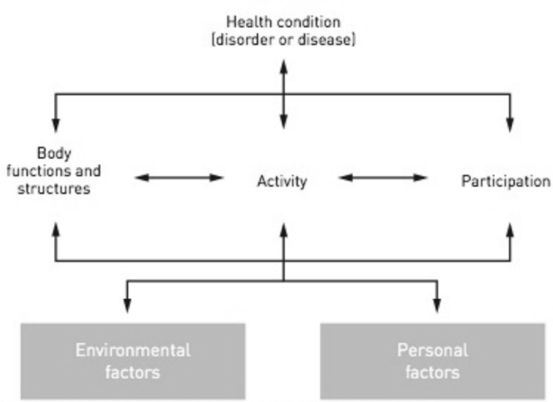


THINK ABOUT

- Why would minority students in special education and from a higher socioeconomic background be more likely to gain employment after graduating from high school? Think about the family, school and neighbourhood conditions that might make a difference for such students. Think about the factors that compound disadvantage for special education students from poorer socioeconomic backgrounds.

CONCEPTS OF DISABILITY

Up to this point we have been using the word 'disability' as it is commonly used in everyday language and large surveys like those reported above. Generally, we report broad medical labels or categories of medical conditions grouped under a label like 'intellectual disability' or 'physical disability'. But what is a disability? Is it simply being born with a medical condition? The World Health Organization (WHO) initially developed a classification system that was used internationally to describe health conditions and disabilities in terms such as 'disability', 'impairment' and 'handicap'. We often find ourselves still using these terms today. However, in 2001, the WHO classification system was extensively revised and is now referred to as the *International classification of functioning, disability and health* (ICF) (WHO, 2009). The origins and significance of this change are outlined in Box 10.2. The revised ICF classification system focuses on the interaction between an individual's health condition or disability, and environmental and personal factors (see Figure 10.5): 'The ICF … combines the major models of disability, recognising the role of environmental factors in the creation of disability and the importance of participation as a desired outcome, as well as the underlying health conditions' (AIHW, 2004, p. 2).



Source: Australian Institute of Health and Welfare.

FIGURE 10.5 Interactions between the health condition, environmental factors and personal factors: components of the ICF.



BOX 10.2 IMPLICATIONS FOR EDUCATORS

HEALTH AND DISABILITY

In the 2001 framework for the ICF, the WHO made a major shift from its earlier 'medicalising' of disability (Pfeiffer, 1998, cited by Foreman & Arthur-Kelly, 2014, p. 26), which focused on the concepts of impairment, disability and handicap and their impact on individuals, to a system concerned with the functioning of the different parts of the body (including psychological functions) and its structures (including organs and limbs). This new orientation is outlined in the following statement:

> The ICF puts the notions of 'health' and 'disability' in a new light. It acknowledges that every human being can experience a decrement in health and thereby experience some degree of disability. Disability is not something that happens to a minority of humanity. The ICF thus recognises the experience of disability as a universal human experience. It shifts the focus from cause to impact, taking into account the social and environmental aspects of disability. It does not see disability only as a 'medical' or 'biological' dysfunction.
>
> Source: WHO (2009).



THINK ABOUT

- The ICF recognises the role of social and environmental factors in the creation of disability. Can you identify any social or environmental factors in schooling or education that could contribute to disability?
- What do you think the ICF means by declaring that disability is 'a universal human experience'?

Labelling and person first language

One of the characteristics of all social groups is the tendency to categorise and label people in terms of attributes that seem significant for the group. For example, someone who is widely admired in public life is called a 'great statesman' or a 'champion'. Negative terms, such as 'fool', 'idiot' and 'weakling', are also used to identify those who are less accepted socially or show weaknesses in any areas of ability. The WHO, however, made a very deliberate decision to move away from labelling conditions (and people) as disabilities, impairments or handicaps.

This partly reflects a broader social concern that the tendency to label and identify people with disabilities is stigmatising. Over time, a variety of stigmatising terms have been used to label and identify children with disabilities, such as 'retarded, 'feeble minded', 'mentally defective' and 'subnormal'. These terms have been replaced with more neutral terms such as 'intellectual disability', 'learning disability' and 'developmental delay'. 'Mongolism' was replaced by 'Down syndrome', 'deaf and dumb' by 'deaf' or 'hearing impaired', and 'spastic' by 'cerebral palsy'. In some of these cases, the term has changed because it was often simply wrong and quite derogatory. For example, people with an intellectual disability are not 'retarded' in intellectual development; although they may have limitations, they still have a capacity to grow and develop intellectually like any other child. Children labelled as 'spastic' may not actually have spasticity, a specific medical term to describe a muscle spasm; rather, they may be affected by a number of complex physical conditions known as cerebral palsy (see also Box 10.3).



BOX 10.3 CLASSROOM LINKS

LABELLING AND STIGMA

During the last decade of the 20th century, there was considerable debate about the way language had been used to label and identify people, and the need to avoid using expressions that are offensive to some groups in society. In particular, gender-neutral language became preferred, as in the substitution of 'flight attendant' for 'air hostess', and 'actor' for 'actress'. Similarly, the way we identified persons with disability changed from 'a retarded individual' to 'a person with an intellectual disability'. The words we use influence the way in which we think about people, objects and events. The way we think about those who are different from our perceived norm can be stigmatising and lead to negative evaluations, discrimination and stereotyping of those people (Goffman, 1968). Goffman (1963) described stigma as the means by which a society indicates extreme disapproval for a person and their attributes. He suggested terms and labels are used to discredit a person or shape an identity that is 'spoiled' and not normal. When we react to the person we perceive as 'different' with embarrassment, rejection or overzealous acceptance, we are reacting to the difference rather than to the person as a whole. When thinking about individuals with disabilities, it is important to remember that they are people first, and that any impairment or unusual characteristic is secondary. In fact, we may know very little about the person or the nature of their condition, but the notion of stigma suggests that we form assumptions about the person because of their attributes.

The disadvantages of labelling include:

- a focus on perceived negative aspects of the person with a disability, rather than the strengths or abilities they possess
- an implication that the label defines the person's capabilities
- the likelihood that the label will continue through life, with a significant impact on self-esteem and a self-fulfilling prophecy of failure
- triggering of inappropriate social responses such as pity, teasing and prejudice
- a negative impact not only on the person with a disability, but also on their family and friends (Ashman, 2005, p. 70).

In all cases, it is now considered more acceptable to use **person first language** by referring to the person first and the label of their condition second, if this is necessary at all. It is much more acceptable to separate the person from the characteristics of the condition; for example: 'Anna *has* an intellectual disability', not 'Anna *is* retarded or disabled' – the latter term implies that Anna is defined by the condition of an intellectual disability, rather than acknowledging that she is a person first and foremost who also just happens to have this condition. If there is no particular reason to identify Anna as a student with a disability, it is preferable to simply introduce her as you would any other student: 'This is Anna. She is in Year 10 and training to be an animal care attendant'. Anna's work-experience manager, for example, never describes Anna as having a disability to his colleagues at the animal shelter. Rather, certain colleagues who supervise Anna in the workplace know that she needs additional support with the explanation of procedures and they have been trained to address these support needs.

person first language
The practice of referring to the person or individual before you refer to the label of their condition

In the final decades of the 20th century, there was also a major shift in the community acceptance of people with disabilities, and the introduction of the concept of **normalisation**, which advocated that people with disabilities should have access to the experiences of normal daily life. This concept was defined by Nirje (1985) and Wolfensberger (1972), who argued that people with disabilities had a right to live 'normal' lives and experience the full range of 'normal' day-to-day activities enjoyed by most people (see Box 10.4).

normalisation
Giving people with disabilities access to the daily experiences and activities available to those in the community who do not have a disability



BOX 10.4 IMPLICATIONS FOR EDUCATORS

NORMALISATION AND CHANGING VIEWS OF DISABILITY

The concept of normalisation arose in the 1960s and was further developed throughout the 1970s. At this time, many children with disabilities were not eligible to receive a typical education available to other students of their age, and many children and adults with disabilities were housed in institutions for the disabled. The conditions and experiences of many persons in these institutions or segregated schools was harsh and far removed from the typical everyday lives of other children or adults. Hence, the term 'normalisation' was developed by Nirje (1985) to promote the right of people with disabilities to experience the same day-to-day living conditions, rights and 'normative' experiences that any other citizen in a society might expect. During the 1970s, the systematic institutionalisation of people with disabilities began to be phased out, and in the early 1980s Australian education systems developed the first special-education policies that promoted the mainstreaming of students with disabilities in regular school settings. Over several decades, the principle of normalisation has led to a profound change in views about persons with disabilities:

- The segregation or institutionalising of people with disabilities is now rare and used only under very specific circumstances. It is not presumed to be the typical or normal way a child or adult should live.
- Assumptions that children with disability could not be educated have changed dramatically, and in developed countries most children with disabilities now enjoy an education alongside their same-aged peers.
- Recognition of negative aspects of using disability to classify and label people with disabilities has led to a non-categorical view of disability, with a focus on the functional needs of individuals.

The concept of normalisation was also associated with changes in the use of language when referring to minority or marginalised groups in the community. These changes are particularly evident in the UK, the USA, Australia and New Zealand in the terms used to refer to people with intellectual impairments. Some differences in the language between these regions can also cause confusion for people reading textbooks and research papers from different parts of the world. For example, in the UK, the term 'learning disability' may be used to refer to intellectual disability, but in Australia and the USA the terms 'learning disability' and 'learning difficulty' are usually used to refer to people *without* an intellectual disability, but who experience other neurological or information-processing problems (see page 377). A difference is also evident in that the term 'mentally retarded' is still used in the USA (Scheerenberger, 1987), while in Australia and New Zealand the term 'intellectual disability' is considered more accurate and less stigmatising. We offer a caution to students of teacher education in Australia and New Zealand that they should not adopt the terms used in international textbooks, such as 'retarded'. Use 'person first language' at all times, and only refer to the disability or condition if absolutely necessary.

A non-categorical view of disability

The labelling and classification of people with a disability has been commonly based on a medical model, identifying and labelling their condition. In some circumstances, understanding the medical aspects of a condition can be very important for teachers; however, doubts about such a classification system began to arise and led to questions being asked about whether such medical classifications should be used for educational purposes. This problem has been particularly acute in systems such as that operating in the USA, where children's disabilities must be medically assessed and formally identified before children

become eligible for special needs services. Although there are no legal requirements to assess children in such a way in Australia and New Zealand, there has been a tendency to make assumptions about educational needs based on the medical labels of conditions. However, as you will read in the following sections, while disability labels or categories provide some understanding of the nature of the condition, they do not provide adequate information about how each individual will be affected by the condition. Hence, it is necessary to carefully assess each child to determine their educational needs. The focus in non-categorical approaches is on providing a curriculum that is suited to the functional needs of each child (such as help in learning to hold a pencil) rather than on a program designed for a group of children who have a particular disabling condition.

DISABILITY IN CLASSROOM SETTINGS

This section considers the educational needs of children in seven areas of prevalent or increasing disability, as identified in the surveys described in the previous sections. Although we are describing categories of disability in this section, we do so for the purposes of explaining condition-related terms, but we also do so with the cautions and caveats outlined in 'A non-categorical view of disability' above. No two individuals in any of these condition groups will have the same learning needs, and their skills and abilities will vary dramatically. We emphasise the range of abilities in each condition, and emphasise approaches in the classroom that make good sense for considering these types of educational needs for any learner who might experience similar difficulties. We are aware that teacher education students may have limited knowledge or life experience of disability, and we are also aware that this can cause confusion and misunderstanding. In some cases, erroneous beliefs may be maintained if some basic information about identifiable characteristics of common disabilities is not provided and myths are not dispelled. We urge all teachers to conduct their own careful research and consultation with parents and other providers, such as paediatricians and psychologists, to gather the most accurate and useful information on a case-by-case basis for every learner with additional needs in their classrooms.

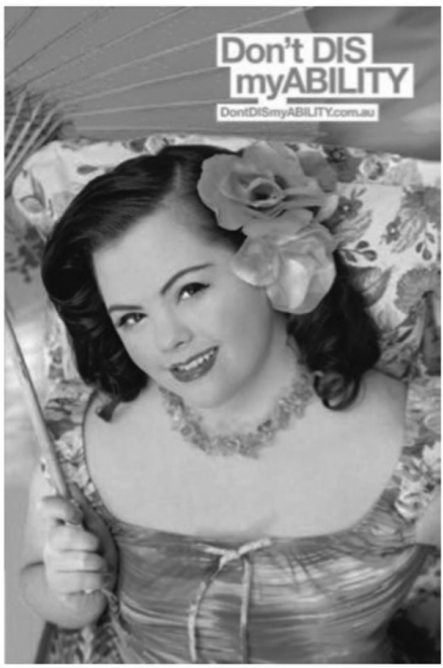
INTELLECTUAL AND DEVELOPMENTAL DISABILITY

Intellectual disabilities, including a range of developmental disabilities, are one of the leading and most prevalent causes of learning impairment in Australia. These are very generic terms for a wide range of congenital or chromosomal disorders, such as Down syndrome, that are present at birth and affect the individual on a lifelong basis. The diagnosis of an intellectual disability is generally based on three key criteria:

1 a significantly below-average level of intelligence, as measured by IQ tests
2 deficiencies in adaptive behaviours such as everyday living skills
3 the manifestation of these symptoms during the developmental periods of a child's life (for example, birth to 18 years of age) (Hudson & Radler, 2005).

Sometimes, a diagnosis might also be made later in a person's life, but in these cases the disability may have been caused by other factors such as a traumatic injury to the brain, drug or alcohol abuse, or other accidents.

Due to the need to determine or assess the support needs of people with such conditions, there has been a tendency to classify these individuals by the level of their IQ into categories of mild, moderate or severe intellectual impairment (a categorical approach). However, the weaknesses of IQ assessments are well known (see Chapter 9) and thus many other measures and tests of adaptive skills are also made. Some conditions may also be accompanied by other conditions or characteristics such as difficulties with speech and communication, problems with eyesight, fine and gross motor coordination difficulties or behavioural problems. Thorough and wide-ranging



Source: Don't DIS My Ability campaign, Department of Family and Community Services, NSW, photographer Jamie North, Pardalote photography.

FIGURE 10.6 Audrey O'Connor is an actor, dancer, performer and writer who has competed in the Special Olympics and who also has Down syndrome. Audrey was the 2011 face of the Don't DIS my ABILITY campaign.

assessments of children with such conditions are made, often before the child starts school. This is a very sensitive time for parents and caregivers who may be overwhelmed by unfamiliar psychological, medical and educational assessments. Teachers and practitioners working with children and their families must be especially sensitive and listen carefully to families and children themselves in order to determine the best level of educational support.

Intellectual and developmental disabilities are also some of the most misunderstood conditions. In the case of children with Down syndrome, for example, the condition may be characterised by distinctive facial characteristics; however, the appearance of these characteristics varies from person to person and it has sometimes been assumed that the 'severity' or obviousness of the facial characteristics is correlated with the severity of the person's intellectual impairment. This is untrue. There is no correlation between facial appearance of the condition and level of ability or disability. Similarly, an over-reliance or overemphasis on IQ scores has led to assumptions that persons with intellectual disabilities cannot learn and therefore cannot make a meaningful contribution to society. These assumptions are also untrue, and significant advocacy movements, led by people with intellectual disabilities, have started to dispel this myth (see Figure 10.6). Many persons with intellectual and developmental disability cope very well with their condition, complete their schooling with carefully modified programs, gain employment and form adult relationships like any other person.

Implications

Today, children with intellectual impairments enjoy a higher level of inclusion in school than ever before. Some condition characteristics may mean that they have problems in organising and sequencing thoughts, in memory or recall of information. Information processing may be slower than for other children, and learning to read may be difficult. The following are some general strategies for classroom practice:

- Use direct language with explicit instructions and break tasks down into smaller steps. These simple strategies will help all learners, not just those with cognitive disabilities.
- Graphic or visual aids can be used to provide instructions and aids to memory, and to teach vocabulary terms in reading materials.
- Age-appropriate adaptations should always be offered; literacy and reading themes should be the same as for other classmates, but expected outcomes may be adapted.
- Alternative curricula in the senior years, such as the Life Skills curricula (NSW Board of Studies, 2014), offer all students the chance to remain in formal education and attain their school-completion certificates.
- Physical development and gross and fine motor skills should not be neglected. Participation in physical education should consider possible weaknesses of muscle tone, balance or coordination, but lots of practice and experience with motor skills is an essential part of development for all children, as we saw in Chapter 2.

SPECIFIC LEARNING DISABILITIES

The term 'specific learning disability', and similar terms such as 'learning difficulties', refers to discrepancies in the expected learning ability in comparison with the person's developmental age and IQ level, and often manifests in specific difficulties in memory or attention processes, literacy or numeracy skills. Labels such as dyslexia, auditory processing disorder or attention deficit disorders all refer to forms of specific learning disabilities. A person with a specific learning disability can have average or above-average intelligence, and may perform very well in one set of skills, such as numeracy, but may have below-average performance in reading or spelling. This discrepancy in expected ability is a defining characteristic of a learning disability (APS, n.d.).

In order for a person to be classified as having such a condition, all other possible causes of learning problems must be ruled out. Such causes might include an intellectual disability, vision or hearing impairments, conditions such as depression or anxiety, and environmental causes such as poor teaching or lack of opportunity. Careful assessment must be made of the person's skills in the affected areas, to work out the specific areas of learning that are affected (APS, n.d.). The cause of specific learning disabilities is not well understood, but increasingly it is thought that they arise from neurological or other differences of brain structure (Miller, Sanchez & Hynd, 2005).

Specific learning disabilities are also widely misunderstood. Some people do not believe it is possible to have a learning problem without also having an intellectual disability. However, children with specific learning disabilities perform well or above average in general IQ tests but have puzzling learning problems in specific areas. Sometimes it is also assumed that children will 'grow out of' their problem, and this is certainly true of a range of learners who do not have specific learning disabilities but may simply lag behind their peers for a little while because of natural or environmental factors that cause temporary differences in their development. People with specific learning disabilities have a lifelong condition that they do not 'grow out of', but they can significantly improve their skills in areas of concern. It is true that many adults with specific learning difficulties have learned to cope with their condition and have a range of compensatory strategies; these might include using calculators, spell checkers or editing tools, for example.

Specific learning disabilities may also be accompanied by other non-academic problems, including behavioural or social difficulties, and these can lead to inattention or impulsiveness in the classroom, or difficulties in peer relationships and in making friends (APS, n.d.). However, these conditions affect every child very differently, and generalisations about behaviour or social skills should not be made.

Implications

Typical approaches to treating learning disabilities are to address the specific skill areas where deficits or problems are noted for each individual (a non-categorical approach). Sometimes the goal is to improve the skills, such as introducing basic literacy and numeracy skills, but in other cases, a strategy for compensating for deficits is also needed.

- As with all good educational practice, use very clear and direct language, and provide visual supports for key instructions.
- Break complex instructions into smaller steps and provide worked examples to relieve cognitive load.
- Visual organisers, desktop timetables, timers and reminders can assist children with planning skills, learning about time and staying on task.
- Break tasks down into small, manageable goals and assist older children to set goals independently.
- Specific reading instruction in phonemic awareness has been proven to be more effective than other approaches in this population.

- Specific instruction in metacognitive strategies and metacognitive awareness has been proven to be effective in this population.
- As children move through education, higher cognitive-load tolerance and faster processing is expected. Relieve load and compensate for poor spelling and numeracy skills with ICT applications, spell checkers and calculators.

ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD)

ADHD is a condition of notable increasing prevalence in Australian society and is commonly encountered at all levels of schooling. This condition is best understood as a syndrome of complex learning and behavioural characteristics. There is some disagreement as to whether to classify this condition as a learning or behaviour disorder (Hutchins, 2007), but what is certain is that learning and/or behaviour may be affected in most individuals with the condition. Diagnosis is complex and the diagnostic criteria for the condition have varied over time, causing confusion and misunderstanding for teachers and parents.

There are two main subtypes within this diagnostic classification – the 'inattentive' subtype and the 'hyperactive-impulsive' subtype – and sometimes people have both types concurrently. The behaviours in these subtypes must be present for more than six months and must be pervasive in that they are present in multiple areas of the child's life.

- 'Inattentive' characteristics include behaviours such as an inability to focus on details or sustain attention for long periods of time; being easily distracted; being unable to follow a set of instructions or to follow through on tasks; and problems organising actions.
- 'Hyperactive-impulsive' characteristics include fidgeting, squirming and excessive running and climbing behaviours; being constantly on the go; blurting out or talking constantly; an inability to wait one's turn; and interrupting or intrusive behaviours.

Although the condition is usually characterised as a behavioural disorder, the learning characteristics are very similar to those of specific learning disabilities and may reflect marked deficits in working memory function, language processing, and possibly higher-order executive functions associated with organising and retrieving information, planning and organising behaviours, or monitoring and reflecting on thought processes (Hutchins, 2007; Tannock, 2007). Some medical practitioners are using the language of cognitive-load theory (see Chapter 6, page 232) to describe the specific information-processing effects felt by the learner. Specifically, Tannock (2007) suggests that poor working memory processes can easily lead to 'overload' when the cognitive load of tasks is high.

The consequences of deficits in attention and impulse control are very serious for learners. Deficits in attention and working memory processes are associated with marked deficiencies in reading and numeracy skills. Deficits in controlling impulses are particularly associated with behavioural problems in the classroom, the appearance of disobedience, and risk taking or 'no limits' in sensation seeking. As we learnt in Chapter 2, working memory and executive-control skills are characteristics of typical brain development and involve the development of neural networks and chemical processes that assist the speed and efficiency of these neural networks. As such, ADHD is widely recognised as a neurobiological condition.

Implications

ADHD is a syndrome of conditions where a non-categorical view of educational needs is essential. No two children with ADHD will have the same diagnosis, the same learning needs or the same behavioural needs. A wide range of approaches may be needed, including those listed above for specific learning disabilities. Here are some helpful strategies:

- Cognitive-behavioural training approaches to behaviour management can be effective. Interventions such as Stop, Think, Do are one example (see Box 14.4 on page 557).
- Assist the child with self-management strategies by setting small, manageable goals. Train older children in concepts of time management and self-monitoring time on and off task by using checklists and reminders.
- Keep to a firm classroom routine, and give advance warnings or signals of changes to programs.
- Allow for rest breaks or periods of cognitive 'down time' – this is helpful for all children, not just those with concentration problems.
- Avoid repeated episodes of 'failing' at classroom or behavioural management tasks – ignore minor fidgeting, reward and reinforce on-task behaviours, ensure success with doable tasks, and provide positive verbal feedback early and often during tasks.

AUTISM SPECTRUM DISORDERS (ASD)

CourseMateExpress
Online resources
Watch a **video** that addresses the inclusive educational experience of a child with autism from a parent's perspective.

The term 'autism spectrum disorder' is so named because it includes a wide variety of disorders and effects of these disorders on individuals. The broad term ASD includes three main classes of condition, including autism, sometimes referred to as 'classic autism'; Asperger's syndrome; and pervasive developmental disorder (PDD), sometimes referred to as atypical autism. ASD appears very early in a child's development and is often referred to as a 'developmental disorder', but effects on development vary markedly from one child to another; for example, one child may have very low intelligence as measured on standard IQ tests and another child might have very high intelligence (APS, n.d.). Over the years, the diagnostic categories in the spectrum have changed; in Australia and internationally it has been very difficult to determine exact incidence or prevalence rates. Suspicion that diagnosis of the disorder has been increasing may be attributed to different classification systems, different inclusion criteria in studies, improved diagnostics or, in some cases, efforts to label children with the condition in order to ensure they receive special education funding support (Australian Advisory Board on Autism Spectrum Disorders, 2007). Nonetheless, the educational support needs of children with ASD are clear and may be very serious in educational contexts.

At a very general level, the APS (n.d.) summarises the key characteristics of ASD into three main areas:

- *Verbal and non-verbal communication.* Skills involving communicating with others can vary dramatically. Some children may have no or very little speech, while others may have normal and sometimes verbose speech. Some children may appear to talk excessively about an interest, unaware that others are not following; may be blunt and direct in comments to others; or generally have unusual vocal behaviours and topics that can be disruptive or confusing for others. Non-verbal communication skills such as making eye contact and attending to facial expressions or hand gestures may be very limited in some children.
- *Social awareness and interaction.* Some children may have difficulty applying the social 'rules' of behaviour such as making eye contact and responding to social cues, such as a person saying their name. They might also engage in behaviours that others find socially inappropriate or distressing, such as rejecting touch or cuddles, touching or licking or tasting unusual objects, or verbalising blunt observations about a person. Developing relationships with others may be very challenging, and bullying during the school years is a commonly reported experience. However, it is a myth that persons with autism cannot experience the joy of meaningful social relationships. Many children with autism do enjoy play and social contact with familiar peers, family and relatives.

they went out hunting kangaroos with their grandfather. Understanding the basis of such differences may help you to consider how to value the students' orientation, while teaching them other ways of thinking about and representing the world. This approach is discussed further later in the chapter.

- *Assertiveness*. The Western individualist orientation means that independent thought and assertiveness in opinion are encouraged, and students may be evaluated on this basis – on the quality of questions they ask, and the clarity and independence of their argument, for example. In collectivist cultures, where interdependence is valued, respect for elders is not associated with arguing with or questioning them. Encouraging students to engage with teachers in this way may be seen as encouraging a lack of respect.

In a project called Bridging Cultures, teachers worked on ways to value collectivist values alongside individualist ones. Box 11.2 (on page 409) describes some of the practices they developed in their classrooms.

OTHER SOURCES OF CULTURAL DIFFERENCE AND MISUNDERSTANDING

Difficulties may arise for students when the beliefs of the home and school differ. As we saw for individualism and collectivism, when an individual's behaviour is interpreted from a cultural perspective that is different from that of the individual in question, misunderstandings and conflict can result. Malcolm, Kessaris and Hunter (2003) described a number of ways in which this can happen for Aboriginal students in mainstream Australian classrooms. In Western Anglo culture, looking people in the eye when you speak to them is a mark of respect, and shows you are attending to them. However, in many other cultures, including some Aboriginal and Asian groups, this would be a mark of disrespect – particularly if shown by a younger person to someone in a position of authority. Without this understanding, teachers might assume that students from cultures that do not favour eye contact are not listening or are not interested. Similarly, teachers who insist on eye contact without explaining that it denotes respect in their culture risk some students and parents assuming that those teachers do not want to be respected.

A second example of culturally based misunderstanding is in students asking questions. For middle-class Anglo groups, asking questions is an important learning strategy, and is also interpreted by teachers as demonstrating curiosity and active engagement with the topic. For other cultures, however, asking questions of a teacher is considered rude, implying doubt about the teacher's willingness to share information. Eades (1993) described this belief–behaviour pattern of Aboriginal people in south-eastern Queensland: unlike in Anglo Australia, knowledge is 'owned' by individuals, and some kinds of knowledge should not be shared with certain groups (such as in mixed company), so questions are inappropriate. Eades explained that in Aboriginal English, hinting or triggering statements may be used rather than direct questions. Silence is also an important feature of Australian Aboriginal interaction. Malcolm, Kessaris and Hunter (2003) add that in some Aboriginal groups, receivers of questions are not obligated to respond – a choice that can be misinterpreted by teachers as defiance or a lack of intelligence. When teachers insist on responses, as in question-and-answer sessions at school, students may feel threatened or embarrassed.



THINK ABOUT

- How might teachers and students misunderstand each other where there are differences in cultural beliefs about questioning?
- How could you, as a teacher, make the value of questioning explicit to your students?

ADDRESSING RACISM AND PREJUDICE

racism
Discrimination based on race or ethnicity

Racism is a form of discrimination based on race or ethnicity. Underlying racism are attitudes of prejudice and cultural stereotypes (that is, assumptions applied to whole groups of people). Because these attitudes reflect beliefs, they influence the way individuals behave and the way they perceive and interpret the actions of others. For this reason, combating racism involves targeting beliefs – or the prejudices underlying racist actions – as much as dealing with the actions themselves.

CourseMateExpress
Online resources
Go further: Explore teaching resources from *Racism No Way!* Via the link on this text's website.

In schools, racism can be experienced by students and teachers directly, through harassment, abuse and discrimination; or indirectly, such as when the cultural beliefs and practices of students or teachers are not recognised, when others have prejudicial attitudes (such as low expectations) or when cultural stereotypes are promoted. Institutional racism occurs when schools are organised and managed in ways that disadvantage some groups. For Aboriginal people and Torres Strait Islanders in Australia, and Māori in New Zealand, racism is reflected in the poorer educational outcomes these groups experience when compared with others (we discuss this issue in detail later in this chapter).

Treating Aboriginal, Māori or Torres Strait Islander students – or any other group – identically, as a response to a stereotype of their culture, is a form of racism. Malin (1998) recommended that teachers get to know the community in which they are working, and that they view any student in three ways: as a learner, as a cultural being and as an individual person.

Although committing, inciting or permitting racist acts is illegal in Australia, racism is a daily experience for many school students. Anyone can experience or display racism, but it is more likely to be experienced by some groups than by others. Kids' Helpline, an Australian children's telephone-counselling service, reported in 2010 that students from Aboriginal and Torres Strait Island backgrounds were more likely to report bullying than were other groups of students.

Racism is destructive to individuals, affecting educational outcomes, emotions, identity and behaviour. It also has far-reaching effects on school climate and school–community relations. Racism works against effective classroom communication, limiting the contributions of some students, and promoting tension and conflict. In addition, racism is an important source of playground violence, both as racist harassment and as a reaction to it.

The website for the Australian educational initiative *Racism. No way!* (2010) identified the following potential consequences for students experiencing racist behaviour: reduced self-esteem and self-confidence, loss of identity; conflict with parents resulting from rejection of their cultural background; development of a 'resistance' culture (discussed later in this chapter); frustration, fear and withdrawal; dropping out; loss of concentration; and non-participation.

Teachers can intervene by taking racist behaviour (such as name calling, teasing and exclusion) seriously rather than by dismissing it as a minor difficulty. Teachers may need to examine their own prejudices or the cultural stereotypes they hold, asking of themselves: 'Are there some groups of which I would have lower expectations than others?', 'Do I treat all students as if they had the same (my) background?' and 'Are my classroom and curriculum built around the ideas and practices I am comfortable with?'

As Figure 11.4 on page 415 illustrates, culturally sensitive education involves dismantling student prejudice and stereotypes, as well as examining teaching practices, curriculum, resources and schools as institutions. Culturally sensitive education also involves including other cultural viewpoints across the curriculum, such as investigating Aboriginal, Māori, Torres Strait Islander and other non-Anglo views of history alongside Anglo histories, looking at mathematical systems across cultures, and reading literature translated from a number of languages. This conveys to students that cultures other than the dominant culture in the society are valued, and helps students develop an understanding of other cultures – including those of their peers – as a step towards breaking down negative stereotypes.

On their own, multicultural curriculum programs have not been shown to be particularly effective in reducing prejudice (Pfeifer, Brown & Juvonen, 2007). We also need to consider the make-up of the school population, and practices in the school that contribute. When school practices such as streaming of classes highlight difference, multicultural education alone will not be enough. Classic theories of prejudice (Allport, 1954) have argued that contact between peers of equal status with common goals is necessary to reduce prejudice – one reason cooperative learning programs have been effective (McKown, 2005; see also Chapter 7).

Pfeifer, Brown and Juvonen (2007) recommended that programs also take account of the cognitive developmental limitations of young children's thinking, particularly before eight years of age. They argued that lack of conservation skill (ability to discount appearance; see Chapter 3), together with weak ability to classify in multiple ways (and so see people as members of multiple groups), and the egocentric weakness in perspective-taking ability, contribute to the development and expression of racial prejudice in young children: children possessing these skills tend to demonstrate less prejudice. Prejudice in young children is not just due to lack of these skills, but they need to be addressed as part of any solution.

One of the goals of the *Melbourne declaration on educational goals for young Australians* (MCEETYA, 2008) is that Australian schooling promotes equity and excellence, and it includes commitments to:

- provide all students with access to high-quality schooling that is free from discrimination based on gender, language, sexual orientation, pregnancy, culture, ethnicity, religion, health or disability, socioeconomic background or geographic location
- ensure that schools build on local cultural knowledge and experience of Indigenous students as a foundation for learning, and work in partnership with local communities on all aspects of the schooling process, including to promote high expectations for the learning outcomes of Indigenous students
- ensure that schooling contributes to a socially cohesive society that respects and appreciates cultural, social and religious diversity.

CourseMateExpress
Online resources
View the **Australian Curriculum guidelines** by following the links from this text's CourseMate website.

As a result, in the Australian Curriculum, Aboriginal and Torres Strait Islander histories and cultures are taught across the curriculum. Ideally, this would be taught by Indigenous people from the community, increasing opportunities for contact between Indigenous and non-Indigenous Australians.

In addition, intercultural understanding is included as a general capability, and Asia and Australia's engagement with Asia is a cross-curriculum priority in the Australian Curriculum. Figure 11.4 (see page 415) suggests a number of dimensions of effective multicultural education.

CULTURE, ADVANTAGE AND DISADVANTAGE

The beliefs and practices of some cultural groups fit well with our schooling system, while those of other groups do not. In 2011, students of language backgrounds other than English (**LBOTE**) held up to 97 per cent of the places at the top 10 selective schools in Sydney (Ho, 2011), and the *Sydney Morning Herald* (Milburn, 2011) reported many of these to be of Indian, Chinese and other Asian backgrounds. This occurs despite considerable barriers to success that have been linked to poorer academic outcomes, such as LBOTE, difference in culture, disrupted early education for those who were refugees, and low SES. Other migrant groups do not show the same results, even though the barriers to success could be said to be similar. In the section on poverty later in this chapter, we discuss risk and resilience, which goes some way to explaining these differences. Another explanation, that of the concept of 'resistance', is set out below.

LBOTE
Language background other than English

RESISTANCE

Ogbu (1987, 1997, 2003) developed a theory to explain why some minority groups within a particular society succeed educationally, while others do not. Based on groups in the USA, he described different

types of minority groups, defining them by the history of their contact with the majority group. **Voluntary minority groups** are those such as refugees and other migrants who have chosen to move to a new society in the hope of improving their lives in some way. For such groups, differences can be seen as barriers to be overcome in striving to succeed in the new society. The strategies these groups develop to deal with barriers tend to be adaptive.

voluntary minority group
A group of people who have at some point chosen to move to a new society in search of a better life

Involuntary minority groups, by contrast, are those such as indigenous peoples or people brought in as slave workers who did not choose to be brought into the society, and whose relationship with the majority has been marked by oppression and/or opposition. For such groups, differences are important markers to be maintained. Educational success in countries such as the USA, Australia and New Zealand may even be seen as 'becoming White', and as rejecting indigenous culture and identity – see Box 11.3 for a case study. This is particularly so when the school is strongly tied to non-indigenous culture. Beresford (2003) cited two research reports that described pressure from peers not to succeed as a factor in the attitudes of Aboriginal students to school and achievement patterns. Some strategies for including Aboriginal, Torres Strait Islander and Māori students in school learning are dealt with later in this chapter.

involuntary minority group
A group of people who have at some point been brought into a society against their will

BOX 11.3 CASE STUDY

ROSIE'S CHOICE

Rosie, a 10-year-old Aboriginal child, attends a rural district high school (K–10). Both Rosie and her teacher report that she has poor literacy skills and is a quiet student, reluctant to contribute to classroom discussions. Although her teacher relates this reluctance to a lack of ability, Rosie suggests other possibilities when talking about school. There seem to be many barriers to Rosie's success in school, but one that stands out is her view that, to be successful, you have to become like a *wadjella* (white person). Her brother is the only Aboriginal boy in the school to continue through to Year 10 and experience academic success at that level. Rosie views his success as the result of him mixing with Anglo-Australian boys and learning to use 'big words' just like them. She is determined that she will not similarly 'sell out' her family and community for such success.

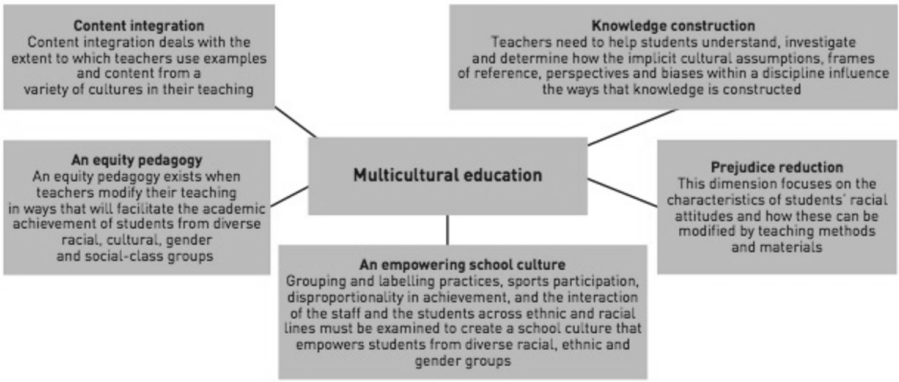
Source: Haig, Konigsberg and Collard (2005). Reproduced with permission from PETAA - Primary English Teaching Association Australia.

ACTIVITIES

1. How could the school ensure that Rosie does not see education as a choice between her family or community and White culture?
2. Review the Aboriginal and Torres Strait Islander education section later in this chapter to identify some of the strategies that have been successfully used in schools to support Aboriginal students.

MULTICULTURAL EDUCATION

Culture is more than visible aspects such as food or costumes, so multicultural education must go beyond these. Banks and McGee Banks (2012) proposed a model of multicultural education that identified the range of aspects to be considered (see Figure 11.4). Teaching style, implicit beliefs, content, students' attitudes, and the school culture and structure all must be considered.



Source: *Multicultural Education: Issues and Perspectives* by James A. Banks and Cherry A. McGee Banks. Copyright © 2003 John Wiley & Sons, Inc. Reproduced with permission of John Wiley & Sons Inc.

FIGURE 11.4 The dimensions of multicultural education.

Box 11.4 gives some strategies for educators to use in multicultural classrooms.



BOX 11.4 IMPLICATIONS FOR EDUCATORS

MULTICULTURAL CLASSROOMS

- 'Invisible' aspects of culture can be difficult for teachers and students to identify. Teachers must therefore:
  - be self-aware of the cultural views they hold, and that are implicit in their teaching
  - be aware of the cultural models of the students they teach
  - teach cultural differences explicitly, in order to make the invisible visible.
- Some common ways of doing things in classrooms might need to be explained to students and/or changed to accommodate their practices. These could include raising your hand to speak, one person talking at a time, looking at the teacher when the teacher is talking, staying in your seat until work is finished, and the use of questions (by teachers to assess learning, and by students to investigate).
- Understanding your own culture necessitates reflection and discussion with others.
- Understanding the cultures of your students will require interaction with the community, both inside and outside the school. For this to be effective, you will need to be careful to look at the strengths represented by the differences you encounter, rather than regarding another way of doing things as 'wrong' or as a source of difficulty.
- Other implications relate to the content of your teaching, such as examining the curriculum and resources to eliminate bias or stereotypes regarding particular groups. Students can be involved in this process so that they are actively involved in detecting and dismantling stereotypes and bias inside and outside the classroom.

GENDER

Look around you. If your education class is typical, there will be many more women than men. Why is it that women tend to choose education in larger numbers than men do? Why are there more women at university than men?

When discussing differences between males and females, we can talk about sex-related differences and gender differences. The use of these terms has been widely debated (Ruble, Martin & Berenbaum, 2006).

Traditionally, 'sex' has been used to refer to aspects of masculinity or femininity that have a biological basis, while 'gender' has referred to the cultural aspects of masculinity and femininity. In reality, of course, we are biological *and* cultural beings, so the two sets of factors are difficult to separate. In this text, we use the term **gender** as an inclusive term that encompasses biological and cultural influences, and that recognises the interdependence of biological and cultural sources of difference.

gender
Those aspects of an individual that relate to the individual's sex; they are biologically and culturally determined

SEX AND GENDER DIFFERENCES

Many of the differences observed between males and females – such as a gendered preference for pink or blue – have a cultural basis, but some appear to be relatively stable and to have a biological component. The physical differences described in Chapter 3 are an obvious example. The trend has been for gender differences in behaviour, emotion and cognition to decrease over time, however, which suggests that environmental factors are also involved (Feingold, 1993). Most of the differences described in this chapter are small, and there are also individual differences within groups of males and females (see Box 11.6 on page 420).

Gender differences in cognition

Tests of general intelligence do not show differences between males and females in overall test scores, although there are differences in some specific abilities that are components of these tests, and in the variability of the scores (Hunt, 2011). Studies of general knowledge show that males tend to score higher than females, and this difference appears across a number of cultures (Lippa, 2005). Hunt (2011) reported that females tend to be better at verbal thinking and language skills, while males tend to be better at spatial–visual reasoning, although there is considerable overlap. There is more variability in these scores for males than for females, so it should not be assumed that all males are strong in spatial–visual thinking, or all females in language (De Lisi & McGillicuddy-De Lisi, 2002). Hyde (2014) reported that differences in spatial–visual abilities are amenable to change through training, and may be linked to activities such as the higher frequency of boys playing video games, which may train this kind of thinking, although other studies have found a difference as early as infancy (Moore & Johnson, 2008).

Gender differences in mathematics performance appear to have been growing smaller over the last two or three decades. Hyde (2014) reviewed meta-analyses of mathematics performance and found the size of the gender difference to be close to zero, while results from the 2012 PISA tests show that it varies from one country to another, with boys performing better than girls in 37 countries (and in most of these cases, the difference was small), girls performing better than boys in five countries, and no difference in 22 countries (OECD, 2014).This data, as well as findings from studies comparing testing or experimental conditions, suggests contextual effects on gender differences in mathematics performance. There is more variability in boys' IQ test scores, reflecting the fact that boys are more likely to be at the highest and lowest ends of the scale, while girls cluster around the mean (Deary et al., 2003), although Hyde (2014) reported that these differences are also small.

In regard to language skills, the story is similar, with girls showing a small advantage over boys, and differences in the size and direction of the gender relationship reported from different countries in PISA test results (OECD, 2014). It should be noted that Australia and New Zealand are among the countries that show a gender difference in mathematics and reading performance, with boys outperforming girls in mathematics, and girls outperforming boys in reading in our countries in the 2012 PISA tests. Once again, these differences refer to averages, and there is considerable overlap in the distributions – boys and girls are more alike than unlike in reading and mathematics performance, although what contributes to that performance may vary. In Australian students' 2012 PISA results, mathematics performance was predicted by mathematics self-efficacy (for both boys and girls), mathematics self-concept (for girls

only) and mathematics anxiety (for boys only) (Thomson, 2014), suggesting these might be factors to look at to address performance differences as well as the drops in performance that were observed in the 2012 tests.

Gender differences in emotion

For a combination of biological and sociological reasons, males are more likely to show aggression than are females. A meta-analysis that looked at studies of aggression reported by individuals, peers, teachers and observation research across a number of countries found more aggression reported in boys than in girls. Aggression was highest in youth (18–22 years), decreasing with age (Archer & Mehdikhani, 2004). Girls were slightly higher in indirect or relational aggression – behaviours such as gossiping and exclusion – with the difference strongest during adolescence. Hyde (2014) reported from a review of research that gender differences in aggression show strong contextual effects, and even disappear under some conditions.

Girls are more likely to experience anxiety than boys, although differences are small, and vary with age and context (Chaplin & Aldao, 2013). Contextual effects on emotions like anxiety suggest that schools can play a role in students' experience and expression of emotions, depending both on teachers' relationships with students and pedagogical decisions affecting motivation (see Chapter 8).

A larger difference is found in the incidence of depression, with women more likely to experience this than men, and the difference first appearing in adolescence (Hyde, 2014). Hyde suggests that this gender difference may relate to differences in stress for boys and girls in adolescence, and effects of various life events such as early puberty, peer sexual harassment and body image concerns. This underscores the importance of school programs that support mental wellbeing, with a focus on these issues for girls in particular.

Lippa (2005) summarised data from Hartung and Widiger (1998) showing that boys are more likely than girls to suffer from mental retardation, reading disorders, stuttering, autism and ADD (see Chapter 10 for more detailed treatment of these learning difficulties). Males are also more likely to be involved in substance abuse. Girls are more likely to be anxious about failure, and boys are more likely to take risks (Lippa, 2005). This has implications for motivation (see Chapter 8). Boys take more risks than girls do, in childhood and in adulthood (Ruble, Martin & Berenbaum, 2006).



THINK ABOUT

- How might these gender differences show up in students' classroom behaviour?
- How might they be influenced by school factors?

GENDER IDENTITY FORMATION

How do we form our beliefs about what it is to be male or female? Walk into your local department store. Who is shopping, and what are they buying? What are the predominant colours in the boys' and girls' clothing and toy sections? How are items for men and women advertised? **Gender schema theory** suggests that children form a gender schema (or concept) for their sex from the messages about typical gender preferences and behaviours that are present in their environment. These messages come from people with whom they interact, such as parents, peers and others, as well as from their observations of the environment. As they organise their experiences, children sort objects or actions into 'male' and 'female', and with an awareness of their own sex apply these labels to themselves or to others (see Figure 11.5). Those objects or actions that are classed as being gender-appropriate are more likely to be remembered or persisted with (Liben & Signorella, 1993).

gender schema theory A theory proposing that children's schemas or understandings about gender influence the way in which they process information and their choices



Source: Matthew Duchesne, © Milk and Honey Photography, 2010.

FIGURE 11.5 Gender identity is formed through direct and indirect experiences. It is particularly strong and often stereotypic in the preschool years.

Messages about gender role do not have to be spoken; many are implicit in the ways we do things. Marmion and Lundberg-Love (2004) described a number of these. Parents model gender roles in their own choices and behaviour, by the jobs they are employed in and their leisure activities. They also reinforce gender roles in their children by the kinds of play they encourage, the jobs they assign to boys and girls, and the extent to which independence, assertiveness, compliance and aggression are encouraged or tolerated. The researchers observed parents interacting with their infant children and describing them in gender-stereotypic ways from as early as 24 hours after birth. Siblings also play a part in gender socialisation. Children have been observed to display more gender-typed behaviour if they have an older sibling of the same sex (Marmion & Lundberg-Love, 2004).

The formation of gender identity is not without conflict. Gender identity is typically more inflexible among preschoolers, who may be heard to say, 'Your dad can't be a nurse, he's a man', or 'He isn't a nurse, he's a doctor'. Peers play important roles in shaping gender identity. Matlin (2004) identified four ways in which peers encourage gender-typed behaviour. They may reject children who behave non-stereotypically, encourage play with peers of the same sex (emphasising the difference, with phrases

BOX 11.5 CASE STUDY

BEING NORMAL

> I get the occasional snigger, tease 'Faggot, gay, etc' because I'm real expressive and very in touch with my feminine side. I'm not gay, but I have three sisters, and I can relate and understand them very well. I'm very sensitive too, and at school guys can be like dogs and sniff you out fast. If you stuff up in the sense of wearing the wrong shoes, clothes, friends, you can cop a whole heap of s**t. But the action of those guys are out of fear of not conforming to the pathetic egoistic standards. Being a guy that isn't popular, if you don't fit in, then you're instantly labelled. What you usually find [is] that the way to harass a guy's dignity is to affect his sexuality. Common issues of insults could be 'faggot, gay, homo, sped, etc' really insulting names. For guys it's also an ego thing. Who's the most heroic, bravest, who can pick up the best chick, who can cop a root or a bit ... first. The peer pressure is pretty strong. You will find that all of the guys are very afraid. You can get the strongest-looking guy, but he's still afraid. Guys think that they have to fit in. I do, sometimes, but I guess I'm realising that it's not worth it, and plus I think, why would I want to be like them. I wish that guys could be more individual because only then, I think the issues mentioned wouldn't occur often (15-year-old male student; CCHS M 2/15).

Source: Martino and Pallotta-Chiarolli (2005).

ACTIVITIES

1. Have you experienced or observed this kind of policing of adolescents' behaviour by their peers? What tactics did they use? What kinds of behaviour were targeted? What impact did it have on the student's behaviour?
2. What role can teachers and schools play in minimising harassment, and broadening ideas of what is 'normal' for boys and girls?

such as 'We're not going to play with the girls, are we?'), show prejudice against children of the other sex ('Ew, boys' germs'), and treat boys and girls differently. Witt (2000) suggested that children test out behaviours with peers. If they are teased about them, then they will stop, while behaviours that are rewarded continue. Thus, there is an ongoing shaping of gender-role behaviour throughout childhood. In adolescence, there is an increased rigidity of gender-role stereotypes, with gender intensification (Matlin, 2004). This probably relates to the development of identity formation (see Chapter 4). It can also show itself in 'boundary policing' (Martino & Pallotta-Chiarolli, 2005), where adolescents single out and ridicule any behaviour that does not fit the norm. Box 11.5 is a case study of a student who has experienced this kind of pressure to be 'normal' from his peers.

As the case study in Box 11.5 implies, students who identify as homosexual can be the targets of such policing, as they challenge ideas of what is normal. As adolescents explore their gender identity, conflicts may sometimes arise for those who are homosexually oriented and who find themselves in predominantly heterosexist schools and communities (Martino & Pallotta-Chiarolli, 2003). The process of 'coming out' and identifying as a gay or lesbian adolescent often has seriously negative effects on students' family lives and peer relationships (Anderson, 1994). This experience may also have a long-term negative impact on the self-concept and self-esteem of such young people (Uribe & Harbeck, 1991). Research indicates that homosexual adolescents experience feelings of isolation, fear and confusion (Ginsburg, 1997), and may be stigmatised by their school communities (Sanelli, 1999) as they seek to come to terms with their sexual orientation and gender identity.

GENDER ISSUES IN SCHOOLS

Gender difference in schooling has been an issue in Australian education since the publication of a report from the Schools Commission in 1975 entitled *Girls, school and society*. The report identified the poorer achievement and participation of girls in education, particularly in traditional 'male' subjects such as Mathematics and Science. It led to the development of a Girls' Education Strategy, which has proven effective, with girls' participation and results improving to the point where girls are now achieving as well as or better than boys in traditional and non-traditional subjects. Early this century, boys became the focus for similar initiatives, as girls were perceived to be achieving higher results in a number of areas. In 2002, the Australian Government released a report of an inquiry into boys' education, entitled *Boys: Getting it right* (House of Representatives Standing Committee on Education and Training, 2003). Concerns addressed in the report included differences in achievements, such as lower literacy achievements of boys compared with girls, and lower matriculation results for boys than for girls, together with boys' disengagement with schooling – reflected in lower retention rates to Year 12 – and higher suspension and expulsion rates for boys than for girls. The differences were reported for each socioeconomic group, but were largest in the lowest socioeconomic groups, suggesting an interaction between gender and social class. Other groups of boys showing particularly poor outcomes of schooling include boys from rural areas, boys with LBOTE, and Indigenous boys (Collins, Kenway & McLeod, 2000; DEST, 2007; ERO, 2008). Literacy is an area of the curriculum in which boys' needs have been highlighted, acknowledging the importance of literacy to ongoing success in school learning (ERO, 2008; Munns et al., 2008).

Although girls may appear to be doing better than boys at school, this does not appear to translate to better employment opportunities after school (ABS, 2013). With limited employment opportunities for girls, it is not surprising that they should stay at school longer and aspire to higher education. Boys tend to move from education to training and/or employment, whereas this pathway is less available to girls (Teese, 2000). Teese suggested that this pattern is reflected in higher numbers of boys enrolling in TAFE courses, while girls tend to enrol in university programs. Related to this is the pattern of subject choice, which is more likely to translate to employability for boys, but not girls.

The Australian experience is repeated in many other countries, such as New Zealand, the UK and the USA (DETYA, 2000). As a result, considerable research has been devoted to accounting for the differences and suggesting ways of improving boys' outcomes. At the same time, a number of reports have cautioned against addressing boys' needs to the neglect of girls', and against wholesale programs that treat all boys (or all girls) as having the same needs or learning styles (Connolly, 2004; ERO, 2008; Munns et al., 2006). Rather, these reports urge that schools look at which groups of boys and which groups of girls are not achieving at the levels of their peers, and target the combination of factors that are relevant for those groups.



BOX 11.6 CLASSROOM LINKS

DIFFERENCES WITHIN AND BETWEEN GROUPS OF BOYS AND GIRLS IN A TYPICAL YEAR 9 CLASS

- George is in the advanced English class.
- Jesse struggles with maths, but likes music.
- Sophie does well in maths, is quiet, and finds it hard to express herself.
- Jon loves English and hates maths and science.
- Joann is very sporty.
- Kevin hates sports and would rather read a book.
- Stacey is in the debating team. She wants to be a lawyer.
- Ben is a computer whiz. He likes maths.
- Simon is good at all sports. He finds it hard to sit still and concentrate on purely academic tasks.
- Fred loves sports, but also does well in school.
- Harry can't wait to leave school.
- Lachlan is the class clown. Relating to his friends is the main thing he likes about going to school.
- Kiani is marking time until she finishes school, keeping a low profile so that she doesn't get called on by the teacher.
- Chloe is keen to participate in class discussions, and is often one of the first to put up her hand.
- Jen also likes class discussions, but usually those between herself and her friends.
- Tim avoids any writing activity.

ACTIVITIES

1. Sort these students into those who are typical and atypical of the descriptions of boys and girls in the text.
2. Can you see a pattern in the boys' or girls' abilities, attitudes or behaviours?
3. If this was your class, what could you do to ensure that you were meeting the needs of all boys and girls?

Understanding differences within and between groups

Figure 11.6 shows the differences between two groups. Differences reported between two groups, such as 'girls are achieving more highly in literacy than boys', are typically reporting a difference in the mean – the average score. Note in Figure 11.6, however, the size of this difference (the black arrow above) compared with the size of the difference within each group (the blue and red arrows). The large overlap in the two curves also represents the large numbers of boys and girls who can be alike on a particular measure.

As well as means, it can be helpful to look at the variability in scores within a particular group. Lippa (2005) reported greater variability in boys' than in girls' scores on measures of mathematical and visual–spatial ability and aggression. As the mean for boys on these measures is higher than that for girls,

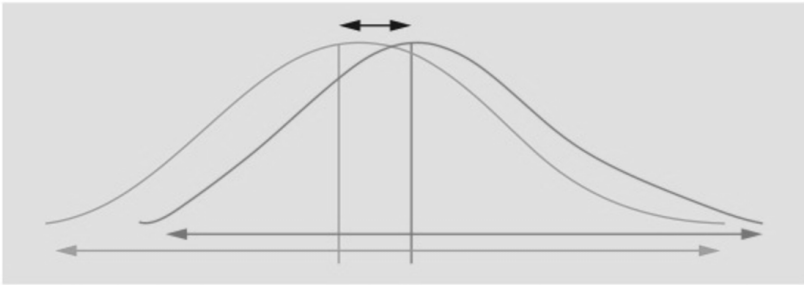


FIGURE 11.6 The difference within each group of boys or girls (the arrows at the base of the diagram) is greater than the difference between the groups (the arrow at the top of the diagram). What implications does this have for our understanding of individual differences and group differences?

it suggests (supported by other data) that there are groups of boys who are very aggressive, boys who are very good at maths and boys with very advanced visual–spatial abilities, but that there are corresponding groups of boys who are not at all aggressive, who struggle with mathematics and who have poor visual–spatial abilities. Group generalisations are just that, and we should be aware of individual differences within groups of boys or girls. Box 11.6 shows another way of thinking about individual and group differences.

Box 11.7 gives some strategies for teachers that effectively address the needs of boys and girls.



BOX 11.7 CLASSROOM LINKS

PROMOTING BOYS' AND GIRLS' ACHIEVEMENT

Koch (2003) made the following suggestions for teachers to ensure inclusive education for boys and girls:

- Use non-sexist, inclusive language.
- Use strategies to ensure you call on male and female students equally.
- Value a range of ways of solving problems and approaching tasks.
- Praise both boys and girls for their achievement (rather than neatness or appearance).
- Coach all students to search for deeper meanings in their answers to questions.
- Use 'wait time' after asking a question, to allow all students a chance to answer.
- Adapt teaching and learning strategies to cater for boys and girls with different preferences, including cooperative learning and technologies.
- Monitor the class to uncover the patterns of dominance in classroom talk. Who is silent and why? Who dominates, and how and why?
- Hold and communicate expectations that both male and female students can accomplish a task or solve a problem.
- Avoid comparisons about the behaviour, achievement and attitudes of boys and girls.
- Encourage emotional expression from boys and girls.
- Ask students whether teachers treat them differently because of their gender.
- Examine the curriculum, texts and other resources you use for bias: Who is included and who is excluded, for example? Does it reflect students' lived experience?
- Examine your practice: Who does it benefit and include, and who does it exclude? (Those girls who struggle using computers? Those boys who struggle with extended writing tasks?)
- Consider how you can best meet the needs of the boys and girls in your classes.

ACTIVITY

Examine a classroom you are familiar with, using these indicators.

1 What are its strengths and weaknesses as an inclusive classroom?
2 What else could the teacher do?

Effective teaching considers all students, and is flexible so as to cater to students' differing needs. This applies to gender differences as much as to cultural differences. Box 11.8 gives some suggestions for inclusive teaching practices that are relevant to the gender issues discussed in this section.



BOX 11.8 IMPLICATIONS FOR EDUCATORS

GENDER IN THE CLASSROOM

- From the findings reviewed in this chapter, it appears that boys and girls can experience gender-related advantages and disadvantages at school. Effective programs consider the needs of boys as well as girls, rather than targeting one group (see Box 11.7).
- Particular groups of boys and girls appear to be particularly vulnerable to gender-based effects; for example, boys in special-education programs, girls who leave school seeking employment, and boys and girls in lower socioeconomic groups. The needs of each of these groups are different from the needs of boys and girls overall.
- One key to avoiding gender bias appears to be variety; that is, ensuring that students are offered a mixture of cooperative and competitive approaches to learning, in individual and group work, and a choice of assessment modes and study topics.
- Participation is a second component of effective, inclusive teaching, ensuring that all students have a chance to participate in all activities. This may involve structuring activities to ensure that all students have chances to try – and succeed – in a range of tasks. Some authors have suggested that waiting longer for student responses and establishing procedures for turn-taking can encourage girls to participate in male-dominated subjects, and may also be advantageous to students of language backgrounds other than English (Grossman & Grossman, 1994).
- Being aware of possible gender bias in your teaching and resources can help you limit it by taking active steps to be even-handed in your treatment of boys and girls. Try videoing your class and observing your interactions for gender bias.

SOCIOECONOMIC STATUS (SES)

Our education system is based on equality of access for all Australians, but there are differences in the educational outcomes of people from different social classes in Australia. The Organisation for Economic Co-operation and Development (OECD) reports a general association between SES and educational outcomes in many, but not all OECD countries. Australia and New Zealand are among the countries that show this inequity, although progress has been made, with the latest PISA data showing improvement in equity for Australian students (OECD, 2014), and a New Zealand Education Review Office (ERO) report identifying a number of schools with lower SES families whose students achieve strong outcomes (ERO, 2014a) – refer to Box 11.10 on page 430 for a summary of the common features of these schools.

An inquiry into schooling in NSW concerning the outcomes associated with low SES when compared with high SES (Vinson, 2002) found:

- lower levels of literacy, numeracy and comprehension
- lower retention rates
- lower participation rates at university
- higher levels of problematic school behaviour (for example, truancy)
- less likelihood of studying specialised maths and science subjects
- greater likelihood of having difficulties with studies and displaying negative attitudes to school
- less successful school-to-labour market transitions.

In addressing why these differences occur, and what might be done to even them out, a number of explanations have been proposed relating to the nature of the home background, the nature of the school, relationships between home and school, and sociocultural factors. We now explore each of these sets of factors, bearing in mind that it is the *interaction* of these factors that produces the outcomes that are reported in research.



THINK ABOUT

Think of someone you know who is worse off than you.
- What has contributed to the difference?
- How have your different circumstances affected your opportunities and your attitudes?

SOCIAL CLASS AND SES

Social class is often discussed as consisting of three categories: upper class, middle class and working (or lower) class. A family's social class is generally evaluated in terms of **socioeconomic status (SES)** – typically a combined measure of parents' education, occupation and income, though each of these factors contributes separately to children's outcomes (Conger & Donnellan, 2007). This recognises that there are economic and educational factors affecting parenting, and that parents' situations affect children's outcomes.

socioeconomic status (SES)
A measure of social and economic position in society; typically a combination of education, occupation and income

SES is not a magical factor that determines educational outcomes any more than do the other factors discussed in this chapter. Differences in achievement are positively correlated with SES because of particular environmental and social factors, experiences, behaviours and beliefs enacted as a result of a family's social and economic situation. Many members of the same social class may share these beliefs and behaviours, but others will not. (Think of your neighbours: they are likely to share your SES, but how many differences can you think of in your belief systems, your experiences, or in the ways you live?) It is important also to note that SES is flexible, not static, and families may move in and out of particular SES groups, and in and out of typical patterns of behaviour and experience associated with their SES.

It is also not inevitable that having low SES will result in poor outcomes. The Comparative Education Research Unit (2004) of the New Zealand Ministry of Education examined data from a large international study of students' achievement to identify those factors that were associated with high achievement in students from low SES backgrounds. They found that there was greater difference among students within each category than between categories. (Do you recognise this pattern from our discussion of gender?) When compared with low achievers, high achievers:

- reported spending more time on homework
- showed more interest and engagement with reading
- indicated strength in competitive and cooperative learning strategies, with more strength in competitive strategies
- were more confident in their own abilities
- reported more availability of educational resources in the home, such as a dictionary, a quiet place to study, a desk for study, textbooks and the number of calculators
- reported better teacher–student relations (Comparative Education Research Unit, 2004).

Typically, reports of the relationship between SES and education focus on those who are in the lowest groups: those in poverty. Some of the explanations regarding the relationship between poverty and educational outcomes are particular to poverty: poor nutrition or multiple stressors, for example, might be experienced in poor families but are less likely to explain why those in the highest SES bracket

do better than those in a middle bracket. Although SES is defined by the three factors of parents' occupation, education and income, poverty tends to be defined by the relationship of income to need, and so focuses on the third indicator (McLoyd, Aikens & Burton, 2006).

It is helpful, however, to understand how poverty affects education, particularly given the numbers of Australians and New Zealanders who are affected by it. Some more-general models of the relationship between SES and education, considering societal and school factors, are discussed later in the chapter.

POVERTY AND EDUCATION

The extent of childhood poverty in Australia and New Zealand is increasing. The Brotherhood of St Laurence reported in 2005 that more than one in 10 Australian children lived in relative poverty (Scutella & Smyth, 2005), while the Australian Council of Social Service reported in 2014 (drawing on ABS figures) that that figure had risen to 17.7 per cent by 2012. The proportion in New Zealand is even greater, with a figure as high as 25 per cent estimated in a report to the Children's Commissioner (2012). Particular groups are disproportionately affected, with Aboriginal children in Australia, and Māori and Pasifika children in New Zealand more likely to live in poverty (Boston, 2014; McLaughlin, Gilfillan and Gordon, 2013). Poverty is associated with a number of health, cognitive and socioemotional outcomes for children, each of which can affect educational outcomes.

Health factors

In Chapter 2, we saw that children's development can be affected by environmental factors. Poor nutrition, inadequate access to health care and exposure to particular environmental hazards, such as high lead levels, can all have an impact on education, both directly and indirectly. Very poor nutrition affects brain growth, physical growth, protection against disease and cognitive functions such as long-term memory. Inadequate nutrition can also result in lethargy, which affects motivation. Environmental hazards may include overcrowded, substandard housing and poor air quality. Children living in some outer suburbs of Sydney, for example, are at higher risk of asthma than those living in other parts of the city, and may have been exposed to high levels of lead from car emissions. This may result in school absence due to illness, and in a lowering of cognitive functioning (Evans, 2006). Lack of access to health care is an important factor in the high rates of otitis media (see page 437) and associated deafness in Australian Aboriginal children. Similarly, in New Zealand, hearing-loss problems in Māori children are detected later than those in Anglo children, and Māori children have higher rates of hospitalisation for asthma.

Parenting factors

As we saw in Module I, parents are important agents in children's development. Studies of poverty and education reveal links between poverty, low levels of parental education and lower levels of school achievement in children (Bradley & Corwyn, 2002; McLaughlin, Gilfillan & Gordon, 2013; Raffo et al., 2010). Parental education appears to be a strong predictor of student performance. In a study for the Smith Family (a large Australian welfare agency), Zappalà and Parker (2000) found that even within the lowest socioeconomic group, parents' education level was strongly associated with student academic outcomes.

One explanation of the importance of parents' education is its effect on what parents do with their children at home, and the ways in which they interact with them. Other factors also contribute to parenting practices, such as working arrangements. Box 11.9 describes a research project that compared family life across class groups. The New Zealand reports *Competent children*

at 12 (Wylie, 2004) and *Competent children at 16* (Wylie & Hogden, 2007) paint a similar picture. Children whose parents (particularly mothers) had higher qualifications tended to have family resources that supported engagement in school, reading comprehension, and mathematics reasoning and understanding skills. These family resources included activities that extend knowledge and communication, as well as analytical skills, parental interest in education, use and enjoyment of reading, and support for children to be assertive. Language experience and use in these homes was linked to development and support of reading and mathematics skills over many years. Wylie suggested that these children were then able to make the most of what school had to offer. Children whose mothers had fewer qualifications did fewer of those activities that contributed to high achievement, and watched more television.



Source: 9nong/Shutterstock

FIGURE 11.7 Childhood experiences help to develop particular selves in children that fit their context. Consider how your experience of childhood has shaped the kinds of choices you make, and the ways it has equipped you to thrive in your context.

BOX 11.9 RESEARCH LINKS

HOW SCHOOLS WORK WITH SOCIAL CLASS TO SHAPE CULTURE AND SELF

Stephens, Markus and Phillips (2014) described how social class works through much more than access to income and resources to determine life outcomes, also shaping the kinds of selves that people develop, and the behavioural choices they make. They suggested that in different social class contexts, particular 'selves' develop in response to opportunities and constraints, and that these are formed in the key settings of home, school and work. Far from being fixed, they are constantly responding to the varying contexts in which individuals participate, which suggests possibilities to intervene and alter both the cultures and their usefulness in schools. Consistent with modern views of culture (and with Bronfenbrenner's model with which we started this chapter), individuals are not only influenced by but themselves influence these cultures, which are constantly changing.

Stephens and colleagues drew on a range of research to identify an 'expressive independent' self that developed in response to middle-class contexts, and a 'hard interdependent' self which developed in response to working-class contexts (see Figure 11.8). The expressive independent self involves personal choice, self-expression, power and influence. It suits middle-class contexts, which tend to be relatively safe, predictable and secure, and middle-class jobs, which tend to require independence, decision making, negotiation and creative thinking. The hard independent self is described as 'socially responsive and self protective' (p. 615). It involves considering and responding to others, and sticking up for the self, as well as toughness and resilience. It prepares children for working-class contexts that are characterised by greater constraints, relative instability, unpredictability and risk, and for working-class jobs that tend to require people to follow directions, work in cooperation with others, and enforce rules.

Stephens, Markus and Phillips describe the cultural selves as socialised in families, schools and workplaces. In families, parents socialise children towards particular selves relating to their class culture, through storytelling, activities and communication styles. In schools, teachers socialise working-class children towards working-class jobs in working-class schools, and middle-class children towards middle-class jobs in middle-class schools. This tends to reproduce the social structure.

At the same time, middle-class selves are institutionalised as 'the best way' in schools and in workplaces – what is needed to succeed in higher education, for example, or in higher-paying jobs. Without realising this, teachers may not recognise that students with working-class selves

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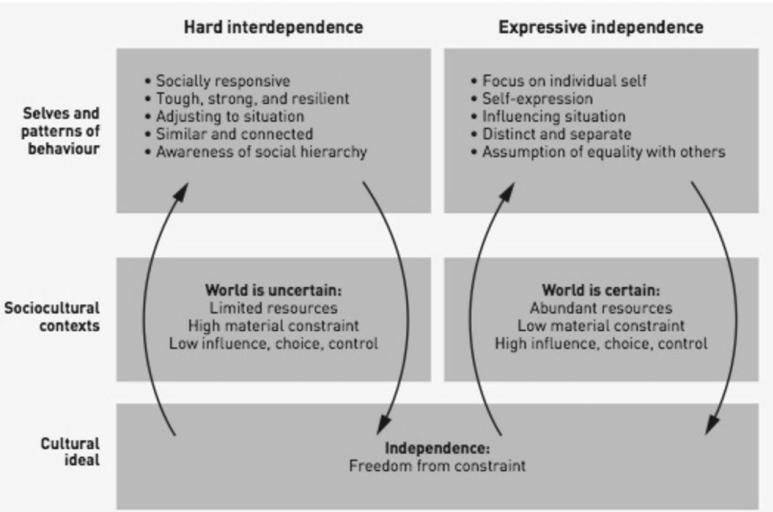

Source: 'Social Class Culture Cycles: How Three Gateway Contexts Shape Selves and Fuel Inequality' by Nicole M. Stephens, Hazel Rose Markus and L. Taylor Phillips, from *Annual Review of Psychology*, Vol. 65, pp. 611-634. Copyright © 2014 by Annual Reviews. Used by permission.

FIGURE 11.8 US social class culture cycles.

need help, as they are less likely to ask for it; and they may not identify them as 'good students' as they don't fit the expressive independent style. Difficulties come for working-class students in middle-class schools when they feel that their hard interdependent selves do not fit the school, and that school is 'not for them'. Stephens, Markus and Phillips report that working-class children experience more stress at school, and there is a link between SES and academic performance in the USA (as well as in Australia and New Zealand). Working-class children who grow up in working-class schools may also have restricted avenues available for work.

Stephens, Markus and Phillips argue that this need not necessarily be the way things work. To change it, teachers need to be aware of the class cultures children from different social classes bring to school (and of their own class culture), so that they can support these children, just as is suggested for children from other cultures. They suggest that teachers could support working-class students in middle-class schools by making expectations explicit, and by valuing the hard interdependence that they bring, enabling them to be bicultural, and to draw on multiple skill sets for the varying demands of different contexts.

ACTIVITIES

1 Stephens, Markus and Phillips' theory is based on the USA. Do you think similar patterns would be found in working-class and middle-class families and schools in Australia or New Zealand? How might they differ?
2 Note as described earlier that SES groupings are not fixed but flexible, and families move in and out of them. Describe how this would influence the situation described by Stephens and colleagues.
3 What activities in school could draw on the strengths of the hard interdependent selves described here? What benefits might they bring for all children?

Researchers Hart and Risley (1995) illustrated the relationship between SES and parenting behaviour in language when they found that parents from the poorest families in their study used only one-third of the spoken language that other parents in the study used when talking to their children – meaning that the children in the poorest families had more limited parental input when learning language. Parental input is important in children's language development, which is related to cognitive development. Language is also very important to learning and displaying knowledge at school.

Providing cognitively stimulating experiences such as trips to museums, libraries, concerts and the zoo, and learning experiences such as specialist classes in gymnastics or music, is financially within the reach of some parents but not others. Bradley and Corwyn (1999) reported that such experiences provide learning opportunities and motivation for continued learning, while their lack can limit cognitive growth and reduce children's ability to benefit from school.

Parents' experiences of education influence how they interact with their children, their ability to prepare their children for school, and their expectations of and how they view schooling. Polidano, Hanel and Buddelmeyer (2012) found that the educational aspirations of 15-year-olds and their parents were the strongest factor explaining socioeconomic differences in school completion in Australia. If parents' aspirations for their children are low, students are unlikely to extend their participation beyond compulsory schooling, as they are unlikely to perceive this as resulting in any benefit. Parents' educational experiences may also affect their view of school itself. Is it seen as a place where their child will be extended and nurtured, or where their child will be misunderstood and mistreated? Most parents value schooling as important, but their experiences influence how effectively they express this value to their children.

Stress factors

One of the major models of the relationship between poverty and education involves the impact of stress on families and children (Boston & Chapple, 2014; Bradley & Corwyn, 2002). Consider some of the likely sources of stress that people living in poverty could encounter: employment uncertainty, lack of financial security, having to move house often, and living in neighbourhoods with high levels of violence, overcrowding and substandard housing conditions. Chronic stress directly affects children's neurological development, and can lead to memory and learning difficulties, as well as reduced ability for the person to cope with stress later in life. However, not all children who experience chronic stress have these outcomes. Sensitive, responsive caregiving can buffer the negative effects, and this may include childcare and education settings outside the home (National Scientific Council on the Developing Child, 2014).

Stress, uncertainty and low social standing have also been correlated with low self-esteem, feelings of powerlessness and learned helplessness, as well as depression (McLaughlin, Sheridan & Lambert, 2014; McLoyd, 1990). These attitudes, in turn, are linked to poorer-than-average relationship quality (including parent–child relationships) (Brody, Flor & Gibson, 1999). In particular, the stress associated with poverty is tied to maladaptive parenting behaviours such as lack of warmth, unresponsiveness, inconsistency or lack of appropriate control (Raffo et al., 2010). More consistent and positive parenting was linked to better cognitive and social-emotional outcomes in families in which parents were employed as compared with jobless families, in the Longitudinal Study of Australian Children (Baxter, Gray, Hand & Hayes, 2012). The negative results of unemployment are not inevitable, however. When unemployed parents had social connections and were involved in community activities, their children's cognitive, social and emotional outcomes were stronger than for those children whose parents didn't have that social capital. Raffo et al. (2010) also reinforced the value of supportive networks in providing resilience for families and children living in poverty.

Risk and resilience

In interpreting models of the relationship between poverty and educational outcomes, we need to be careful not to generalise negative outcomes to all families in poverty. The notion of risk and resilience was introduced in Chapter 10. The factors just outlined (from the heading 'Poverty and education' onwards) constitute **risk factors** – or factors associated with negative outcomes – that exist for children and families in poverty. They do not inevitably lead to poor outcomes. Bowes, Grace and Hayes (2012) pointed out that risk factors change over time, so families and children may move in and out of being at risk. As we saw with stress factors, there are also factors that engender resilience to such risks, which helps some families and children overcome difficulties such as those described earlier. What provides an individual or a family with resilience can also change over time, and exists in balance with risk factors.

risk factor
A factor associated with negative outcomes

Garmezy (1993) identified three groups of factors that provide resilience for children at risk through poverty:

1 *Personality characteristics*. Examples include self-esteem, belief in personal control, mastery motivation (the belief that difficulties can be overcome and that effort leads to success) and persistence, as well as humour, adaptive coping strategies and optimism (for example, remaining optimistic in the face of poverty can make it less likely that negative parenting will result) (Brody et al., 1994).
2 *Family characteristics*. These include cohesion, shared values, patience and the presence of supportive adults. The considerable success of some refugee groups despite their living in poverty has been attributed to such characteristics (Caplan, Whitmore & Choy, 1989).
3 *Availability of external support systems*. Having support from others outside the family can mitigate the effects of poverty by providing access to resources beyond the means of the family, by reducing some causes and consequences of stress, and by providing help to cope with stress as it occurs.



THINK ABOUT

- How could schools contribute to resilience factors in students considered as being 'at risk'?

SCHOOL FACTORS

Just as children's school outcomes do not arise simply from individual characteristics but also reflect family and environmental factors, so too there are factors in the school and wider society that contribute to these outcomes. Check back to Bronfenbrenner's model (Figure 11.3 on page 405) to see how these sets of factors fit together.

In light of the research reviewed in this chapter, it might be tempting to attribute the lower achievement of children from low SES groups to home background, and even to form lower expectations of those children than of others. But schools also contribute to unequal educational outcomes in important ways, and can also contribute to resilience, as Box 11.9 (see page 425) indicates.

Amount of schooling is related to income, health, and cognitive and social outcomes (Vinson, 2007). Children in Australia from disadvantaged groups are less likely to attend preschool than are those of higher SES (Maguire & Hayes, 2014). A review of access to early childhood education in Australia undertaken by the Australian Institute of Family Studies found that children from disadvantaged families were indeed more likely to miss out on early childhood education, particularly Indigenous children and those with language backgrounds other than English (Baxter & Hand, 2013). In New Zealand, participation rates are higher overall, but still lower for Māori and Pasifika groups (New Zealand Ministry of Education, 2011a). Worldwide, *quality* preschool experience has been linked to social and academic skills, and better school outcomes (for example, Berlinski, Galiani & Manacorda, 2008; Burchinal et al., 2008).

As well as years of schooling, quality of school experience counts. There are a number of factors based in the school and in its interactions with the family that explain differences in educational outcomes across the broad spectrum of SES groups. Of course, we should recognise that individual schools sit within a society, and that broader forces are also at work. Our focus here, however, is on the difference that individual teachers and schools can make.

Teacher expectations

McLoyd (1998) suggested that teachers tend to perceive the academic ability and behaviour of students from lower socioeconomic backgrounds more negatively than that of students from higher socioeconomic backgrounds. Poor children are likely to receive less positive attention and less reinforcement for academic achievement, which is perhaps in line with teachers' lower expectations of these students.

Home and school difference

Some ways in which a given school may contribute to educational disadvantage are linked to the relationship between school and community. Related to this is the 'closeness of fit' between home and school practices. Although some policymakers have seen this as a problem of the home, others look to the school to accommodate student differences, whether these differences originate from ethnicity, gender, social class or individual characteristics.

Following are some of the key ways in which home and school can interact to contribute to educational disadvantage. You may recognise some recurring themes that run through this chapter. Sources of individual difference are important issues for educators because of the need to consider how these differences impact on, and are impacted by, education. Schools can perpetuate but also act to prevent these outcomes of difference from occurring. In this chapter, you will find a number of examples of schools that have worked effectively with their communities, rather than in opposition to them.

- *Schools advantage children whose home experiences fit the school 'style'* (Comber et al., 2005). Because schools (like the teachers who work within them) tend to be White, Anglo, middle-class institutions, they tend to favour students who come from such backgrounds. One important example involves the use of language. Language, and particularly decontextualised language (that is, language that discusses something not present in the current context), is central to the work of schools. Studies of the language patterns of different social groups show that the way language is used in schools tends to mirror the language patterns of the middle class (Heath, 1983).
- *Establishing or maintaining a home–school divide.* The values and practices of the school and home may differ. Schools that ignore this difference or denigrate the home values set up a divide between home and school. Eckermann (1994) suggested teaching about differences explicitly, and helping students to judge when one set of values or behaviours applies and when another would be more useful.
- *Differing communication styles of home and school.* Although the language spoken at home and at school superficially may be the same, differences in communication styles used at home and at school can lead to misunderstandings and conflict.
- *Perceptions of and about minority groups.* As described earlier in this chapter, minority groups may see schools as the 'opposition': something to be distrusted at best, and resisted at worst. This is related to societal forces beyond the school, but may be exacerbated by particular practices that reject the minority students' beliefs and behaviours. Negative perceptions may be minimised by involving the community in the school, and the school in the community.



THINK ABOUT

- Can you think of other ways in which differences between home and school could influence students' educational outcomes?

Box 11.10 summarises the findings of a New Zealand report of the practices of schools that achieve high academic outcomes for students from low-SES families.

BOX 11.10 RESEARCH LINKS

TOWARDS EQUITABLE OUTCOMES IN SECONDARY SCHOOLS: GOOD PRACTICE

New Zealand's ERO identified seven schools that enrolled significant numbers of children from families of low SES (decile 1–5 schools), which nonetheless achieved outcomes in attendance and academic achievement that were better than those of similar schools. While the schools were different in many ways, they had the following features in common, which were identified as good practice for achieving success for and engaging every student in the school.

School culture

- Schools focused on the students' wellbeing and on building deeply caring relationships.
- A 'can do' attitude pervaded the schools – schools believed that all students can succeed and that teachers can find ways to help that happen.
- *Whānau*, parents and community were involved in their teenager's learning.
- Responses to problems were solution-focused and restorative practices were used.

Students

- Students were confident young adults, helped to take responsibility for themselves and their learning.
- Students were active members of their school community.

Learning

- Carefully selected and adapted professional learning advanced the school's strategic plan.
- School leaders and teachers used extensive, high-quality data to identify students' needs and respond appropriately.
- Community links extended opportunities for students' learning.

Leadership

- Senior leaders worked extremely efficiently as a team with high levels of relational trust.

Source: ERO (2014b). 'National reports 2014', published by New Zealand Education Review Office, © 2014.

ACTIVITIES

1. Explore some of the school case studies presented in the ERO report to see how these things worked in practice.
2. Link these practices to the principles presented in this chapter. To what extent do they align? What other principles are represented here? Why would they be important?

THREATENING ENVIRONMENTS

Residents in Australia and New Zealand experience natural disasters such as fires, floods and earthquakes on a fairly regular basis, either personally or through media coverage. In addition, refugees may have experienced war or terror before coming to Australia or New Zealand, and further trauma in detention centres. How do these experiences affect children and young people, and how can we support them?

Children may be affected directly as a result of physical dangers, stress, disruption of routine and loss of home, school and community, and indirectly through impacts of parenting quality, economic factors, and 'reading' of parental anxiety in social referencing (Masten & Narayan, 2012). Children and young people are variously affected, with younger children protected in part by lack of understanding, but vulnerable in not possessing the cognitive and emotional skills to manage emotions and thoughts.

Older children and young people are more vulnerable to anxiety through their greater understanding of what is happening, and their ability to imagine further effects, while protected by their greater level of cognitive and emotional regulation skills.

In a review of the literature, Masten and Narayan (2012) identified the following protective factors. They are proposed to support a sense of safety and connectedness, control and agency, regulation of emotion and behaviour, and optimistic thinking, all of which help individuals to adapt in responding to threats.

- *Psychological factors:* Intelligence, self-regulation, cognitive flexibility, self-efficacy and a sense of self-confidence are all identified as protective. Teaching these skills as part of disaster readiness might therefore be helpful. Religious beliefs and practices are also helpful in conveying hope, belief and a sense of meaning.
- *Relationships:* Close and supportive relationships are paramount, particularly attachment relationships with parents. Being close to parents during a terrifying experience is particularly important. Reuniting children with families is thus important when disasters come.
- *Acculturation:* For refugee children, development of language skills in the new country and a positive bicultural identity were both associated with recovery from traumatic experiences.
- *Environments in which to play and learn:* Having functional schools or childcare settings, and safe places in which to play is one of the keys to restoring normalcy and providing constructive activities, connections to competent adults, peer interaction, respite for parents and a re-establishment of routines.

When a disaster occurs, the following principles of intervention are agreed in the research to be of benefit to promote resilience: promote a sense of safety, self- and group efficacy, calming, connectedness and hope. Although the care of parents is the key to this, adults such as teachers or childcare providers also have important roles to play in the context of disaster. The work on risk and resilience discussed earlier in this chapter is also relevant here.

INCLUSIVE EDUCATION FOR ABORIGINAL AND TORRES STRAIT ISLANDER STUDENTS IN AUSTRALIA, AND MĀORI STUDENTS IN NEW ZEALAND

ABORIGINAL AUSTRALIANS AND TORRES STRAIT ISLANDERS: DIVERSITY AND COMMONALITY

Aboriginal people and Torres Strait Islanders are not a homogeneous group. Important differences exist among different peoples and language groups, and among Aboriginal people living in urban, rural and remote locations. Kooris living in inner-city Sydney are no less Aboriginal than Yolngu people living in 'traditional' communities in the Northern Territory, notwithstanding large differences in lifestyle, language and beliefs. In addition, different individuals and communities may have differing experiences of education; for example, Aboriginal people living in remote areas generally have poorer educational outcomes than those living in urban areas. Each State or Territory in Australia has its own education practices and policies regarding Indigenous Australians. For example, the schools in the Torres Strait employ Indigenous teachers and principals in much higher proportions than is the case in many other areas of Australia.

Such diversity in practices and policies across Australia is broadened by individuals or groups moving between States. It is also complicated by individuals moving between urban and rural, and between

'traditional' and 'non-traditional' locations. In one school there may be students from a number of different groups; individuals within any group, too, differ in aspirations, attitudes and values. There are also differences in the aspirations of different communities and their goals for education. Although the majority of Aboriginal and Torres Strait Islander Australians place a high priority on education (DEET, 1989), what they seek from that education may differ. Skills in English literacy and numeracy are important to many, as is maintaining Indigenous culture and language, but the relative importance of these two goals is different for different communities. Families living in remote communities may place less importance on learning 'White' skills and greater emphasis on the teaching of their own culture. Others might not entrust the teaching of their culture and language to the school, preferring to maintain that function within the community. For still other groups, learning the skills of literacy and numeracy is seen as an essential outcome of schooling, and such groups are concerned that this process might be compromised if too much emphasis is placed on the learning of culture (Nakata, 1995). Once again, listening to the concerns and needs of a particular community is important in ensuring a match between community and school goals.

Notwithstanding the diversity among Aboriginal people and Torres Strait Islanders, there are commonalities among the different peoples in terms of values, ways of relating, and ways of using language (Bourke, Rigby & Burden, 2000). The sociohistorical background of some groups of Indigenous students also has commonalities in terms of status in society and exposure to institutional racism, and the related issues of school attendance, participation and achievement.

WHAT MAKES THE DIFFERENCE TO ABORIGINAL AND TORRES STRAIT ISLANDER STUDENTS' SUCCESS IN SCHOOL?

Many Aboriginal and Torres Strait Islander students do well at school. However, there remain many students who do not succeed (ACARA, 2014). What makes the difference, and how can schools ensure that all students have an opportunity to succeed in school? In a number of recent reports of successful practice, some common themes emerge.

The National Numeracy Review (Commonwealth of Australia, 2008) identified features of programs that led to improvements in the outcomes of Aboriginal and Torres Strait Islander students. Many of these features are important for other learners as well. The features are:

- valuing by teachers and school communities of the culture, language, skills and strengths that Indigenous students bring to the classroom
- considering cultural ways of learning, both to include students' ways of learning and to teach school ways of learning
- culturally and contextually aligned learning programs, resting on strong community partnerships
- recognising and valuing different pathways to learning
- use of Indigenous educators to help students to bridge school–home differences
- using relevant and meaningful contexts for learning, so that learning can be situated in students' lives
- involvement of first-language speakers in the classroom to help students to think about mathematics in their mother tongue, through scaffolding and elaboration
- high expectations of students and their learning
- stable staffing – linked to the importance of strong relationships teachers build with teachers
- use of strategies to cater for difficulties that affect learning, such as hearing loss, absenteeism and homework not being completed.

A study by DEST (Commonwealth of Australia, 2005) of programs that have been successful in increasing and maintaining the attendance of Aboriginal and Torres Strait Islander students identified the following features of successful programs: developing strong relationships between schools and their

Indigenous communities; creating curricula that are practical and relevant to students, and explicitly valuing Indigenous cultures; improving access to schooling; using Indigenous staff to liaise between home and school, and to give students a sense of belonging; helping with transitions from home to school and from school to work; increasing parent involvement in schools; and transporting students to school or preschool. The CourseMate website contains further examples of successful programs for Indigenous students.

In these reports, we can identify the common elements of building partnerships between schools and communities, considering the particular learning strengths and needs of students, the importance of relationships between students and teachers, and support for language, which are all interrelated. These elements are discussed below.

Celebrating skills and strengths

Valuing students' skills and strengths, and the knowledge they bring with them to school, is an important element in engaging them in school learning. Many Indigenous students may be skilled in a number of areas – including spatial, observational and kinaesthetic domains, among others – but as for all students, the presence and depth of skills depend on a student's early experiences. The National Numeracy Review (Commonwealth of Australia, 2008) described the successful highlighting of the strengths of Aboriginal and Torres Strait Islander students in the visualisation of three-dimensional space and subitising (recognising numbers without counting, such as in recognising the pattern of dots on dice as representing particular numbers) to publicly value students and create positive learning environments.

Drawing on Aboriginal ways of learning

Numerous authors have described the world views of various Indigenous groups in Australia (Harris, 1990), and have sought to link these to learning preferences. Others have cautioned against assuming that all Aboriginal people have the same learning style, pointing out that there will be differences in individuals' preferences, as well as across different groups (Groome, 1995). To the extent that they are characteristic of particular cultural groups, ways of learning develop from family and community processes. As these processes vary from one community to another, and from one family to another, and as they intersect with individuals' interests and personalities, so will individuals' ways of thinking about the world, as well as organising and learning about the world.

Partington (2003) pointed out that student learning and retention of knowledge and skills is more likely to be achieved by adapting teaching strategies to the needs of students than by trying to change students' culture and social backgrounds. Box 11.11 gives an example of how one region of NSW has done this, describing pedagogy that fits local ways of knowing and doing. The student companion website contains a description of another Aboriginal pedagogy developed at the Batchelor Institute of Indigenous Tertiary Education in the Northern Territory.



Source: © Newspix/News Ltd/Tim Carrafa

FIGURE 11.9 Aboriginal and Torres Strait Islander children in some communities are given greater independence and responsibility than is typically seen with children from other Australian groups.

Independence

The child-rearing style of many Australian Aboriginal and Torres Strait Islander communities affords children greater independence and responsibility than that which typically



BOX 11.11 CLASSROOM LINKS

8WAYS

In Western NSW, a research project involving Department of Education and Training staff, James Cook University's School of Indigenous Studies and the Western New South Wales Regional Aboriginal Education Team between 2007 and 2009 developed into an Aboriginal pedagogical model that has been adopted by schools in the region and beyond. They built a wikispace on which the model continues to evolve through ongoing dialogue. The aim is for local Aboriginal values, systems, protocols and processes to be identified by dialogue with the community, and then integrated into mainstream schooling through the pedagogy as it applies to each community. From the wikispace:

> Every place, every People, has its own unique pedagogies. These 8 simple ones are merely a starting point for dialogue. Each school engages in a different way, and produces its own unique frameworks for Aboriginal education through dialogue with the community about local ways of doing things.

Source: http://8ways.wikispaces.com

ACTIVITIES

1. Use the CourseMate link to explore the resources on the 8ways website, to understand the model and how it has been applied. What could you contribute to the discussion there?
2. See also Yunkaporta and Kirby (2011) for a discussion of the model by some of those involved in its development.
3. Compare this Aboriginal pedagogy with the one developed in Darwin (also in the CourseMate link). How are they similar, and how are they different?

results from Western child-rearing practices. This means that Aboriginal or Torres Strait Islander students may respond better to adult-education models than to the usual model used in schools, which sees students as dependent on and (in terms of role) subordinate to the teacher.

This independence may also mean that parents take a different role and approach in terms of encouraging children to attend school. For example, they may be reluctant to compel children to attend. Sims, O'Connor and Forrest (2003) suggest that teachers build on the child-caring role often taken by older children by involving these students in peer mentoring.

Interdependence

Cultures that emphasise relationships over tasks (Harris, 1990) lend themselves to collaborative and cooperative learning models (see Chapters 6 and 7 for examples of these approaches). Group work may be favoured over independent tasks, and cooperation over competition, although Ulstrup (1994, cited in Groome, 1995) reported a strong preference for competition held alongside cohesion and cooperative learning preferences. Greenfield and Suzuki (1998) likewise suggested that children from cultures that emphasise relationships tend to be cooperative with groups of which they are members, and competitive with groups of which they are not members.

Sims, O'Connor and Forrest (2003) described children as resources and responsibilities of their community, such that children will be parented not just by their biological parents but also by the community. They suggest that teachers involve the family group in conferences, recognising the supportive roles that each member plays in raising the child. Being involved with the whole community outside school will help teachers to develop relationships with the range of people who care for the child.

Supporting first language

Many Aboriginal and Torres Strait Islander students are competent in several languages, and can switch between various languages and dialects when talking in different contexts. This language skill represents a strong understanding of language and how it works, and it can be harnessed in English language and literacy learning.

The majority of Aboriginal and Torres Strait Islander students come to school speaking a language other than **Standard Australian English (SAE)** (Bourke, Rigby & Burden, 2000). They may speak a language completely distinct from English, a 'Creole' (that is, an amalgam of English vocabulary and their own language structure that exists as a new language) or a form of **Aboriginal English**.

Standard Australian English (SAE)
The language of mainstream Australia, and 'standard' in the sense that it does not vary significantly across communities

Aboriginal English
A dialect distinct from Standard Australian English, and having many variants in different Aboriginal communities

It is important to recognise that Aboriginal English is a separate dialect, different in every aspect of language from SAE (Malcolm et al., 1999). Aboriginal English has many different forms across different localities, and 'strong' and 'weak' forms may be used within a community, depending on the context. Although SAE and the Aboriginal English spoken in some areas may be mutually intelligible, Aboriginal English remains an important marker of Aboriginal identity. Like all languages, it bears important aspects of its speakers' culture and world view. Its similarity to SAE may cause difficulties when people – Indigenous and non-Indigenous Australians – fail to recognise its legitimacy and distinction as a separate language. Malcolm et al. (1999) described how students' use of Aboriginal English may not be accepted. Teachers who are unaware of this issue may correct students' use of Aboriginal English as being incorrect speech or writing, rather than recognising its source and explicitly teaching students about the differences between Aboriginal English and SAE, and when to use SAE and when to use Aboriginal English. The NSW Board of Studies (cited in Malcolm et al., 1999, p. 21) quoted an Aboriginal student as saying: 'Teachers are always correcting what we say or how we say. They say it is bad English. It makes us feel bad'.

Some Aboriginal people may discourage the use of Aboriginal English out of a desire for their children to succeed in the wider society. Another example is given by Malcolm et al. (1999) from earlier research done by Eagleson, Kaldor and Malcolm (1982, p. 237):

> [M]y mother and father, uncles and aunties would constantly tell me not to use Aboriginal English and to speak far more slowly than I did and to speak in standard English … you had to because you went to a white school I would imagine and the whites were the people that you had to sort of mimic and be like.
>
> Source: Malcolm et al. (1999).

The concern of Aboriginal parents over their children acquiring the literacy and numeracy skills needed for survival and success in Australian society has been reported by Harris (1990). The challenge remains how to provide these skills for Aboriginal and Torres Strait Islander children without degrading or eliminating their own language and culture. One approach to dealing with this challenge has been the development of 'two-ways' (or 'both-ways') schooling, which seeks to teach Western and traditional Aboriginal content and methodology side by side (Harris, 1990).

Researchers at Edith Cowan University in Western Australia developed a program promoting two-way pedagogy, called 'the ABC of Two-way Literacy and Learning'. They suggest that teachers:

- *accept* Aboriginal English at school, recognising, valuing and encouraging its use when appropriate
- *bridge* to SAE, building upon what students know, and teaching explicitly about what they don't know and need to master in SAE
- *cultivate* Aboriginal ways of learning, tapping into the strengths of Aboriginal learning preferences and culture.

A rich cultural heritage

Recognising the richness of Indigenous Australians' cultural heritage involves being aware of contemporary culture as well as that of the past, and recognising different ways of viewing history, time, land and relationships. Students living in traditional communities might have considerable knowledge of the land, of the Dreaming, and of the traditional dance, music and painting particular to their community. Those in urban communities might have a very different cultural heritage. Nonetheless, it is helpful to return to our earlier discussion of culture, remembering that this often involves more than visible characteristics. Students' cultural heritage also influences how they view learning, teachers and fellow students.

Involving the community in the school, and the school in the community

CourseMateExpress

Online resources
Watch a **video** in which an Aboriginal teacher offers her approach to involving the Aboriginal community in the school.

Ideally, Aboriginal and Torres Strait Islander children would be taught by members of their own communities. In practice, Australia has few fully trained Indigenous teachers relative to the size of the Indigenous school population. One way in which this gap has been bridged is by employing Aboriginal and Islander Education Workers (AIEWs), who work alongside non-Indigenous teachers in the classroom. This provides an opportunity for non-Indigenous teachers to gain understanding and insight into issues relevant to their Aboriginal and Torres Strait Islander students. AIEWs often liaise between the school and the community to make the school a welcoming place for Aboriginal and Torres Strait Islander families. An AIEW can also function as an important role model for the children and families involved in the school. Other roles for AIEWs include assisting teachers and students, monitoring students' attendance and behaviour, counselling or advising students, and providing induction for new teachers (HREOC, 2000). In some States, AIEWs are assisted to study to become teachers.

A second way in which schools can consult their Indigenous community is through the local or regional Aboriginal Education Consultative Group (AECG). The role of these groups is to advise schools on educational issues relevant to Aboriginal children in the school. Informal opportunities can also be taken to be involved in the community, and to involve parents and other community members in the school as visitors, teachers or consultants when developing teaching programs.

Bridging the cultural divide

When ways of learning differ between home and school, two approaches to bridge the divide are to change the school way of learning to match the home way, and to explicitly teach about the differences and support students in developing school ways of learning alongside their home ways. By combining these approaches, teachers can communicate the value of the students' home culture, and help to empower their future learning by giving them access to using school (Western) ways, and an understanding of how they work.

For example, some Aboriginal and Torres Strait Islander students have an observational model of learning at home in which they watch a whole task being performed, and avoid shame by waiting until they are confident of success before attempting it themselves. In many situations, observational learning might be of considerable benefit, and can be built into the classroom approach. Not calling on individual students and allowing them to work in small groups can minimise the risk of students feeling shame. Students can also be supported to learn in new ways: to take risks with their learning, and to learn in steps, rather than waiting until they feel confident of succeeding at the whole task before starting (Commonwealth of Australia, 2008).



BOX 11.12 CLASSROOM LINKS

ENHANCING INDIGENOUS AUSTRALIAN STUDENTS' EXPERIENCES

In 2005, the Australian Government committed to make a difference in students' outcomes from education. The 'What Works. The Work Program' website was one of the initiatives to help teachers to consider how to improve outcomes for Indigenous students. Its checklist prompts teachers to consider how well they are prepared for the task.

Analysing the issues: Some checkpoints for improving the level of student success

This checklist has been found to be a useful way to assess the state of your practice. Check for areas of strength and weakness. If you can answer most of these questions positively, you're doing well.

General

- Have you specifically (and sensitively) investigated the backgrounds, aspirations and needs of your Indigenous students?
- Do you know their families and carers on a friendly basis?
- Are processes in place for liaising and maintaining regular contact with members of local communities?
- Do you have easy access to local data about achievement, retention and attendance of your Indigenous students?
- Do you have specific targets in place for students' success and have you implemented means for their achievement?
- Does each Indigenous student have a Personalised Learning Plan (PLP)?
- Are teachers, students and parents (or carers) all involved in the PLP process?

Acknowledgment, recognition and support of Indigenous cultures

- Are provisions in place for non-Indigenous staff to learn about Indigenous cultures in general and local Indigenous cultures in particular?
- Is there a recognisable Indigenous 'presence' in the school in terms of teaching and employed support staff, guests to the school and other support personnel?
- Does the school recognise and express its respect for the cultures of its Indigenous students?
- Are the ways it does so acceptable to and appreciated by local Indigenous community members?

Developing skills

- Is intensive support available for students whose skills in reading and writing SAE and numeracy are below conventional levels?
- Are procedures in place for testing for hearing or vision impairment and responding to any problems?
- Is regular use made of the life experiences and knowledge of students to make connections with other curriculum content?
- Are Indigenous cultures represented in an accurate and relevant way in the curriculum?
- Are there consistent opportunities available for students to work cooperatively?
- Are learning activities varied (for example, via the use of ICTs)?
- Are learning activities related to students' learning strengths?

Attendance and participation

When regular attendance and consistent participation are problems:

- Do you have an individual 'case management' process in place?
- Are Indigenous peers, mentors or members of staff used to support individual students?
- Have you worked with key members of the local community to discuss possible strategies that might change the situation?

Source: What Works. The Work Program. *Improving outcomes for Indigenous students. The workbook and guide for school educators*, DEEWR (2010).
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ACTIVITIES

1 Complete the checklist for a school you are familiar with. What are the biggest challenges here?
2 Visit the 'What Works' website at www.whatworks.edu.au to explore these principles further, and to see how some schools are implementing them.
3 Discuss with an Indigenous person their experience of education (or their aspirations for, and experiences of, education for their children). How would the above principles help?

A second example comes from the ways in which language is used. In Western cultures, language is used for learning and teaching as well as social purposes, but in some Aboriginal and Torres Strait Islander groups, learning and teaching do not happen through language, but through observation and participation. Language has a primarily social purpose. The writers of the National Numeracy Review suggest explicitly teaching students to talk about their mathematical thinking for learning purposes, in the context of conversations about the use of language at home and at school.

Although it is helpful to think about learning as a cultural activity, it is worth restating that there is considerable variability within and among Aboriginal groups, as with all groups of children, and that teachers should get to know the learning approaches of the individual children in their classes and the communities where they teach.

Heath issues: otitis media

otitis media
A disease of the middle ear that can affect hearing

One health problem that affects the learning of a great number of Aboriginal Australian students is associated with hearing. **Otitis media** is a disease involving inflammation of the middle ear, and commonly afflicts infants and young children.

Recall from Chapter 2 that language development is foundational to cognitive, social and emotional development. Disruptions in linguistic input in infancy can affect development across a number of domains, and recurrent hearing loss in the school years further affects classroom learning. The NSW Health Department (2000) identified potential effects of otitis media on:

- speech and language development, with up to two years' delay in the development of reading and communication skills in children who have had chronic otitis media in infancy
- auditory processing and listening skills
- the ability to distinguish the soft sounds of speech (affecting phonemic awareness, which is crucial for reading development)
- word identification and comprehension skills
- development of an age-appropriate vocabulary
- short-term auditory memory
- the ability to follow verbal instructions
- reading and maths performance at school
- the ability to pick up contextual cues to meaning
- communication difficulties, leading to behavioural and social problems through frustration and anger
- balance, coordination and motor-skill development.

Many of these effects contribute to learning disabilities, particularly in the early years when learning leans heavily on language. Noise in the classroom can make this process even more difficult. In addition, when children are learning in a second language, difficulties with hearing limit their capacity to learn that language and the curriculum content. When basic skills such as learning to read are affected, further learning in later years is also disrupted. Teachers can assist children who are experiencing difficulties associated with otitis media by supporting learning with non-verbal means of communication, modification of the learning environment, and use of small-group work with peers to assist (Jacobs, Rowlands, Sinclar & Williams, 2011). Box 11.13 describes further strategies that teachers can employ to support students affected by otitis media.



BOX 11.13 CLASSROOM LINKS

OTITIS MEDIA IN THE CLASSROOM

Jacobs, Rowlands, Sinclar and Williams (2011) built on a resource developed by the Western Australia Department of Education to develop a website, Do You Hear What I Hear?, to assist teachers in supporting students affected by otitis media. Their suggestions include:

- amplification, used alongside the other support strategies suggested here
- reduction of ambient noise; for example, from air conditioners, furniture scraping on the floor, or classroom chatter at key listening times
- employing teaching strategies to maximise attention and processing of instructions or information delivered verbally, such as repeating and keeping instructions brief, complementary non-verbal means of communication, and ensuring the speaker's face is clearly seen
- developing students' listening skills, as this may have been limited by their experience of conductive hearing loss
- small-group work for activities requiring communication
- peer tutoring and buddy systems.
- Indigenous education workers may also be able to support students with home language and cultural knowledge as well as listening.

Source: Adapted from Jacobs, Rowlands, Sinclar and Williams (2011).

ACTIVITIES

1 Explore the Do You Hear What I Hear? website (www.doyouhear.org.au) for more strategies, resources and information about otitis media.
2 Block your ears with headphones or another device, then attend a lecture or other setting in which information is delivered orally. Reflect on your experience in terms of what you missed out on (both in the explicit information and in what went on alongside it; for example, in peer interaction). What might have helped you to access the information, and to be socially included?

Strategies for enhancing Indigenous students' success

Box 11.12 discusses strategies for enhancing the school experiences of Aboriginal and Torres Strait Islander students. The student companion website describes further results from research about 'what has worked' for schools engaging Aboriginal and Torres Strait Islander students.

MĀORI LEARNERS AND NEW ZEALAND'S EDUCATION SYSTEM

Although some of the educational outcomes look similar for indigenous people across the world, the position of Māori people in New Zealand, for instance, is quite different from that of Aboriginal people in Australia, and this difference flows through to the education system. Māori make up 23 per cent of all New Zealand students, and the majority attend mainstream schools (ERO, 2014a). Māori words are used in curriculum documents and are commonly understood.

The New Zealand Ministry of Education is committed to achieving success for Māori students in line with the general population. In 2008, the ministry released Ka Hikitia, a Māori education strategy, which was updated in 2013 and extends to 2017. Committed to 'using and acting on evidence of what

makes the greatest difference for and with Māori education', and 'increasing *whānau* (community) and *iwi* (family) authority and involvement in education', the current strategy has five focus areas:

1 Māori language in education, such that all Māori students have access to quality Māori language in all aspects of their education
2 all Māori children participate in high-quality early education, through increases in quality of provision, and supports to remove barriers and lift participation rates
3 in primary and secondary education, ensuring all Māori students have strong literacy, numeracy and language skills, and achieve at least NCEA level 2 (Year 12) or its equivalent – they aim to achieve this by engaging students in quality learning and teaching experiences, ensuring all stakeholders have high expectations for Māori learners, and that stakeholders collaborate to achieve these outcomes
4 in tertiary education, ensuring that Māori students succeed at higher levels
5 organisational success to support Māori educational success, through leadership, evidence-based practice and effective action.

In addition, Tataiako, a set of cultural competencies, has been developed for teachers and linked to the teaching standards, to guide teachers in ensuring Māori experience success as Māori, and that Māori identity, language and culture are supported. The competencies are:

> *Wananga:* participating with learners and communities in robust dialogue for the benefit of Māori learners' achievement
> *Whanaungatanga:* actively engaging in respectful working relationships with Māori learners, parents and whanau, hapu, iwi and the Māori community
> *Manaakitanga:* showing integrity, sincerity and respect towards Māori beliefs, language and culture
> *Tangata Whenuatanga:* affirming Māori learners as Māori. Providing contexts for learning where the language, identity and culture of Māori learners and their whanau is affirmed.
> *Ako:* taking responsibility for their own learning and that of Māori learners.

Source: New Zealand Ministry of Education (2011b). © Crown 2011.

The common culture and language shared by Māori communities across New Zealand means the task of developing resources, training teachers in the language and culture, and appropriately shaping the curriculum is less problematic than that faced by education departments in Australia. At the same time, it can mean that Māori students are stereotyped, without consideration for differences between rural and urban, or traditional and non-traditional communities (Bishop & Glynn, 1999).

Source: david harcock/Alamy



FIGURE 11.10 Māori family and community involvement at all levels of educational planning, implementation and evaluation is a key to Māori engagement and success in education.

Bishop and Glynn (1999) stressed that appropriate approaches to Māori education maximise outcomes, such as participation, by ensuring Māori community involvement in every stage of development, implementation and evaluation. This ensures that Māori aspirations, preferences and practices take central place. Māori-medium preschools (*te kohanga reo*), primary schools (*kura kaupapa* Māori), secondary schools (*wharekura*) and tertiary institutions (*whare waananga* Māori) have been successful not just because education is offered in *te reo* Māori (Māori language), but also because of the links between language and culture described earlier in this chapter.

Māori ways of interacting, roles for teachers and students, and learning patterns such as looking, listening, imitating and storytelling are used. Importantly, too, ongoing community involvement ensures that these elements are dynamic, adapt to changes in the aspirations, preferences and practices of the community, and resist stereotyping.

Bishop, Berryman, Tiakiwai and Richardson (2003) interviewed Year 9 Māori students about what promoted their learning, and developed an effective teaching profile. They found that when teachers applied these principles, their students' achievement and attitudes improved. A summary of the profile can be found on the CourseMate website. Box 11.14 gives further details of the project.



BOX 11.14 CLASSROOM LINKS

TE KOTAHITANGA: IMPROVING THE EDUCATIONAL ACHIEVEMENT OF MĀORI STUDENTS

From 2000 to 2010, Bishop and his colleagues were commissioned by the New Zealand Ministry of Education to investigate how the educational achievement of Māori students could be improved.

In the first phase of this project, years 9 and 10 students were interviewed about what it was like to be Māori in the classroom. They described an absence of respectful, caring relationships with teachers, lack of positive recognition of their culture, and a need to set it aside if they wanted to be 'engaged learners'. Students were also asked what kinds of teacher relations would help them to engage in learning.

Bishop, Berryman, Tiakiwai and Richardson (2003) devised a Culturally Responsive Pedagogy of Relations, with the principles for teachers being:

- creating contexts for learning in their classrooms
- sharing power, with interdependent, non-dominating relations between students and teachers
- developing interactive, responsive learning that spirals
- connecting people with a common vision of excellence in educational outcomes and what it looks like.

An Effective Teaching Profile was developed in 2001 to encapsulate what this pedagogy would look like in practice. It rested on the foundation of two key teacher attitudes:

1. Teachers reject explanations of Māori students' achievement levels that place the blame on students' or their families' problems.
2. Teachers commit to accept professional responsibility for students' learning, and to create a change for Māori students' learning.

Bishop and colleagues (2003) theorised that together with these twin attitudes, effective teachers of Māori students would demonstrate daily that they:

- care for their students as culturally located individuals
- have high expectations of students' learning
- manage classrooms to promote student learning
- interact with students in a range of ways involving extended logical dialogue, and help students to interact with others in this way
- use a range of strategies to facilitate learning
- promote, monitor and reflect on learning outcomes that lead to improvements in Māori student achievement, and share that knowledge with their students.

In 2004 and 2005, teachers were involved in an ongoing professional development program to learn about the profile, and be supported in using it with their students. In the third phase of the project, Bishop, Berryman, Tiakiwai and Richardson (2003) evaluated the effects of the

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Online resources
Go further: View the Effective Teaching Profile on this text's website.

program, and found that 'when Māori students have good relationships with their teachers, they are able to thrive at school'. These relationships were the result of teachers' commitment to building caring and learning relationships with Māori students, teachers' strong belief that Māori students could improve their achievement, and the students' ability to take responsibility for their learning and performance. Students described what it was like to be Māori in these classrooms in terms of good relationships with teachers, being challenged in their learning, and being listened to as individuals. There were also improvements in literacy and numeracy outcomes for the students in the schools involved in the project. Phases 4 and 5 extended the program to further schools, and in 2014, Te Kotahitanga reported 49 schools as being involved in the program. Five of the seven successful schools identified in the report discussed in Box 11.10 had been involved in this program, and named it as a significant factor in their students' success.

Sources: Adapted from Bishop, Berryman, Tiakiwai and Richardson (2003); Bishop, Berryman and Wearmouth (2014).

ACTIVITIES

1. Read about the current activities of the project and view videos of teacher and school stories at http://tekotahitanga.tki.org.nz
2. Check the Effective Teaching Profile (on the CourseMate website) and the principles here against your own philosophy of teaching, and against what you have seen in classrooms. What is different? What is similar?
3. What might make the difference for the students you teach?

CourseMateExpress

Online resources
Take a moment to consider your philosophy of learning and teaching. You may wish to use the **Develop your philosophy** tool on the textbook's CourseMate website.

Bishop, Berryman, Tiakiwai and Richardson (2003) found that although teachers were most likely to explain (Māori) students' achievement in terms of student factors and home background, students and principals pointed to classroom interaction and in-class relationships as being most important to their success. Ka Hikitia, the Māori Education Strategy (New Zealand Ministry of Education, 2008), highlights a shift from old 'It's their problem' approaches to a 'Māori potential' approach in education. This involves a shift in focus, as described in Table 11.2, recognising that: 'all Māori learners have unlimited potential'; 'being Māori is an asset, not a problem'; and 'all Māori are inherently capable of achieving success'. These principles could equally be applied to other groups.

TABLE 11.2 'Māori potential' approach in education

LESS FOCUS ON ...	MORE FOCUS ON ...
Remedying deficit	Realising potential
Problems of dysfunction	Identifying opportunity
Government intervention	Investing in people and local solutions
Targeting deficit	Tailoring education to the learner
Māori as a minority	Indigeneity and distinctiveness
Instructing and informing	Collaborating and co-constructing

Source: 'Māori Potential Approach in education', from Māori Potential Approach. Copyright © 2008 by New Zealand Ministry of Education. Used by permission.

EFFECTIVE TEACHING FOR NEW ZEALAND MĀORI AND ABORIGINAL AND TORRES STRAIT ISLANDER COMMUNITIES

Many of the strategies for effective teaching discussed earlier in this text equally apply to the teaching of indigenous students. However, some specific suggestions have also been put forward in the literature – these are discussed in Box 11.15.



BOX 11.15 IMPLICATIONS FOR EDUCATORS

STRATEGIES FOR ENHANCING INDIGENOUS STUDENTS' LEARNING

- Some parents may feel wary of school and reluctant to participate, therefore the school has a particular responsibility to bridge the gap by going to parents in formal and informal ways, both to celebrate successes and to resolve difficulties.
- Community involvement in the school is invaluable. Support it by inviting parents and elders to be involved in classroom teaching and in educational decision making. If inviting people into the school to teach, let them choose content and methodology. Their choices may help you understand more about community priorities and methods of teaching and learning.
- Community involvement in the school needs to be matched by school involvement in the community. Benefits include establishing links between school and community, increasing the school's understanding of the community, and demonstrating the school's commitment to the community. It gives teachers an opportunity to get to know those in the community, their concerns and their goals for education.
- Know your students, and build on their strengths and learning preferences.
- Include indigenous perspectives in mainstream curricula.
- Teach students how to recognise and dismantle stereotypes.
- Consider using cooperative methods (such as 'jigsaw'; see Chapter 7) as a way of reducing racial tension and developing tolerance in students.
- Ensure that the curriculum is relevant to students' needs and interests so as to encourage their participation.
- Have high expectations of all students, and work to help them to meet them.

CONCLUDING COMMENTS

In this chapter, we have examined a number of examples of differences among groups as well as diversity within groups. We have seen examples of factors in students' family, culture, school and teachers that all have an impact on their educational outcomes. It is worth recalling the finding from Rowe and Rowe's (2002) research that individual teachers make a larger contribution to differences in student outcomes than do SES, ethnicity or gender alone. Effective teachers are aware of, and cater for, student difference and its sociocultural bases. A common element of effective programs that address individual difference is their focus on the *individual* as a learner as well as a member of a group.

CHAPTER REVIEW

- Bronfenbrenner's bioecological systems theory proposed a number of interconnecting contexts that influence, and are influenced by, the individual in development. This mutual influence contributes to considerable individual difference among members of groups. The contexts range from the immediate interactions within the family outwards to the wider culture.
- Culture is learnt, transmitted and constructed by all of us, and includes the beliefs and behaviours shared by a group and passed on to new members through a constant process of socialisation.
- Cultural differences between groups in society can create misunderstandings and conflict. In the school context, such differences can be sociolinguistic, as well as relating to broader beliefs about learning and understandings of roles. Effective, inclusive teaching involves understanding such cultural differences and teaching about them explicitly.
- Racism is felt directly and indirectly by many students in school. Teachers have a responsibility to deal directly with acts of racism and to target attitudes of prejudice that underlie it.
- Gender differences exist in cognition, emotion and educational achievement, although such differences tend to be small, with larger differences occurring within groups than among them.
- Explanations of gender differences in educational outcomes include a differential focus on employment prospects, biological differences, school structures, and male and female roles in school and society.
- Poverty is associated with poor educational outcomes, as well as a number of other related characteristics, including health, parenting factors and stress. These characteristics constitute risks for poor outcomes, but there are also resilience factors that help individuals to overcome or withstand such difficulties.
- Schools can contribute to educational inequality through teacher expectations, differences between home and school, and the nature of a less-than-satisfactory home–school relationship. Considering children not only as school students but as members of families and communities, and involving those communities in the school, are important strategies in addressing educational inequality.
- Aboriginal and Torres Strait Islander students can bring a number of strengths to school, including independence, interdependence, linguistic competence, a rich cultural heritage and skills across a number of areas.
- In Australia, there is considerable variety in culture, language and goals for education. There are also commonalities in experiences of education across Indigenous groups.
- Māori people in New Zealand share a common language and culture, which has enabled the Ministry of Education to adapt curricula to be more relevant to Māori students.
- Valuing indigenous cultures, support for first language, community involvement in the school, and school involvement in the community are key strategies for improving indigenous students' educational outcomes. Relationships with students are another key.

ONLINE STUDY RESOURCES

COURSEMATE EXPRESS

Visit http://login.cengagebrain.com and use the access code that comes with this book for 12 months' access to the student resources for this text.

The CourseMate Express website contains a range of resources and study tools for this chapter, including:

- a **self-check quiz**
- **crosswords**, **flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.

SEARCH ME! EDUCATION

Explore Search me! education for articles relevant to this chapter. Fast and convenient, Search me! education is updated daily and provides you with 24-hour access to full-text articles from hundreds of scholarly and popular journals, ebooks and newspapers, including *The Australian* and *The New York Times*. Log in to Search me! through http://login.cengagebrain.com and use the search terms listed in the 'Education databases' section (page 447) as a starting point.

QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1 How can teachers have an impact on the learning of students from various sociocultural groups?

	POSITIVELY	NEGATIVELY
Boys		
Girls		
Students with language backgrounds other than English		
Students from low-SES backgrounds		
Indigenous students		

2 Describe your own culture:
   a What are the key beliefs?
   b How do these key beliefs explain why you behave as you do?
   c Try to imagine how someone might interpret your behaviour differently.
   d How would you explain your beliefs and behaviour to others?

3 Develop a pedagogy of education that fits your personal culture. How would you communicate your ideas to students and their parents who were from a cultural background different from your own?

4 Talk to your parents about their experiences of education, and how that might have influenced their parenting and also their goals for your education.

5 Map the influences on boys' and girls' schooling experiences. Discuss how these influences relate to the outcomes for boys and girls that have been reported.

6 Describe some of the strategies that you could employ to ensure that your classroom is inclusive of boys and girls.

7 Give as many examples as you can of differences within groups of people. Do these differences discount the differences reported among groups? Why or why not?

8 What are four key principles of effective practice for Indigenous Australian students? How are they the same and/or different from principles of effective practice for New Zealand Māori students? For other groups?

KEY TERMS

Aboriginal English
chronosystem
culture
ethnicity
exosystem
gender
gender schema theory
hidden curriculum
involuntary minority group
LBOTE
macrosystem
mesosystem
microsystem
otitis media
racism
risk factor
socialisation
sociocultural factors
socioeconomic status (SES)
sociolinguistic features of language
Standard Australian English (SAE)
voluntary minority group

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'SOCIOCULTURAL FACTORS IN THE LEARNING PROCESS' AND MATERIAL IN OTHER CHAPTERS

- Consider how the learning difficulties or abilities of boys and girls (see chapters 9 and 10) might be viewed differently by teachers, and the impact this could have on their educational needs.
- How might sociocultural factors such as culture, gender or SES influence decisions about classroom management strategies (see Chapter 14) or assessment and reporting (see Chapter 13)?

FURTHER RESEARCH

RECOMMENDED READING

Australian Bureau of Statistics (2013), More women than men in less secure jobs. Media Release 150/2013. 27 August 2013.

Banks, J. A. & McGee Banks, C. A. (Eds). (2012). *Multicultural education: Issues and perspectives* (8th ed.). New York: John Wiley & Sons.

Beresford, Q., Partington, G. & Gower, G. (Eds). (2012). *Reform and resistance in Aboriginal education.* Fully revised edition. Crawley: University of Western Australia Publishing.

Bowes, J., Grace, R. & Hodge, K. (2012). *Children, families and communities: Context and consequences* (4th ed.). Melbourne: Oxford University Press.

Maguire, B. & Hayes, A. (2014). Access to preschool education in the year before full time school. Longitudinal Study of Australian Children Annual Statistical Report 2011, Chapter 6. Australian Institute of Family Studies.

Raffo, C., Dyson, A., Gunter, H., Hall, D., Jones, L. & Kalambouka, A. (Eds). (2010). *Education and poverty in affluent countries*. New York and London: Routledge.

RECOMMENDED WEBSITES

The following government bodies have written or commissioned extensive reports on gender, poverty and indigenous education, and these can be accessed from their websites (also check your local department of education website to look at current policies and support in these areas):

Australian Government Department of Education and Training (formerly DEEWR): http://education.gov.au
Education Council: http://scseec.edu.au
ERO: www.ero.govt.nz
MINEDU: www.minedu.govt.nz

For more information on Aboriginal education, visit:

What Works: www.whatworks.edu.au
Dare to lead: www.daretolead.edu.au
Otitis media: www.doyouhear.org.au

Asia Education Foundation support for studies of Asia in Australian schools: www.asiaeducation.edu.au
Racism. No way!: www.racismnoway.com.au
Face the Facts (Human Rights Commission): www.humanrights.gov.au/education/face-facts

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

- Aboriginal
- coeducation
- culture conflict
- gender
- gender bias
- gender difference
- indigenous
- Māori
- multicultural
- poverty
- racism
- risk AND resilience
- single sex
- social class
- socioeconomic status.

Try combining these words with 'education' or 'schooling'. Adding 'Australia' or 'New Zealand' to your search terms will limit the results to articles relating to these contexts.

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

INDIVIDUAL DIFFERENCE IN THE INCLUSIVE CLASSROOM

Module III has identified key issues contributing to the individual differences you will encounter in classrooms: intelligence, motivation and engagement, special needs, and sociocultural background. These topics are ones in which you will be challenged to consider how you will

	MOTIVATION	INTELLIGENCE
Key ideas or topics	• Motivation • Engagement	• Models of intelligence • Measuring intelligence • Gifted and talented education, and creativity
Main theories and theorists	**Behavioural approaches:** Reinforcement **Social learning approaches:** Self-efficacy, verbal persuasion, observation of others **Humanist approaches:** Maslow's needs and the drive for self-actualisation **Cognitive approaches:** Atkinson – achievement motivation; Weiner – attributions; goal theory – performance and mastery goals	**Models:** • Spearman – g • Thurstone – primary mental abilities • Guilford – structure of intellect • Gardner – multiple intelligences • Sternberg – triarchic theory • Emotional intelligence **Measurement:** Binet, Wechsler **Gifted education:** Gagne, Sternberg
Catering for these differences in the inclusive classroom	**Motivating students:** Avoid overuse of external reinforcement; develop efficacy through successful learning experiences; attend to the needs of the whole child, so that they are free to pursue learning; encourage mastery rather than performance goals; give feedback that encourages students to attribute success and failure to their own effort, rather than to ability or external factors over which they have no control **Engaging students:** Establish supportive relationships with students, firm but warm and positive classroom discipline, and high expectations of achievement; give students interesting, important and challenging tasks; support positive peer relations	**Intelligence:** • Varying classroom activities • Considering each child's abilities and potential • Practical intelligence can be taught • Using measurement wisely to identify students needing special programs, and to plan appropriate help **Gifted education:** Differentiating the curriculum, acceleration



balance the needs, interests and backgrounds of varying learners. As you review the summary table below, consider the research that has been discussed in these chapters, and how you might use it to guide your practice and ensure that all learners' needs are catered for in your classroom.

	SPECIAL NEEDS	SOCIOCULTURAL FACTORS
	• Inclusive education • Educational risk and resilience • Learners with special needs	• Culture • Gender • Socioeconomic status (SES), poverty • Aboriginal and Torres Strait Islander students in Australia • Māori students in New Zealand
	Special education: Programs provided for the education of children with special needs **Inclusive education:** Educational support provided to allow all students to have their learning needs met within regular school environments.	Bronfenbrenner's bio-social-ecological model of development Explanations of gender difference based on male/female characteristics, culture, and school factors
	Inclusive education involves *all* learners as participants in the classroom community. Consider the learning needs of students in the class, and how they can be supported to learn in the regular classroom. Adjustments can be made to teaching, learning activities, assessment and resources to allow all to participate. Differentiate teaching and learning activities for a range of ability levels; Individual Education Plans (IEPs) may be used for students with high support needs; involve parents and teaching aides; avoid labelling or viewing students in terms of a disability – remember they are a student first; assist students to develop supportive peer relationships; set firm but fair classroom rules, and be consistent in implementing them.	**Culture/language:** Teach explicitly about cultural and language differences; make explicit the hidden curriculum; be aware of sources of potential cultural misunderstanding; dismantle prejudice and stereotypes **Gender:** Use a variety of strategies to cater for a range of preferences, avoid comparing boys and girls; communicate high expectations of all **SES:** Close the gap between home and school by getting to know families, and taking account of students' interests; prior knowledge, and home experience; welcome families into school **Indigeneity:** Celebrate skills and strengths, highlight potential; connect with community; support first language; draw on indigenous ways of learning

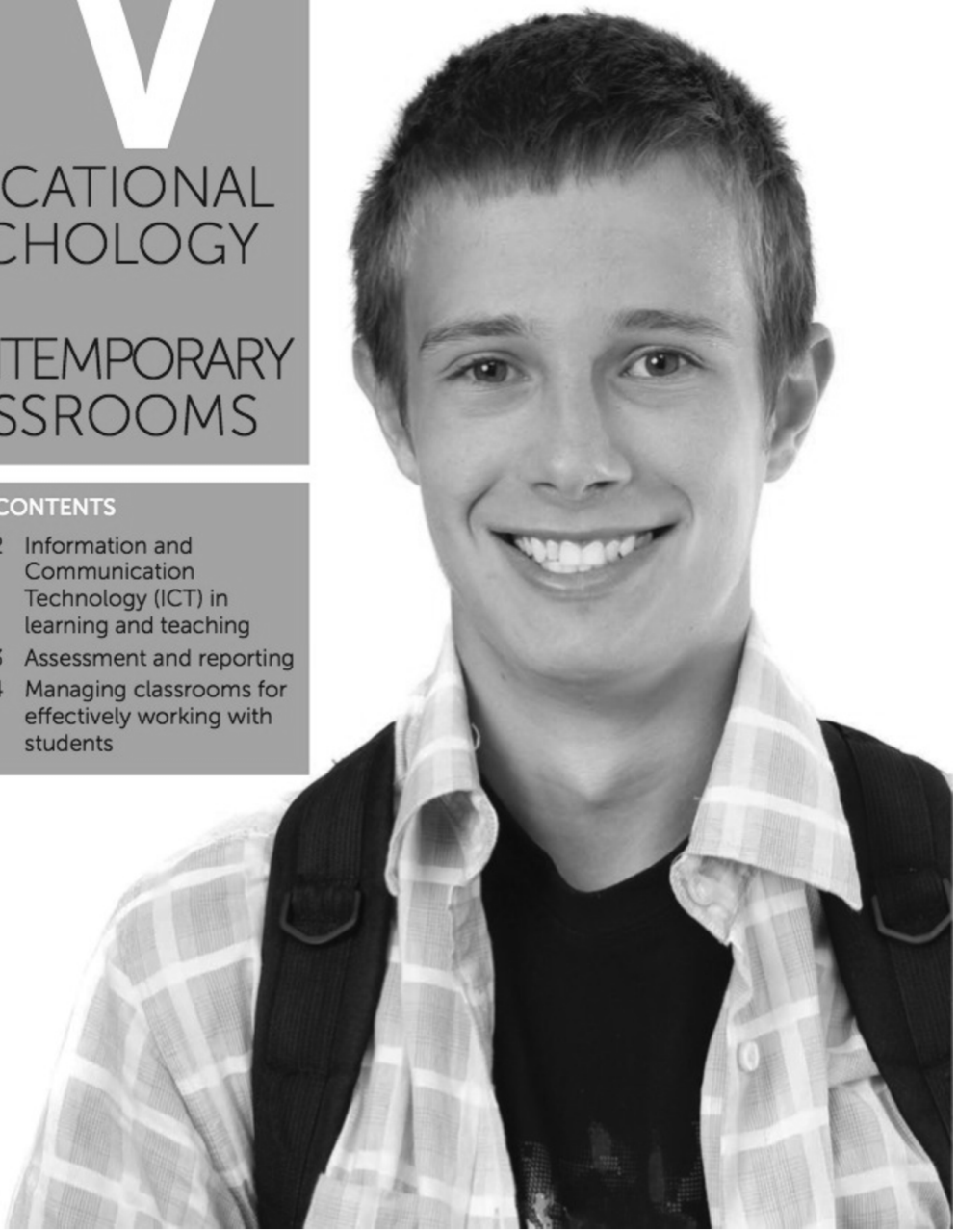
Module

IV

EDUCATIONAL PSYCHOLOGY IN CONTEMPORARY CLASSROOMS

MODULE CONTENTS

Chapter 12	Information and Communication Technology (ICT) in learning and teaching
Chapter 13	Assessment and reporting
Chapter 14	Managing classrooms for effectively working with students



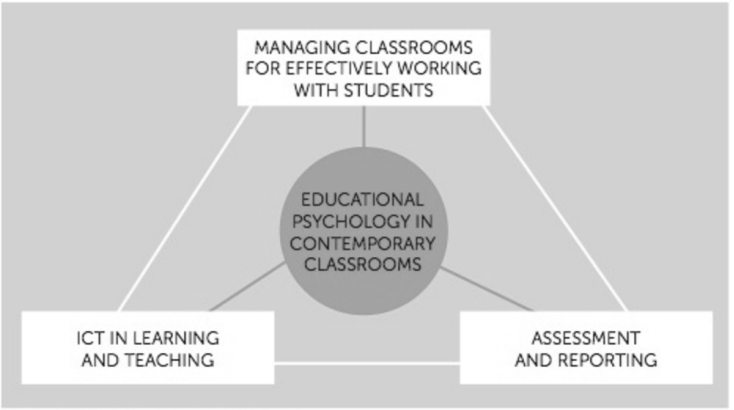


FIGURE MIV Module IV concept map.

Core question: How can educational psychology help us address key learning and teaching issues?

Educational psychology plays a central role in equipping educators to deal with the sorts of issues they confront in the learning environment. This final module considers how the theories and principles of educational psychology can help teachers in the 21st century address three significant areas:

- teaching about, and learning and teaching using information and communication technology (ICT)
- assessing students' learning, and reporting assessments to others
- managing the classroom and effectively working with the diverse range of students who comprise a teacher's learning community.

Chapter 12 examines how an understanding of learning theories and the principles of development can guide the successful integration of ICTs into the learning–teaching process, and how ICTs are transforming learning and teaching. Chapter 13 looks at assessment, which lies at the core of effective teaching and which is influenced by teachers' understanding of student development (see Module I), their understanding of how students learn (see Module II) and their understanding of student differences in such areas as ability, motivation and background experiences (see Module III). Chapter 14 deals with managing classrooms effectively, and discusses how teachers manage themselves, their students, their resources, their time and their energies in the learning environment. This final chapter presents theories and strategies for classroom implementation.



Chapter 12

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN LEARNING AND TEACHING

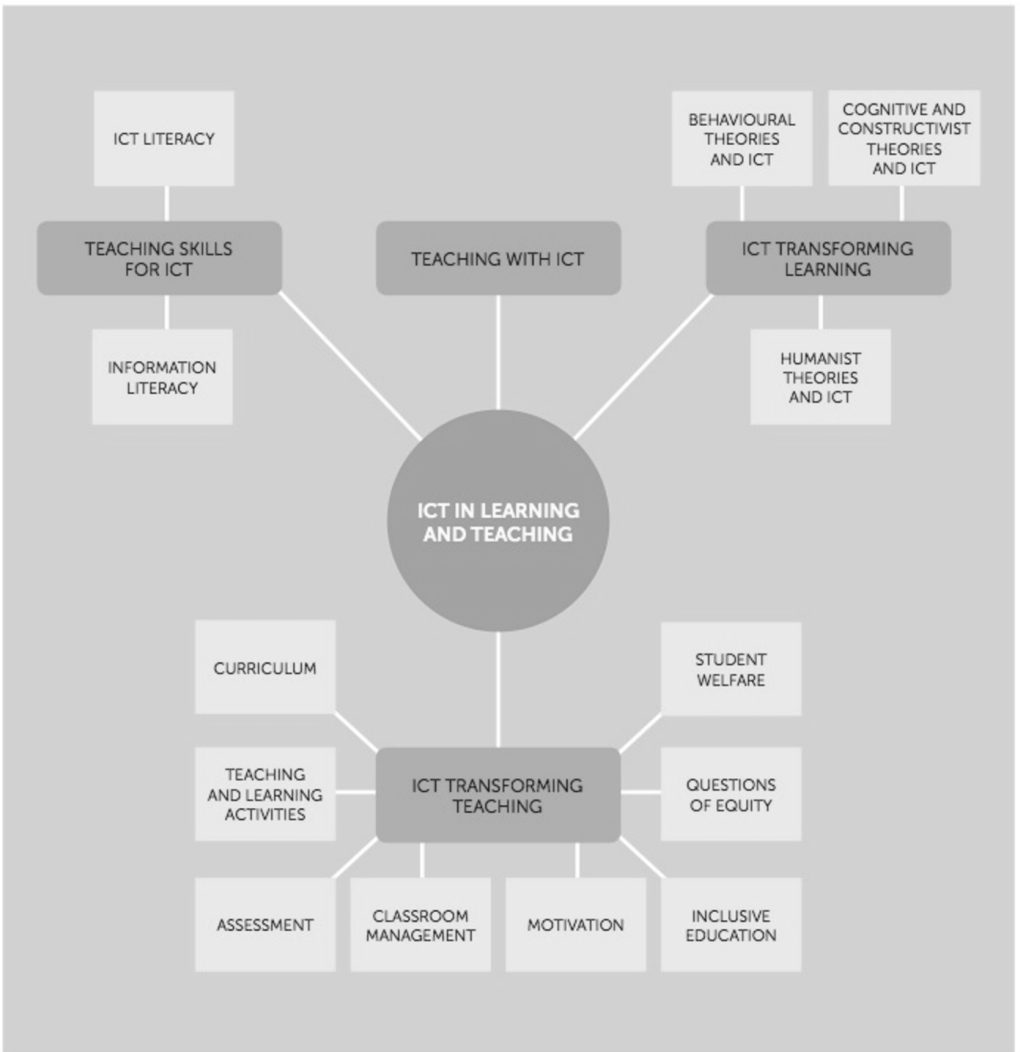


FIGURE 12.1 Chapter 12 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- How are ICTs integral to learning and teaching in today's classrooms?
- What are some essential skills for effective use of ICTs by learners?
- How do behavioural, cognitive, constructivist and humanist theories of learning guide the use of ICTs in education?
- How are ICTs transforming learning and teaching in our classrooms?
- How could using ICTs contribute to inequities among learners? Discuss strategies for addressing these in your teaching.
- What are some potential positive and negative outcomes of the use of ICTs in the learning–teaching process? What could you do to maximise the positive and minimise the negative possibilities?

Bring your learning to life with **interactive learning, study** and **exam preparation tools** that support the printed textbook. CourseMate Express includes **quizzes**, **interactive activities**, **videos**, a tool to help you '**develop your philosophy**' and more.

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INTRODUCTION

Teachers are talking in a staff meeting about recent advances in technology integration at the school and in the curriculum. One teacher is particularly concerned about a media piece she saw on the negative impacts of Internet use on students' brains. Another says, 'But I see my students doing amazing things. They have more opportunities, and are motivated to learn because of the technology'. A third teacher comments on the ease with which her students use the technology. 'It's how they think now', she says. 'We don't really need to teach them to use it; we need them to teach us.' Another objects: 'I'm not so sure. They do seem at ease with it, but they don't all use it well – just look at the cyberbullying we hear about. Or the plagiarism. Doing a research assignment seems to mean 'copy and paste from Google' to many of them'.

How might we best respond to these concerns and issues? In this chapter, we present research and theory from educational psychology that can assist us as learners and teachers as we consider the potentials offered by, and issues relating to, ICT in education.

ICT IN LEARNING AND TEACHING

Information and communication technology (ICT) is used in schools throughout Australia and New Zealand for a wide range of educational purposes, including publishing, communicating, instructing, learning, assessing and motivating. It is also widely used outside school, with at least 98 per cent of Australian and New Zealand 15-year-olds reporting use of computers (OECD, 2011). In the 2012 Census, 96 per cent of Australian households with children under 15 reported having access to the Internet at home (ABS, 2012). The *Melbourne declaration on educational goals for young Australians* (MCEETYA, 2008) includes the goal that, as successful learners, all young Australians will be 'creative and productive users of technology, especially ICT, as a foundation for success in all learning areas'. As a result, the Australian Curriculum identifies ICT competency as a general capability, one of a series of interconnected skills that underpin learning and are integrated throughout the curriculum (ACARA, 2012a).

information and communication technology (ICT) Any technology used to access, gather, manipulate and present or communicate information, such as electronic hardware, software and network connectivity

New Zealand's National Curriculum also sees ICT used as a tool for learning, although it is not explicitly included as content to be taught. There is scope for integration of ICT content in developing the competency for using language, symbols and texts in the New Zealand curriculum.

If you are in a teacher education program in Australia or New Zealand, you may also be aware that the *Australian professional standards for teachers* and the *Graduating teacher standards: Aotearoa New Zealand* both include ICT:

> APTS 2.6 Implement teaching strategies for using ICT to expand curriculum learning opportunities for students …
>
> APTS 3.4 Demonstrate knowledge of a range of resources, including ICT, that engage students in their learning …
>
> APTS 4.5 Demonstrate an understanding of the relevant issues and the strategies available to support the safe, responsible and ethical use of ICT in learning and teaching.

Source: AITSL (2014).

> Standard 4d Demonstrate proficiency in oral and written language (Māori &/or English), in numeracy and in ICT relevant to their professional role.

Source: New Zealand Teachers Council (2015).

Clearly, ICT is an integral aspect of teaching as well as learning, influencing what we teach and how it is taught, as well as other aspects of teaching practice such as engaging students and classroom management.

Box 12.1 provides a sample of ICT applications currently being used in e-learning (learning using technology) in classrooms, together with some potential benefits for learning. Rapid development of ICT means these examples are likely to change and expand over time. Keep abreast of new ideas through education pages on social bookmarking sites such as Delicious and Pinterest, or through your local education department.

BOX 12.1 CLASSROOM LINKS

HOW MIGHT YOU USE ICT IN YOUR TEACHING?

APPLICATION (AND DEFINITION)	EXAMPLE	POTENTIAL BENEFITS
Interactive whiteboards (IWBs) – typically with software that enables interactive activity	In class discussion, a text is annotated on the IWB. This annotated file is then saved and made available for students. In pairs, students discuss possible answers to a problem. They enter their answer on the IWB and receive feedback via the program.	Benefits depend on teachers' effective use of the software. IWBs can support interactive learning, can be used to demonstrate processes and their outcomes, may provide feedback, are multimodal and can be used for dynamic presentation of information.
Wikis – websites that can be added to and revised by visitors to the site; this 'peer review' of information is the means of keeping it current and accurate	Wikipedia is the most famous wiki. Teachers have also developed wikis with their classes to encourage students to use them not just to gather information, but also to contribute and evaluate knowledge.	Development of critical thinking, and evaluation of information encountered online, when students are involved in developing a wiki site.
Synchronous online platforms – typically allow live video, audio and text interaction, with desktop sharing and an interactive whiteboard space	Centra is used in the Northern Territory and South Australia for distance education, and Elluminate and similar programs are used by many universities.	In distance education, allows easy interaction and file sharing between students, and between students and teachers.

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APPLICATION (AND DEFINITION)	EXAMPLE	POTENTIAL BENEFITS
Asynchronous interaction	Email, discussion boards	Broadens student–teacher, student–student and parent–teacher interaction outside class time.
Learning objects – interactive digital files used for learning	The Learning Federation has a database of thousands of learning objects that can be accessed by teachers in Australia and New Zealand (see the Online resources link below this box). Several of the Online resources activities on the student website for this text are learning objects.	Multimodal presentation of material is engaging and allows for processing of the information through multiple mental pathways (see Chapter 6). Interactive aspect allows self-pacing of activity.
Learning management systems (LMS)	Moodle is widely used to make content available to students and teachers at home and school, with teachers posting assignments or support files, while students can post their assignments for review or marking, and have discussions with teachers and other students within their course. Your university is likely to use a learning management system for students to access lectures and materials online, and interact with others in your course.	Materials (and support) easily accessed at home as well as school. Parents can see what students are learning. Interaction may support collaborative learning. See the case study in Box 6.2 on page 223.
Videoconferencing and web conferencing	Classes of students are combined across schools to broaden curriculum offerings. Experts may be brought in from a distance to interact with students.	Students in small or remote communities have wider access and global live interaction with other students or experts.
Blogs and vlogs (web logs and video logs)	Students keep a learning journal in blog form, tracking development of their ideas, and integrating work samples or video of performances. Teachers may also post blogs with resources for students.	Teachers can monitor progress of thinking. Students develop reflective skills and receive ongoing feedback from others in their learning community. Parents have ongoing access to how their child's learning is progressing.
SNS – social networking sites	Facebook and Twitter tend to be used socially. Similar private sites can be set up within a learning community using tools such as Ning or Wackwall – enabling students to share video, photographs and comments relating to their learning.	Promotes collaborative learning.
MP3 players and tablets	Many schools have class sets of tablets or MP3 players that are loaded with educational games and used in small groups to encourage students to practise key skills. Students may also use MP3 players to develop podcasts; for example, by recording observations when out in the field. Teachers may use MP3 players to remind students of instructions for an activity.	Students can practise tasks in a different modality. Instructions can be instantly reviewed when required. Data and observations can be easily be recorded to take back to class.

ACTIVITIES

1 Which of these have you used in your learning? Which have you seen used?
2 Add further examples and potential benefits by discussing with your peers their experiences.

SHIFTS IN ICT USE IN EDUCATION OVER TIME

ICTs can be thought of as any technology used to access, gather, manipulate and present or communicate information. Under this definition, pencil and paper, books, or chalkboard and chalk can be included as relevant, although the term is usually used to refer to computer hardware, software and connectivity, including mobile devices such as smart phones. Technologies used for education have shifted from mechanical means in previous centuries, to the increasingly complex technologies such as video, overhead projectors, film and television used in the later part of last century. From about 1982, the rapid spread of desktop computers led to a focus on computer technologies, initially primarily used for information gathering and presentation, or drill and practice using teacher-set activities. A more recent shift has come with the widespread use of mobile phones and access to the Internet, which has increasingly highlighted the communication aspect of ICT. This more recent approach is sometimes referred to as Web 2.0. Web 3.0 is now being discussed as the next generation of the Internet, sometimes referred to as 'the semantic web', involving connective intelligence, in which information from a range of sources will be linked to make searching more sophisticated; it may also generate new data about a learner's preferences, strengths and weaknesses drawn from a range of his or her online activities. The initial use of the Internet in classrooms focused on information and resource retrieval, but this has now shifted to the sharing of files, publishing of content (both texts and multimedia files, such as on YouTube), communicating and relating socially online through sites such as Facebook, and collaboration using wiki sites or google docs (White, 2008). Some of the shifts in ICT use over time are depicted in Table 12.1. Shifts you may note include changes noted by Knobel and Lankshear (2007) and White (2008); these are:

- from a focus on information to a focus on communication and relationships
- from stand-alone computers to connectivity
- from users as consumers to users as producers of content
- from individual to collaborative practice
- from ICTs as tools of practice to ICTs as transformers of practice.

TABLE 12.1 Shifts in use of ICT tools

PREVIOUS CENTURIES	1970s	1982–1990s WEB 1.0	21st CENTURY WEB 2.0
Paper, pens	Video, film, television	Word processing, desktop publishing	Webpage creation for sharing of work Creation and online publishing of audio, video and multimedia files
Encyclopaedia searching		WebQuests (searching for information online)	Contributing or editing information in wiki sites such as Wikipedia
Classroom activities		Learning objects (computer-based activities that may be interactive)	Communicating with others around learning through email, SMS, social networking sites
Books		Databases, spreadsheets	Simulations that allow learners to see the results of their actions or choices in real time
Educational games for drill and practice		Educational computer games for drill and practice	Creating environments, identities and pathways within a game Educational games that provide feedback, allow students to self-pace and self-direct learning paths
Chalk boards	Overhead projectors Whiteboards	Learning management systems Asynchronous online interaction such as email	Interactive whiteboards Videoconferencing Synchronous online interaction
		Individual work published	Collaborative work – wikis



THINK ABOUT

- How you have seen or experienced these shifts? What impact might they have had on how you learn? How might they influence how you teach?

THINKING CRITICALLY ABOUT 'DIGITAL NATIVES'

Some commentators have claimed that the arrival and rapid spread of digital technologies towards the end of the 20th century and into the start of the 21st century has fundamentally changed learners to the extent that they are no longer the same type of student whom many teachers have been trained to teach (Prensky, 2001). Prensky coined the term **digital natives** to refer to the generation of learners who have grown up surrounded by new technologies, and have rapidly integrated this technology into their lives on a day-to-day basis. Similarly, Oblinger and Oblinger (2005) referred to the **net generation** as those young people born after 1982 who have grown up in a world in which instant messaging, the Internet and constant connectivity are simply expected. The corollary of this is that there is proposed to be a 'digital divide' between these learners and their teachers who are 'digital immigrants', with a challenge for teachers to engage students through use of digital technologies (Prensky, 2001).

digital natives
A term used to describe someone who has grown up in the era of digital technologies

net generation
A term used to describe someone who has grown up in the era of Internet connectivity

Other writers have questioned the notion of the digital native, pointing out the considerable variability that exists between individuals in their access to and use of ICT. Both views may be supported by the results from national and international studies of students' use of ICT, with computer and Internet access and usage being high overall in Australia and New Zealand, but also showing variation for different gender and socioeconomic groups in both countries (MCEECDYA, 2010; OECD, 2011). It appears that access and use don't of themselves imply that everyone uses the Internet in the same way, or with universal benefit in terms of learning. Consider, as a parallel, a skill such as reading; we have universal access to reading material, and widespread opportunity to read a range of types of texts, yet some reading has better results for our thinking and learning than others. It depends on what we read, and how we engage with a text.

Although studies such as the OECD's PISA report show widespread Internet access and activity, writers such as Bennett and Maton (2010) and Kennedy et al. (2008) have demonstrated variation in types of use of the Internet between individuals as well as among particular groups. For example, while they could all be said to belong to the net generation, students in early childhood, middle childhood and adolescence show different patterns of use of the Internet, as well as variations in level and type of use (ABS, 2011; Grimley & Allan, 2010; Johnson, 2010b; Luckin et al., 2009). Johnson (2010a) reported a range of factors that can influence the use of the Internet by children, as well as the ways in which Internet use might relate to cognitive development. She found that children access the Internet for different purposes and with different results in home, school and community environments, and that there are variations in developmental outcomes through use of different technologies.

Some writers have cautioned that there is a false assumption that familiarity or ease of use are the same as effective use in terms of learning. Patterns of student activity using laptops in classrooms, for example, suggest that students rapidly switch between multiple activities online (Leander, 2007), but this may not support deep engagement with the activities. Work on student online searching shows that students often use poor search strategies, and need to be taught how to search efficiently for information online (Coombes, 2009). Luckin et al. (2009) and Kimber and Wyatt-Smith (2010) similarly found infrequent critical thinking, evaluation or metacognitive reflection in students' online work. Chapter 6 discusses the teaching of these skills to students.

A large study of 2600 students and interviews with more than 100 teachers in the UK showed that teachers and students are rapidly embracing Web 2.0 technologies (BECTA, 2008). Most students

(96 per cent) had Internet connections at home, and 74 per cent of students had social networking accounts. Teachers employed a range of Web 2.0 applications in their classrooms and believed that these had the following effects on student learning:

- *Increased participation and engagement.* Online discussions and chats were seen to be especially beneficial to quieter students, allowing them the chance to participate without anxiety, and engagement was fostered by allowing students to express themselves in a variety of media, such as video.
- *Discussion outside of school.* Online discussions allowed students to continue learning outside school.
- *Extension of interest.* The availability of online technologies means students can study at any time and extend their areas of interest independently.
- *Sense of ownership.* When students publish and upload their work online, they have a sense of ownership and pay attention to quality.

However, as suggested previously, this report also found that, although students frequently used online technologies, their use of Web 2.0 was 'embryonic' in the sense that they lacked the literacy skills necessary for critical analysis and metacognitive engagement with these new applications. Technical skills were also weak, leading to a lack of knowledge about the full extent of online applications (BECTA, 2008).

In summary, we cannot assume that having access to and using technology (even in schools) necessarily means being able to use it to enhance learning (Kennedy et al., 2008). At the same time, Leander (2007) cautioned that there may be a disconnect between students' online activity out of school and in school, with greater communication, focus on relationships, and collaboration evident in out-of-school activity. Certainly these features of Web 2.0 can be taken up by teachers, as we will explore in the section on transforming pedagogy later in this chapter. In the following section, we consider how to support learners to develop the essential skills they need to use ICT effectively for varied purposes, including learning: their ICT literacy.



Source: © Australian Curriculum, Assessment and Reporting Authority 2012.

FIGURE 12.2 Elements for ICT capability.

ICT LITERACY

The Australian Curriculum identifies ICT as a general capability that underpins learning and work in the digital age. This capability is claimed to have three components: the abilities to use ICT effectively to investigate, communicate and create. It also involves managing and operating ICT, and applying social and ethical protocols and practices when using ICT (ACARA, 2012a). Figure 12.2 shows how these elements interrelate.

ICT literacy
The capacity for purposeful and effective use of ICTs in one's own setting

Clearly, **ICT literacy** is more than simply knowing how to use a computer. For teachers, ICT literacy involves understanding when and how to use the full range of ICTs to support learning, communication and creative processes. Learners need to become ICT literate in order to understand the impact of new technologies on the way we live and learn. This includes awareness of the social and economic impacts of ICTs, and learning how to use ICT ethically and responsibly. Learners also need to learn how to use ICTs for present and future learning and problem solving. ICTs enable rapid access to vast amounts of information. In order to be ICT literate, students also need to be 'information literate'. Under the National Assessment Program, ICT literacy is assessed in years 6 and 10. Table 12.2 describes the proficiency levels and some data from the 2011 tests.

INFORMATION LITERACY

Information literacy is the ability to locate, evaluate, manipulate, manage and communicate information to become an independent lifelong learner (Meredyth et al., 1999). Information literacy involves knowledge and skills; it also includes values and attitudes about knowledge and how it is used and shared (Langford, 2000). The concept of information literacy extends beyond computer use, but it is particularly important to be information literate when sifting through all the information that ICTs make available. To be information literate, students need more than technical skills. They also need to apply higher-order cognitive skills of discrimination, interpretation and critical analysis (see Chapter 6).

information literacy The ability to locate, evaluate and use information; it extends beyond technical skills

The Australian and New Zealand Information Literacy Framework (ANZIIL, 2004) defines the information-literate person as someone who:

- recognises the need for information and determines the nature and extent of the information needed
- finds needed information effectively and efficiently
- critically evaluates information and the information-seeking process
- manages information collected or generated
- applies prior and new information to construct new concepts or create new understandings
- uses information with understanding, and acknowledges cultural, ethical, economic, legal and social issues surrounding the use of information.

These skills develop over time and are influenced by each learner's developmental stage and level of experience in computer use. The Australian School Librarians Association (2006, pp. 22–7) provides a six-level description of the development of information literacy skills across a range of areas, including:

- *defining information needs* through narrowing down a topic to focus a specific investigation
- *locating information* using search strategies, adapting search strategies and recognising the different points of view that need to be included
- *selecting information* by recognising main ideas and key words, using note-taking strategies that identify the main ideas and assessing the credibility of information
- *organising information* in an appropriate way, according to the nature of the task and accounting for audience
- *creating and sharing information* to address a task requirement, incorporating unique forms or frameworks depending on the nature of the task or audience needs
- *evaluating information* by asking questions about whether the problem was addressed, whether the solution or deductions were appropriately supported, and remedying the areas that need improvement.

The basic descriptions provided in Table 12.2 demonstrate skills ranging from Level 1, which involves teacher-guided learning and the development of introductory skills, to Level 6, where the learner is capable of independently analysing a research task or coming up with their own research problems. These learners are capable of devising their own search strategies, and independently employ a range of cognitive strategies to organise and assess information, such as skimming headings, and then synthesising and making inferences and deductions about the range of information they have collected (Australian School Librarians Association, 2006, pp. 22–7). Many readers of this text, as university students, will recognise that they need skills such as those associated with Level 6 of information literacy. Figures in the left column represent the proportion of Year 6 and Year 10 students achieving each level in the 2011 ICT literacy NAP test (ACARA, 2012a).

TABLE 12.2 Proficiency levels in ICT literacy

LEVEL	PROFICIENCY LEVEL DESCRIPTION	EXAMPLES OF STUDENT ACHIEVEMENT AT THIS LEVEL
6 0% of Y6 2% of Y10	Students working at Level 6 create information products that show evidence of technical proficiency, and careful planning and review. They use software features to organise information and to synthesise and represent data as integrated complete information products. They design information products consistent with the conventions of specific communication modes and audiences, and use available software features to enhance the communicative effect of their work.	• Create an information product in which the flow of information is clear, logical and integrated to make the product unified and complete. • Select appropriate key points and data from available resources and use their own words to include and explicate them in an information product. • Use graphics and text software editing features such as font formats, colour, animations and page transitions, in ways that enhance the structure and communicative purpose of an information product. • Include relevant tables and charts to enhance an information product and support these representations of data with text that clearly explains their purpose and contents.
5 1% of Y6 19% of Y10	Students working at Level 5 evaluate the credibility of information from electronic sources and select the most relevant information to use for a specific communicative purpose. They create information products that show evidence of planning and technical competence. They use software features to reshape and present information graphically consistent with presentation conventions. They design information products that combine different elements and accurately represent their source data. They use available software features to enhance the appearance of their information products.	• Create an information product in which the information flow is clear and logical, and the tone and style are consistent and appropriate to a specified audience. • Select and include information from electronic resources in an information product to suit an explicit communicative purpose. • Use graphics and text software editing features such as font formats, colour and animations consistently within an information product to suit a specified audience. • Create tables and charts that accurately represent data and include them in an information product with text that refers to their contents. • Apply specialised software and file-management functions such as using the history function on a web browser to return to a previously visited page or sorting data in a spreadsheet according to a specified criterion.
4 20% of Y6 44% of Y10	Students working at Level 4 generate well-targeted searches for electronic information sources and select relevant information from within sources to meet a specific purpose. They create information products with simple linear structures and use software commands to edit and reformat information products in ways that demonstrate some consideration of audience and communicative purpose. They recognise situations in which ICT misuse may occur and explain how specific protocols can prevent this.	• Create an information product in which the flow of information is clear and the tone is controlled to suit a specified audience. • Generate searches that target relevant resources and then select relevant sections of these resources to include, with some modification and supporting text, in an information product. • Apply graphics and text software editing features such as font formats, colour and image placement consistently across a simple information product. • Apply infrequently used software and file-management functions such as displaying a specified hidden toolbar in a word processor, or using a single pull-down menu function to save all the attachments of an email to a new location. • Identify security risks associated with Internet data and explain the importance of respecting and protecting the intellectual property rights of authors. >>

LEVEL	PROFICIENCY LEVEL DESCRIPTION	EXAMPLES OF STUDENT ACHIEVEMENT AT THIS LEVEL
Proficient standard for Year 10:		
3 40% of Y6 25% of Y10	Students working at Level 3 generate simple general search questions and select the best information source to meet a specific purpose. They retrieve information from given electronic sources to answer specific, concrete questions. They assemble information in a provided simple linear order to create information products. They use conventionally recognised software commands to edit and reformat information products. They recognise common examples in which ICT misuse may occur and suggest ways of avoiding them.	• Create an information product that follows a prescribed explicit structure. • Select clear, simple, relevant information from given information sources and include it in an information product. • Use graphics and text software editing features to manipulate aspects such as colour, image size and placement in simple information products. • Apply common software and file-management functions such as left aligning selected text, rotating an image, or creating and naming a new file on the desktop. • Recognise the potential for ICT misuse such as plagiarism, computer viruses and deliberate identity concealment, and suggest measures to protect against them.
Proficient standard for Year 6:		
2 27% of Y6 8% of Y10	Students working at Level 2 locate simple, explicit information from within a given electronic source. They add content to and make simple changes to existing information products when instructed. They edit information products to create products that show limited consistency of design and information management. They recognise and identify basic ICT electronic security and health and safety usage issues and practices.	• Locate explicit relevant information or links to information from within a webpage. • Make changes to some presentation elements in an information product. • Apply simple software and file-management functions such as copying and pasting information from one column of a spreadsheet to another column, or adding a webpage to a list of favourites (bookmarks) in a web browser. • Recognise common computer use conventions and practices such as the use of the '.edu' suffix in the URL of a school's website, the need to keep virus-protection software up-to-date, and the need to maintain good posture when using a computer.
1 11% of Y6 2% of Y10	Students working at Level 1 perform basic tasks using computers and software. They implement the most commonly used file-management and software commands when instructed. They recognise the most commonly used ICT terminology and functions.	• Apply graphics manipulation software features such as adding and moving predefined shapes to reproduce the basic attributes of a simple image. • Apply basic file- and computer-management functions such as opening and dragging and dropping files on the desktop. • Apply generic software commands such as the 'save as' and 'paste' functions, or selecting all the text on a page. • Recognise basic computer use conventions such as identifying the main parts of a computer and that the 'shut-down' command is a safe way to turn off a computer.

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THINK ABOUT

- How could students' levels of proficiency in ICT be developed in your classroom? What would you need to build into learning activities using ICT, for example?



BOX 12.2 IMPLICATIONS FOR EDUCATORS

ICTs IN THE CLASSROOM

- *ICTs are tools to enhance learning and teaching.* Approach ICTs such as computers, tablets, digital cameras, IWBs, smart phones and the apps they use as vehicles to promote learning. Do not be driven to use them just because they are there. Where appropriate, integrate ICTs into your lessons at the planning stage, and always evaluate their effectiveness for your purposes.
- *Make the most of students' expertise and willingness to experiment with ICTs.* Some students will know more than you do about using computers. Encourage the more capable students to demonstrate their skills and to help you and their peers where appropriate. Monitor how students are using ICTs such as smart phones and the Internet. Even if some of these items are banned from use at school, acknowledge student experience and expertise where possible. This will help students to feel valued and will keep you up-to-date with their ICT interests.
- *Use ICTs' communication capacities.* Use ICTs such as online discussion boards to encourage students to communicate with learners in other countries and from other cultures. Design projects that involve collaborations between students in your classroom and those in rural areas, other cities or other countries. Discuss 'netiquette' (Internet etiquette) and sociocultural differences that may emerge from cross-cultural interactions online.
- *Make use of interactivity of ICTs.* Collaborative tools such as wikis and Google Docs support collaborative learning. IWBs and their associated software can be used powerfully to encourage interaction around learning. Consider having students work in pairs on individual boards (which can be laminated sheets with whiteboard markers) to solve a problem before trying it on the IWB to receive feedback.
- *Go beyond skills-based* computer literacy. Help students to explore their attitudes, values and judgement-making abilities by developing their information and ICT literacy. Students need time to search and evaluate the Internet in meaningful ways. Provide scaffolding to help them do this step by step. Encourage critical thinking and the analysis of information. Give students opportunities to apply their learning by encouraging them to publish their own websites, including digital images and animations.

ICT TRANSFORMING LEARNING

You may recall from Chapter 3 that Vygotsky claimed that cultural tools such as language shape the thinking and behaviour of members of a cultural group. Modern ICTs such as smart phones, tablets, digital cameras, computers and Internet connectivity could be said to be cultural tools of this type. How might our thinking patterns be changing as we use these tools? There are several theoretical models in the current literature, and some research evidence to support the notion that there are some changes in thinking that could be attributed to ICT use. As further research is undertaken in this area, we are likely to add to our understanding of this important question.

CHANGING PATTERNS OF COGNITIVE SKILLS?

As discussed above, Vygotsky's theory suggests that we would see changing patterns of cognitive skills with use of the cultural tool. Johnson (2008) compared frequent and infrequent users of the Internet among first-year Psychology students. She didn't find any difference in patterns of skills for frequent compared with infrequent users, although frequent users showed increased capacity. (This finding will be discussed further below.)

One of the capacities attributed to digital natives is the ability to multitask (being able to attend to multiple stimuli at once), with Prensky (2001) initially arguing that digital natives might develop this capacity. This does not appear to be the case – in fact, our cognitive architecture allows us to attend to just one stimulus at a time. Although people may learn to switch rapidly between stimuli, studies of learners switching rapidly between tasks show substantial slowing of processing, so this practice is not helpful to learning (Baddeley, 2012).

STRENGTHENING OF NEURAL PATHWAYS

In our discussion of neuroplasticity in Chapter 2, we saw that activity strengthens particular neurological pathways or networks, so that tasks that are performed regularly become easier, more fluid and natural. It is likely that this contributes to ease of use and adding on of new ICT skills to existing ones by frequent users of Internet applications.

An interesting series of studies examining effects of texting on linguistic abilities such as spelling skills showed that texting was associated with improved spelling skills (Plester, Wood & Joshi, 2009; Wood et al., 2011). Wood et al. (2011) suggest that this may occur by focusing the texters' attention on the visual and orthographic features of words rather than their phonological features, although further research is required to validate the hypothesis.

BUILDING COGNITIVE CAPACITY

Johnson (2010a) found correlations between teacher and parent ratings of cognitive and social development and various Internet activities reported by eight- to 12-year-old children. Why might this be? One contributor could be an increase in cognitive capacity. You might recall from previous chapters (see Chapters 2 and 6) that our cognitive capacity expands with development, contributes to intelligence, and is dependent on speed of processing and the size of various memory stores. As mentioned above, in the earlier study, Johnson (2008) found that frequent Internet users had significantly better abilities than infrequent users in planning, attention and processing. Johnson noted that the study only showed correlations, not causes, and suggested that there may be a reciprocal relationship between Internet use and cognitive capacity – those with greater capacity might seek out this stimulating environment, which, in turn, contributes to increased capacity, and so on. Another study did look at causes: Dye, Green and Bavelier (2009) found that playing action video games increased capacity, leading to faster reaction times without decreasing players' accuracy. It is possible that with practice, automaticity is developed, freeing up working memory.

Johnstone et al. (2012) developed a series of computer games for children with ADHD that were designed to train working memory and control of inhibitions, which are weaknesses related to the condition (see Chapter 10). They found that as well as resulting in improvements in working memory, ignoring distracting stimuli, and sustained attention for the children with ADHD in the study, the program resulted in improvements in behaviour for children with and without ADHD. These findings suggest that playing computer games can indeed build cognitive capacity, although the games in the study were explicitly designed to do this, unlike the majority of computer-based games.

ICT TRANSFORMING PEDAGOGY

One of the most important implications of ICT is its potential to transform and change traditional ideas about learning and teaching. Studies of teachers adopting ICT suggest that teachers initially tend to add ICT as another element to traditional classroom practice, carrying out traditional teaching tasks in new ways, and gradually move towards transforming their practice – doing new things in new ways (Betcher & Lee, 2009). One of the shifts shown in Table 12.1 (see page 456) was from ICTs as tools to ICTs as transformers of teaching and learning practices.

CourseMateExpress

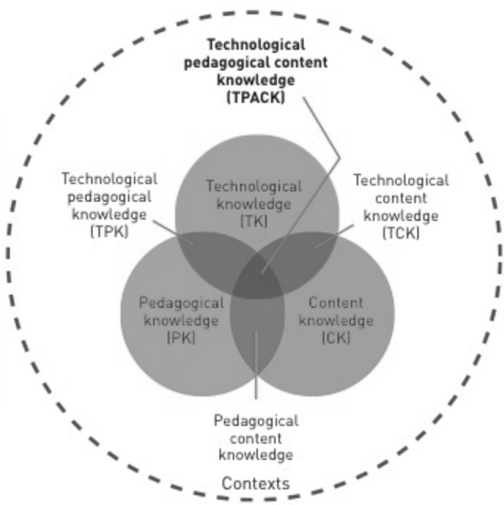
Online resources
Watch a **video** on this text's website of a teacher talking about the role of ICT in powerful pedagogy.

As discussed in the section on learning theories and ICTs below, several learning theories have informed and been extended by the integration of ICTs into learning and teaching. ICTs also transform pedagogy by raising new questions or issues for consideration within key facets of teachers' practice: assessment, motivating and engaging students, catering for students' diverse needs, classroom management and student welfare.

CourseMateExpress

Online resources
Explore the TPACK model and its use in ICT education with the **Interactive Activity** on this text's website.

Making decisions about how and when this should happen in your classroom will require you to draw on and combine multiple stores of knowledge: theories of learning and teaching and knowledge of classroom practice and your students (pedagogical knowledge), knowledge of your content area (content knowledge), knowledge of how to teach your content area (pedagogical content knowledge), and knowledge of ICT (technological knowledge). Koehler and Mishra (2009) argued that effective use of ICTs in teaching involves the combination of all of these kinds of knowledge, identifying a final kind of knowledge they call TPACK: 'technological pedagogical content knowledge'. They argue that both knowledge of how ICT can be used to access and process subject matter, and also knowledge of how ICT can support and enhance learning are elements of TPACK. Supporting this, Wood and Ashfield (2008) found that use of IWB technology that resulted in student learning benefits depended on teachers' pedagogical knowledge being employed alongside their technical knowledge of how to use the boards. Box 12.4 on page 479 provides a case study of a teacher doing this. Figure 12.3 shows Koehler and Mishra's (2009) model of how knowledge of technology and how to use it effectively in teaching interacts with other kinds of knowledge teachers hold.



Source: © tpack.org Reproduced with permission

FIGURE 12.3 Technological pedagogical content knowledge.

As we discuss in the following sections, it is important that teachers' practices in the use of ICT are guided by careful theoretical principles. Each of the major theories of learning provides some insight into the application of ICT in the classroom.

ICT AND THEORIES OF LEARNING

Clark (1985, 2012) challenged meta-analyses showing the effects of computer-based instruction on achievement, arguing that the gains observed can be attributed to the instructional methods underpinning the applications, rather than to the use of computers themselves. Technology has nonetheless provided new opportunities for the application of learning theories. Hattie's meta-analyses (2009) found that computer use is most effective when a range of teaching strategies is used, and when there are multiple opportunities for learning. Inan, Lowther, Ross and Strahl (2010) found that teachers tended to use more student-centred practices when computers were used as a learning tool, and more teacher-directed practices for

drill and practice applications. Module II outlined several theories of learning, which we now revisit as they provide a useful framework for understanding different approaches to ICT use in education.

Behavioural theories and ICT

Behaviourism argues that learning takes place through the association of stimulus and response (see Chapter 5). Learning is defined as mastering subject matter and achieving behavioural objectives. Computers are particularly useful for this purpose. Before the era of personal computers, B. F. Skinner himself supported the use of teaching machines as a way of providing immediate reinforcement to promote learning and to respond to individual learner needs (Skinner, 1968). In the context of ICT, behavioural learning principles can underpin the use of computer software to tutor students. Hattie (2009) reported that tutoring applications are among some of the most effective uses of computers for learning. Using behavioural principles of stimulus–response and reward–punishment, the computer and its software operate as a tutor, teaching the user through **computer-assisted instruction (CAI)**, which is also known as 'computer-based instruction' (CBI) or 'computer-assisted learning' (CAL). (Note that these differ from 'computer-mediated instruction' (CMI, or distributed learning), which is discussed on page 469.)

computer-assisted instruction (CAI) A computer and its software are used as a tutor; also known as 'computer-based instruction' (CBI) or -'computer-assisted learning' (CAL)

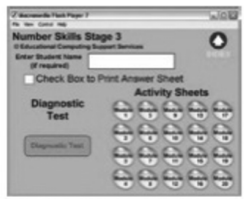
With the computer as tutor, the teaching process is computer-driven, using the following pattern of interaction (see Figure 12.4 for an illustration of this process):

- The computer presents information.
- The user is asked to respond to a question or problem.
- The computer evaluates the user's response using pre-programmed criteria.
- The computer responds to the user (for example, if the user enters a correct response, the program allows them to move to the next stage – or equivalent – and if responses are inappropriate or incorrect, the computer program may take the user back to repeat an exercise until they are able to

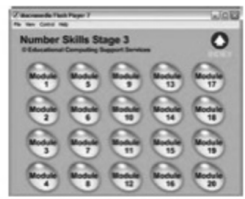
Source: Krause (2006)



a Students may choose to test themselves, practise online with immediate feedback or print out an activity sheet.



b Activity sheets also have downloadable, printable answers for self-checking.



c Students select a module.



d The problem is set and students enter their response. Instant feedback is provided by pressing the 'Go' button. Notice there is opportunity for feedback for an incorrect response.



e An advantage of the computer as tutor is that students' time on task can be measured, and scores provided instantly.

FIGURE 12.4 Using the computer as a tutor.

provide the correct response). Encouraging and immediate feedback like 'Not quite right, try that once more' helps to maintain learners' motivation and engagement.

A common tutor application is in drill-and-practice activities. Drill-and-practice applications are used widely across a range of curriculum areas. A typical drill-and-practice routine is illustrated in Figure 12.4, in which the student has multiple opportunities to practise a particular problem and provide the correct answer. In some computer programs, students are given additional instruction when they enter incorrect responses; if not, teachers may provide such support.

Drill-and-practice applications are based on the behaviourist principle of mastery learning, which contends that everyone can learn given the right circumstances and sufficient practice (see Chapter 5). The software demonstrated in Figure 12.4 illustrates some of the distinctive capabilities of CAI: the learning is self-paced, the program has an inbuilt stopwatch so that students have direct feedback on their level of accuracy and the time they have taken, and students may go back over problems and repeat them to achieve mastery of the skills. In addition, the computer can be programmed to randomly generate new problems of the same type, so no two students will do the same set of questions, and retesting is meaningful.



Source: Getty Images/Gary John Norman

FIGURE 12.5 Computers may be used as tutors or facilitators of learning, to develop automaticity of skills; as intellectual partners, provoking more advanced thinking; to provide authentic learning experiences; and for social interaction around learning.

Computer games are another example of the computer-as-tutor applications. Their educational value is discussed later in this chapter. Many of your students will have grown up using Sony PlayStation, Xbox or Nintendo Wii. All of these provide examples of competitive play between a user (or users) and the computer, with instant feedback and often an associated high level of interest and motivation. Educational games on online sites such as Studyladder provide a variation on drill and practice, but with a game element that rewards young players who spell simple words, match rhyming words, solve mathematical sums and identify letters or numbers. Such games combine bright colours and animation to motivate and stimulate young learners.

There is some evidence to suggest that, compared with traditional instruction, CAI can enhance achievement when it provides opportunities for extended practice, leading to automaticity of skills (Hattie, 2009; Keengwe & Hussein, 2013). As discussed in Chapter 5, however, such approaches have also been criticised for teaching a narrow range of skills in a highly controlled environment.



THINK ABOUT

- Can you see any benefits in using computers for drill-and-practice activities in your teaching area?
- Discuss the following statement with your tutorial or study group: 'Computers enable the teacher to be in the machine. Eventually, computers will replace teachers'.

Cognitive and constructivist theories and ICT

ICTs play a significant role in promoting cognitive and constructivist learning principles in classrooms. Cognitive theorists such as Piaget emphasised active problem solving and meaning-making on the part of the learner. Piaget and Vygotsky (see Chapter 3) pointed out the importance of social interaction in learning. One of the key characteristics of ICTs is interactivity between the computer and the user, between the user and the computer, and between the user and other users in online environments.

As illustrated in behaviourist applications, the machine-based view of the computer saw them used for drill-and-practice-type procedures, but ICT may also function as a scaffold that fosters learners' cognitive development in a constructivist manner, and many intelligent tutoring systems (ITS) employ this approach.

De Jong and Pieters (2006) argued that constructivist principles are supported by computer environments that contain cognitive tools or scaffolds to support students' learning. These viewpoints suggest that computers have the capacity to function as 'intellectual partners' to promote critical thinking and higher-order cognitive processing. ICTs provide a range of resources for students to use in problem solving, thinking, reflecting and collaborating with others within physical classrooms and across the globe in virtual learning contexts. As argued by de Jong and Pieters, these computer environments, with their potential for interactivity, are more conducive to active and engaged learning than more traditional teacher-centred approaches. According to its advocates, the constructivist classroom that integrates ICT provides students with a complex laboratory in which to observe, question, practise and validate knowledge.

ICTs can be integrated into constructivist learning environments in a range of ways. According to Hattie's (2009) meta-analyses, effective use of computers includes a number of constructivist principles:

- *The student, rather than the teacher, controls the learning.* This includes control of pacing, time spent achieving mastery, sequence of learning, and choice of items.
- *Use of peer learning.* Hattie found that when used in pairs, computers were more effective than when used alone or by larger groups of students. He suggests this is likely to be because of opportunities for exposure to a range of ideas as well as feedback.
- *Optimisation of feedback.* Tasks can be tailored to students' learning needs to ensure they are sufficiently challenging, and feedback that includes explanations and hints can act as scaffolding to support students working within their zone of proximal development.

Simulations and authentic learning

As you will recall from Chapter 6, constructivism examines the ways in which learners make meaning from experience. Rather than viewing learning as the transmission of knowledge, constructivists see it as an internal process of interpretation. Constructivists value 'authentic' or 'situated' learning, in which learners take part in activities that are directly relevant to the application of learning. These authentic tasks enable learners to experience problem solving in real-world contexts. An example of computer technology that encourages students to solve problems in an 'authentic' environment is a computer simulation. **Simulations** are a unique form of tutoring facilitated by computer technology. A computer simulation represents a model of a real system or phenomenon. Simulations make use of **hypermedia**, a system that links pieces of information such as text, graphics, sound and video elements in an online virtual environment. These simulations offer an imaginary environment that is realistic enough to provide meaningful issues and consequences, and allow students to solve problems and interact with the situation. For example, students learning geography may see a computer-simulated volcanic eruption. They may analyse conditions and practise their analytical skills without actually visiting a volcano. Science students may perform a virtual dissection rather than operating on real animals. A stock-market simulation enables students to buy and sell and to practise their problem-solving skills without putting real money at risk. Simulations can be beneficial, as they allow users to experience certain phenomena vicariously and with less risk and cost. They offer opportunities that students may not otherwise have for direct experience.

simulation
A model of a real system or phenomenon

hypermedia
A system that links pieces of information such as text, sound, visual images, animation and video in electronic environments

Simulations are particularly useful for addressing controversial issues and challenging learners to consider the perspectives of others. Their strong experiential and interactive focus helps to engage students (Global Education Centre, 2005). For example, the Ollie Saves the Planet online game is a



Source: © Sustain Ability International Pty Ltd

FIGURE 12.6 Ollie Saves the Planet – simulation and problem solving online.

fun children's activity, developed by the Australian Government and industry groups, that introduces players to the concept of sustainability by using simulations to focus on such issues as waste, water, energy, air and biodiversity (see Figure 12.6). Various Australian characters guide players by introducing them to problems, suggesting solutions and providing encouragement along the way.

Authentic learning experiences

Using email and other forms of social media also facilitates authentic learning. Interacting online provides a medium for written communication that is embedded in an authentic context – that of exchanging ideas and information with peers within the class or elsewhere, including overseas. Email and social media tools such as blogs and discussion boards may be used to encourage students to write for a real audience, such as peers or community members, about topics that affect them. Potential benefits of such authentic learning and assessment experiences supported by computers include an increase in students' motivation for learning as they come to appreciate the relevance of their learning in real-world contexts. In many classes, authentic learning and assessment tasks also encourage collaboration between learners, and they become more active constructors and interpreters of their learning.

Collaboration and social interaction

Collaboration among learners is another defining characteristic of constructivist classrooms (see Chapter 6). The Web has strong potential for social interactivity and for supporting collaboration and student-centred learning (Light, 1993; Mercer, 1996). For example, it is possible for virtual communities of learners on the Internet to work in small, collaborative groups to achieve a common goal (Dillenbourg & Schneider, 1995). Collaboration can also be encouraged as learners sit around the computer and work on problem solving or interactive activities as a group. Teachers need to be careful when forming such groups, as students may need assistance in maintaining task focus and in sharing responsibilities among group members, as we saw in Chapter 7. In the case of computers, in particular, there may be a tendency for the more competent and confident computer users to dominate. Nevertheless, the heterogeneous grouping of learners around computer-related tasks can assist in creating zones of proximal development (see Chapter 3) and be beneficial for all students.

ICT provides opportunities for students to build shared meaning and to collaborate as they use technology. For example, when students are arranged in groups around computers, they often act as peer coaches for one another, offering advice to those having difficulty with computers or software applications.

ICTs facilitate global collaboration, as the circle of social interaction is enlarged beyond student peers in the classroom to students and experts across the school, the larger community and the world. Through the introduction of a variety of perspectives and increased opportunities to interact with others, learners are challenged to think laterally and to consider other cultural and community perspectives.

Distributed learning

One way in which ICTs facilitate collaboration is through **distributed learning (computer-mediated instruction, or CMI)**, which allows teachers, students and learning resources to be in different locations so that teaching and learning can occur independently of time and place. This is particularly useful when learners are in isolated or remote areas, such as in rural Australia. Regular face-to-face interaction with peers and teachers may be impossible, but distributed learning and teaching means that students may learn by means of technology such as web-, video- or audio-conferencing, email and satellite broadcasting.

distributed learning (computer-mediated instruction, or CMI)
Teachers, students and learning resources can be in different locations so that learning and teaching occur independently of time and place

Distributed learning and teaching has a learner-centred focus and emphasises interaction and communication among learners and teachers. The Internet connects teachers and learners to people outside the school environment, thus providing access to expertise not available locally. Web-based videos or photographs provide visual stimuli for learning, hyperlinks expand the information resources available to learners, and online discussion forums and email facilitate collaborative learning activities.

Mobile learning (or mlearning) has been a particular kind of distributed learning that has gained prominence from the widespread availability and use of mobile devices. Some consequences of mobile learning include schools' adoption of BYOD, or 'bring your own device', to broaden students' access to technology in school; use of QR codes, which allow students to easily access files or websites by scanning a code; a blending of boundaries between school and life outside school, with learning happening anywhere and at any time, and learning in school being potentially interrupted by the outside world; and learning content increasingly delivered from outside the school, through websites such as the Kahn Academy (www.kahnacademy.com).

mobile learning (or mlearning)
Use of mobile devices for learning at any time or place

Distributed cognition

Related to distributed learning is the concept of **distributed cognition**, which is cognition that is not limited to individuals but is something shared by individuals who form communities, co-construct knowledge and share cultural tools. Technological tools such as computer-mediated communication (CMC) and the Internet have fostered the study and understanding of distributed cognition, and have offered opportunities for collaborative learning and shared production of content. Alvarez, Salavati, Nussbaum and Milrad (2013) suggested that this capacity for distributed thinking also links to new media literacies that teachers can assist students to develop (see below).

distributed cognition
The notion that cognition is shared by individuals who make up communities and who share cultural tools

ICTs have a significant role to play in enhancing student learning in constructivist classrooms. A WebQuest is an online activity that illustrates many constructivist principles. WebQuests are inquiry activities that present students with a challenging task, provide access to a range of resources (most often accessed through the Internet), and scaffold the learning process to promote problem solving and higher-order thinking (Rubin, 2013). WebQuests are an example of online activities that help students to learn and think collaboratively while capitalising on the possibilities of using the Internet to facilitate distributed cognition. Students benefit from being linked to a wide variety of Web resources, including learners from other cultures and countries, so that they can explore and make sense of the issues involved in each challenge.

HUMANIST LEARNING THEORIES AND ICT

Humanist theories of learning draw attention to the more personal, social and qualitative aspects of learning. They emphasise holistic learning and the development of human potential (see Chapter 7). Some might argue that humanism and technology are incompatible, yet technology provides multiple opportunities for connecting students to others worldwide, for fostering self-understanding, for self-directed learning, and for engendering a greater awareness and appreciation of a student's own culture and those of others. By enabling connectivity and interaction with others from diverse cultures and

backgrounds, ICT can play an important role in raising learners' awareness of the interrelationships between themselves and their community, both locally and globally. When educators select and use ICTs with care, such technologies may be used to shape educational experiences that help learners understand themselves better, take responsibility for their learning, and learn to reach beyond their current development to find their full potential. Humanist theories can also direct teachers' attention to particular aspects of students' activity online, such as social presence in online work, and skills for cooperative learning (Cicciarelli, 2007).

STRENGTHS AND LIMITATIONS OF DIFFERENT APPROACHES TO LEARNING WITH ICT

ICT can do much to foster learners' construction of meaning and their own learning experiences, whether they are working at their own pace or in collaboration with others. However, if not informed by sound educational principles and theories, computer-based activities can impede learning, waste valuable learning time and become a distraction rather than an asset (Hattie, 2009).

There are obvious limitations to the behavioural approach to learning, as outlined in Chapter 5. These limitations apply equally in the context of ICT use, for since behavioural theory relies almost exclusively on observable behaviour and does not account for individual thought processes, the role of behaviourism in learning is limited to the types of learning that can be easily observed (such as factual recall), rather than less defined learning that involves conceptual change within the learner. Drill and practice and tutoring programs can focus on lower-level thinking skills (Roblyer & Doering, 2013).

Although constructivist classrooms offer much to promote student-centred learning, teaching that is based on constructivist principles is extremely demanding of the teacher, particularly when technology is involved, and requires time and support for the learner. It takes teachers' time to locate appropriate resources, plan activities, arrange the classroom so as to promote collaboration, and at the same time ensure quality time on task. Another problem may be that some of the most appealing software websites may provide realistic representations of content by using video that may be slow to download. Bandwidth issues and limited computer resources in some schools or remote locations can also work against the creative use of ICT.

Siemens (2005) argued that traditional learning theories are more concerned with the actual process of learning rather than the value of what is being learnt. He argued for a new learning theory for the digital age that reflects what it is to learn in a networked world. Siemens suggested that traditional learning theories do not adequately address questions such as:

- How do we conceive of learning when knowledge is no longer acquired in a linear manner?
- How do learning theories accommodate the fact that technology now performs many of the cognitive operations previously performed by learners (for example, information storage and retrieval)?

As an alternative, Siemens (2005) proposed a learning theory of 'connectivism'. This theory views learning as a process that occurs within nebulous environments that are not entirely under the control of the individual. Learning is focused on connecting specialised information sets that enable us to learn more. The connectivist theory acknowledges that learning may reside in non-human appliances, that it is a process of connecting specialised nodes or information sources, and that nurturing and maintaining connections is required to foster ongoing learning. This is just one example of current attempts to reflect how ICTs are changing the way we learn and interact with information in digital contexts.

Despite the limitations of current learning theories, they work together to add to our understanding of how ICTs contribute to the learning process. Teachers will be more effective in their use of ICTs if they understand these theories and how to apply them effectively.

Using ICTs in classrooms has implications for all aspects of teachers' practice, including curriculum content and how it is taught, classroom management, assessment, motivation and engagement of students, student welfare, ensuring equity of access to education, and supporting students with diverse needs. These topics are each treated in detail in other chapters; here we look at how the use of ICT is transforming teachers' practice relating to each aspect.

TRANSFORMING CURRICULUM

There are two main ways in which ICTs are transforming curriculum: in terms of the content being taught, and in terms of the ways that students learn that content. In this section, we look first at the example of literacy, which has expanded and changed through ICT use in society, and then at the example of mathematics instruction, in which ICT has offered new ways for students to work mathematically and to learn.

New literacies

When did you last 'LOL' (laugh out loud) as you stepped 'AFK' (away from the keyboard) after saying 'B4N' ('Bye for now') to your virtual chat-room friends? And are you feeling :-) (happy) or :-((sad) today? All these words, phrases and symbols are examples of how ICTs and the Internet have altered our language. Equally, literacy practices and skills have changed with the incorporation of multimodal texts, hyperlinks, and collaborative production of texts into our society.

Broad notions of literacy are being challenged and changed by new technologies that require multiple forms of literacy to exploit their full potential (Leu, Kinzer, Coiro & Cammack, 2004). This is evident in the way people have redefined standard literacy practices as they have used new technologies to find new ways to communicate and manipulate language as they express their identity in new electronic spaces (Leu, Leu & Coiro, 2004).

Consider, for example, the multimodal texts that are created in a blog incorporating visual, hypertext, video and text components, or a typical Facebook page (see Figure 12.7). Multimodal texts involve the integration of five modes to convey meaning: visual, language, gestural, audio and spatial organisation (Anstey & Bull, 2009). Multimodal texts require new 'grammars' of the various modal elements in these texts. Kimber and Wyatt-Smith (2010) suggested that as students produce these new text types, they need to be supported to create and evaluate quality texts for particular purposes. They proposed that teachers use criteria that go beyond print-dominant notions, rather attending to e-proficiency, e-credibility and e-design in discussing and assessing quality of text with their students. Table 12.3 spells out the components of these criteria as described by Kimber and Wyatt-Smith.

New text formats have also changed the way in which a reader must process and comprehend a text. As Leu et al. (2008) explained, the Internet in particular has given rise to new text formats, new reasons for reading, and the need for new reading comprehension skills for information online. For example, hyperlinks in online texts can dramatically change the way a reader navigates or approaches a text. The hyperlinks can allow a reader to choose specific pathways or topics to follow, and hence reading becomes a non-linear process that is quite different from the linear process of following page after page of a standard text.



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FIGURE 12.7 Multimodal texts are changing our notions of grammar and the writing process.

TABLE 12.3 Assessment framework for using, creating and sharing knowledge online. Note that while each is presented in its own row, the arrangement is not hierarchical and is considered as a dynamic, mutually informing and overlapping set of learning priorities. Hence, the dotted lines denote both the boundlessness and the opportunity for the coalescence of the several components.

USE EXISTING KNOWLEDGE TEXTS OR MATERIALS	CREATE AND SHARE NEW KNOWLEDGE TEXTS OR MATERIALS
Transmodal facility Ability to work with and across source texts, technology platforms and modes of representation to create a new digital text where critical thinking about content and concepts is balanced with the aesthetics of design.	
e-proficiency	
• Ability to locate and retrieve information in written, visual, auditory and digital modes, using a variety of search engines, databases and strategies • Ability to use a range of software efficiently and fluently • Ability to keep efficient records of source texts for tracking purposes	• Ability to select software and mode of display appropriate for selected audience, the medium and type of content • Ability to exploit the affordances of the software and achieve particular effects in accord with the intended audience/purposes
e-credibility	
• Ability to establish accuracy, currency, reliability and trustworthiness of sources (sites and authors) • Ability to discern how values and ideologies are operating in source texts and how these work to represent people, cultures, places and eras • Ability to make a discriminating selection of sources, balance viewpoints and find corroborating evidence • Ability to formulate a position on a topic by informed use of a range of source materials • Ability to identify and examine how elements of a text (verbal, visual/auditory channels) work to communicate and 'normalise' a position	• Discriminating choice of material resources for display or communication • Discriminating use of selected sources • To formulate, communicate and defend as appropriate a position, distinguishing it from other possible positions • Ethical/scholarly acknowledgment and use of all sources
e-designing	
• Ability to identify/discern the potential of source material and to select for (a) new applications and (b) appropriate mode/s of display • Ability to utilise sources ethically (for example, with accurate representation and proper acknowledgements) • Ability to be receptive to the contributions of others	• Ability to assemble, compose or design an aesthetic, creative combination/transformation or treatment of existing sources and materials into new, cohesive representations or text (for example, colours, fonts, spatial layout)

Source: Kimber and Wyatt-Smith (2010). Copyright © 2010 by Kay Kimber and Claire Wyatt-Smith. Used by permission.



THINK ABOUT

- How are these criteria similar to and different from those you would use for a print-based text? How would you help students to develop these skills?

As Leu et al. (2008) pointed out, such changes in texts require new skills and strategies from the reader. The reader must choose the links that are optimal to direct and focus their attention, or work out which links might be distracting and will disrupt their search for specific meaning or knowledge in a text.

new literacies
The skills, strategies and dispositions for using and adapting to rapidly changing ICTs

Teaching **new literacies**, then, involves teaching about these literacies, as well as teaching students how to engage with them and how to produce them. For example, it will involve teaching the information literacy skills we discussed in a previous section that help students to select, read and evaluate information online. It will also involve teaching skills for producing multimodal and collaborative texts alongside traditional print-based texts. Students also need to recognise the purpose for their authoring, with a difference in register between the social blogs they produce out of school, and those they produce

for educational purposes in school. Hansford and Adlington (2009) advise that the particular text type chosen for a task should match that task's purpose. They give examples of collaborative online authoring (in a wiki) being used to develop a 'choose your own adventure' text with multiple paths; and a blog being used for a social commentary exercise in geography, with each text type matching a clear educational purpose. They suggest that a blog for educational purposes, for example, needs to have a strong and clear sense of purpose, a well-informed point of view, and quality of presentation.

These new kinds of texts have prompted the need for new tasks associated with them, new approaches to teaching them, and new ways of assessing them. As Knobel and Lankshear (2007) argued, simply transplanting old ways of teaching onto new text types will not work. We now turn to mathematics, where ICTs have opened up new strategies for learning and teaching.

New ways of learning in mathematics

From the 1970s, when handheld calculators first became cheaply available, concerns were expressed about their possible effects on children's abilities to do mental calculation. However, Ellington (2003) demonstrated in a meta-analysis of studies that this is not the case; rather, calculator use was associated with better student attitudes, and operational and problem-solving skills. Goos (2010) proposed that this benefit occurred because calculators provided a means to test hypotheses and speed up calculation, arguing that technology can deepen mathematical learning by focusing students on problem solving and question generation rather than on finding answers. In terms of cognitive load theory (see Chapter 6), calculators could be said to free up working memory by taking over that aspect of a mathematical problem.

Technology can provide several benefits in mathematics learning: as a tool to help students perform mathematical tasks, as a means of visualisation, and as a means of provoking inquiry. Visualisation can be aided by the use of interactive tools; for example, showing how angles change as shapes change, showing relationships between statistics and graphing, and in mathematical modelling. Geiger, Faragher and Goos (2010) described an example of technology acting to support student social interactions around mathematics, with students testing a model using a CAS calculator, and being prompted to question their assumptions by the answers they received. Geiger, Faragher and Goos (2010) described the technology in this case as a teaching partner.

CourseMateExpress
Online resources
Go further: Try a tool for geometry learning via the link on this text's website.

The Australian Government has developed a website of resources to help teachers become proficient in their use of ICTs. Termed 'Teaching teachers for the future', it links ICT use to various curriculum areas in the Australian Curriculum. New Zealand also has an e-learning website with resources for teachers. More links are given at the end of this chapter.

CourseMateExpress
Online resources
Go further: Explore the 'Teaching teachers for the future' and 'Enabling e-learning' websites.

TRANSFORMING TEACHING AND LEARNING ACTIVITIES

The role of gaming in learning

Computer games are an increasingly important part of the lives of many children. James Gee, a prominent theorist in this area, argued that 'video games recruit good learning and that a game's design is inherently connected to designing good learning for players' (Gee, 2008, p. 21). In talking about games, Gee refers to a label familiar to the pre-'net generation' of learners, who commonly referred to them as 'video games', as does Gee. Indeed, for many people, the technology of games commenced many years ago in the form of video games such as Pac-Man, Donkey Kong and Space Invaders, which were played on large video consoles in public game parlours. Then the first home-based game machines arrived; the net generation of learners will be familiar with current forms of these devices – Sony PlayStation, Nintendo Wii and Microsoft Xbox consoles. Internet connectivity is now a feature of the gaming world, enabling virtual interconnections between players, sometimes on a massive scale.

Gee links the importance of games to modern theories of learning that emphasise experience-based learning and participation in a community of practice in which the learner forms a social identity based on their interaction with other learners, or, in the case of games, interaction with other gamers. These learning principles emerge from the constructivist and neo-Vygotskian theories of learning (Chapter 6). In citing examples of such games, Gee (2008) refers to a range of games in which the gamers take on the perspective of characters and hence immerse themselves in a situated learning context. Sometimes gamers produce new social identities by creating an **avatar**; examples of such games include Half Life and Second Life. Avatars enable the computer user to create new, often anonymous online identities for themselves. Video games also invoke social learning theories in that players situate themselves in another perspective; for example, Civilisation and The Sims, in which the learner must take on and model the characteristics necessary for the game of survival in another civilisation. Gee suggests that the people designing video games have succeeded in capturing the attention of and engaging learners by applying good theories of learning (Gee, 2007).

avatar
A fictional and usually graphical representation of a computer user for use in online environments such as games

Many researchers are now asking how games might be used to support learning in the digital age. Games develop skills in such areas as strategic thinking, planning, communication, application of numbers, negotiating skills, group decision making and data handling (Kirriemuir & McFarlance, 2004).

Computer games may improve attention and reading skills and motivate children to learn (Sohn, 2004). Pelletier (2005) argues for the benefits of studying computer games as texts in school. As discussed above, effective interpretation of ICTs relies on the development of learners' literacy in multimodal texts (texts that include written, verbal and visual components), and computer games are a useful tool for developing such skills.

Various forms of 'serious games' designed for specific educational purposes have been used around the world for some time (Education.au, 2009). In Australia, the game Murder under the Microscope is one such example, in which student teams must compete to solve an ecological crime (see Box 12.3). This rich learning environment provides access to real scientists online who can answer questions, and provides a range of online content and discussion opportunities (Education.au, 2009).

Despite the potential benefits of using computer games in learning, there remains a concern about the link between computer games and violence. For example, Lam, Cheng and Liu (2013) found that adolescents in their study who had been involved in bullying others online were four times as likely as others to have been exposed to violent online games. Arguments about the links continue in the psychological and medical literature (for example, Ferguson, 2014; Strasburger, Donnerstein & Bushman, 2014). Another concern is that of the apparent dominance of boys and male role models in computer games. As we will discuss in the upcoming section addressing the inclusiveness of ICT, some people question the notion of a 'gender divide' in gaming while acknowledging a range of other gender-based issues associated with ICT. Table 12.4 outlines a range of implications arising from the use of games in the classroom.

TRANSFORMING ASSESSMENT

ICT has been an invaluable tool for assessment, providing opportunities to assess students formatively in new ways, as well as assisting evaluation and reporting of assessment data. Just as ICT is transforming ways of teaching, it is also contributing to changes in assessment practice.

Computers can be particularly useful for teachers interested in understanding learners' cognitive and thinking processes, since computers can make students' thinking processes visible for teachers in a way that other methods of learning cannot (Tempelaar, Rienties & Giesbers, 2014). For instance, students'

BOX 12.3 CLASSROOM LINKS

MURDER UNDER THE MICROSCOPE



Source: © Corbis/Tim Oleary

Developed by the Centre for Curriculum and Learning Innovation, Murder under the Microscope is an online game investigating environmental problems in the context of solving a crime. The game is used in schools across as well as outside Australia, with more than 22 000 students reported to be involved in 2010. It is designed for students in years 5–10. Students are presented each year with an eco-crime they must investigate. Working in teams, students study crime sites, victims and villains, and draw on clues provided on the website and by their own research to try to solve the mystery.

Resources on the website include a teacher's wiki, a timeline of events, activity cards, video clips and other support materials to assist teachers in supporting their students.

Although the aims of the program are linked to environmental education and sustainability, a 2009 report of Murder under the Microscope also found that it:

- facilitated engagement and motivation for learning
- developed group work skills and positive attitudes to group work
- developed literacy skills in varied literacies.

Interestingly, although the students reported enjoying the activity, when asked whether they would like to learn like this all the time, most replied no. It appeared that they and the teachers saw this as an additional rather than a core learning activity. It also reminds us that students prefer a balance of different activities for learning.

ACTIVITIES

1 Go to the Murder under the Microscope website (www.microscope.edu.au/index.aspx) to view past eco-crimes and materials.
2 Consider how games such as this can be used to integrate multiple purposes for learning. How could you adapt this principle to another curriculum area? What about another form of technology?

choices about how to use a particular computer application can reveal their thinking and problem-solving strategies: word-processing applications facilitate learners' revising and editing on screen, and records of students' Internet search strategies are easily reviewed. Teachers can observe students working with computers, monitor their progress, stop and ask about students' goals, and make suggestions for revision or the use of different strategies. A number of programs such as Mathletics and Studyladder keep records of student progress as they complete activities online, which teachers and parents can access to formatively assess students' progress. This provides information about which topics students have mastered, and those they may be having difficulty with.

In Chapter 13, we discuss dynamic assessment, in which teachers assess students' ability to benefit from instruction, in order to determine the optimal instruction needed. Computer-based interactive assessments can provide a means for this to happen, by adjusting help according to students' responses, and then pinpointing the specific points at which a student required assistance, and whether they were able to benefit from this.

TABLE 12.4 Benefits and issues arising from gaming use in schools

EDUCATIONAL USES AND BENEFITS OF GAMES	ISSUES
• Many students are already familiar with mobile device–based gaming. • Gaming activity can occur with user versus machine on an individual console, or user versus other users on a network, or the Internet. • Technology can be used to represent reality – real-life examples that are relevant to the student. • Games can provide an immersive experience. • Well-designed games are able to encourage problem solving and lateral thinking. • Opportunities to develop relationships can arise through games with individuals locally and around the world. • They are able to provide different levels of challenge and thus extended learning opportunities. • They encourage (in fact, demand) active participation in the learning experience. • Games provide opportunities for drill and practice, and can encourage visualisation and experimentation.	• Development of educational games to a level that matches commercial games is expensive and a highly specialised skill. • The gaming element must be supported by sound pedagogy and clearly defined learning outcomes. • Games can be highly competitive and this is not appropriate for some students; some can become obsessed with a game. • Issues related to what kind of device will be used to deliver games, what kind of games will be used, and issues of violence, appropriateness and age level all need to be considered.

Source: Adapted from Millea, J., Green, I. & Putland, G., *Emerging Technologies: A framework for thinking*, ACT Department of Education and Training, 2005, p. 74, released under the National Educational Access Licence for Schools (NEALS).

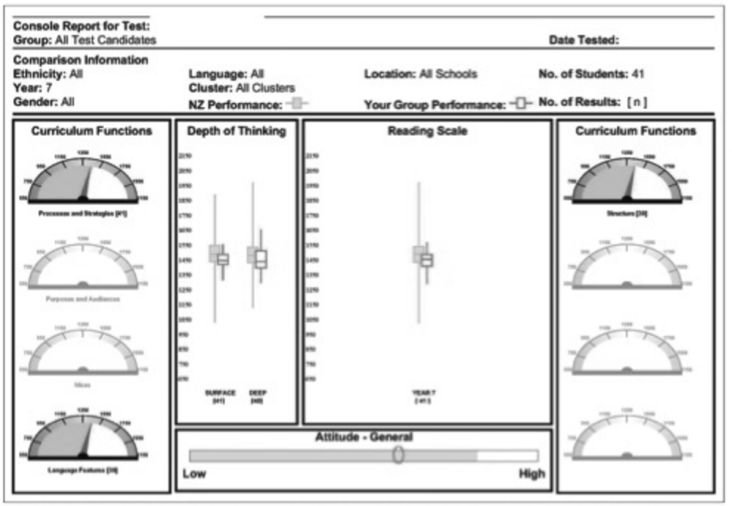
Another means of employing tracking of student responses is through Temporal Evidence Maps (TEMs) (Zoanetti, 2010) that identify the processes students use in the process of completing a task such as problem solving. This identifies errors in students' thinking or strategy use, which can then be addressed by the teacher. Just as teachers may do this by sitting one-on-one with a student 'talking aloud' as they work through the problem, the tracking can be done by a computer without relying on the student's ability to articulate their thinking, or the teacher's time being available to work one-on-one with each student.

Analysis and reporting of assessment results can also be facilitated through ICT. AsTTle (assessment tools for teaching and learning) was developed by the Ministry of Education in New Zealand to provide teachers, parents and students with information about a student's level of achievement in literacy and numeracy in relation to the national standards. Teachers compose tests by selecting items from a pool. The tests are completed and scored online, producing a series of interactive graph reports for individuals and groups, relating student achievement to curriculum levels, objectives and national norms. An example of one of these reports is given in Figure 12.8.

Masters (2013) described a number of ways in which ICT can transform assessment practices. He described new technologies as enabling:

- assessment anywhere, on any device, any time
- use of simulations, games and other interactive multimedia applications as environments for assessment
- personalised assessments tailored to students' academic level and need; for example, intelligent systems are able to adjust questions based on the learner's previous responses
- information gathering about learners' thought processes, strategies, misunderstandings and errors, supporting diagnostic assessment
- timely, quality feedback.

Assessment is discussed in further detail in Chapter 13.



Source: Learning Media Limited

FIGURE 12.8 AsTTle generates information comparing student test results with national norms, curriculum levels and objectives.

TRANSFORMING CLASSROOM MANAGEMENT

Computers can be used as an effective classroom-management tool, both by the opportunities they offer to monitor student engagement in tasks, and to encourage students to collaborate on computer-related tasks. In a review of the literature, Wright (2010) found that e-learning changes the dynamics of classrooms, and noted that teachers' active presence and participation in e-learning is important for its effectiveness. For many teachers using ICT – particularly those new to teaching – integrating computers into the curriculum may present several practical classroom-management challenges. For instance, there are often insufficient computers for individualised use, which means students may need to be grouped around computers. If groups are not effectively arranged, if students are not used to working collaboratively or if they do not have specified roles in their group, they may become distracted as they surf the Web or waste time talking. Time on task may suffer and this may cause undue noise and disruption in the classroom. If students are working online, there may be technical difficulties – such as computers crashing or networks going down – that could mean the planned task cannot be accomplished. In this case, teachers need to have contingency plans and alternative activities organised. Such classroom-management issues can be addressed, but they can also cause frustration and stress for both teachers and learners.

One issue that has arisen as a result of the use of school laptop programs and BYOD policies in schools is the monitoring of student work to ensure that they stay on task (Leander, 2007), and to provide help when students encounter difficulties. One simple response to this is for the teacher to reposition themselves behind the students, so that they can see what is on students' screens. Networked computers can also be monitored from a central computer using software that allows the teacher to view the desktops of individual students, and enter a desktop remotely to provide assistance as the teacher sees the need for it, so that students do not need to stop and ask. (Using this method, teachers can also close down documents or applications that should not be open.)

A further issue is the distraction that computers can pose when the teacher requires the students' attention. In this case, asking students to close their laptop or to turn away from the screen can quickly show compliance, and avoid distractions while students 'just finish what they were working on'. Chapter 14 has more on approaches to classroom management.

TRANSFORMING APPROACHES TO MOTIVATION

In and of themselves, ICT tools such as IWBs, digital cameras and simulation games may initially engage students by offering them new ways to interact and learn in the classroom, although some research suggests that such motivation is limited in duration (Moss et al., 2007). In the end, it will be the ways teachers use the technologies that determine whether and how they motivate and engage students. Careful selection of the appropriate tool and matching to student need are important to ensure ICTs are a learning technology and not simply an entertainment.



Source: © Corbis/Ron Nickel/Design Pics

FIGURE 12.9 ICTs may enhance motivation in students, improving their attendance and attitudes towards learning.

ICTs may contribute to enhanced student motivation (see Figure 12.9), as their use in classrooms has been found to:

- encourage self-regulation and control over learning (McLoughlin & Lee, 2010)
- improve interaction between educators and students in the learning environment
- contribute to self-efficacy through use of digital objects that identify success, give opportunities to 'redo' a task for greater success, allow students to start at simpler levels and work up to more difficult tasks, provide prompts and helps for completing tasks, and allow self-correction (Handley, 2010)
- enhance self-efficacy and agency through decision making, controlling the learning environment, social modelling and social persuasion in Web 2.0 applications (Hall & Hall, 2010).

ICTs are thought to promote student engagement through:

- opportunities for collaboration and co-construction of knowledge in social media applications (Henderson, Snyder & Beale, 2013)
- personalised learning, with ready access to support as it is needed (Wright, 2010)
- action-based discovery learning that is interactive, practical and often experimental (Jukes, 2005; Livingstone & Bober, 2005)
- linking learners rapidly to constantly growing information sources through hyperlinks and hypertext systems (Jukes, 2005)
- tracking learner progress (for self and reporting to others)
- increasing physical involvement and engagement with learning, in that computer users engage by selecting courses of action or search strategies for themselves
- enabling distributed learning and cognition, which may broaden students' experiences and perspectives.

However, as we found with the links between use of technology and learning, links between technology and student engagement are not automatic, but depend on individual learner characteristics as well as the effectiveness of the particular technological application being used and its management (Girard, Ecalle & Magnan, 2013; Gurung & Rutledge, 2014; Nansen et al., 2012).

Box 12.4 describes a case study from a project investigating the use of digital learning objects to motivate and engage Indigenous students. (See Chapter 8 for further detail on motivating and engaging students.)

BOX 12.4 RESEARCH LINKS

USING THE LEARNING FEDERATION DIGITAL CURRICULUM RESOURCES TO ENHANCE THE EDUCATION OF INDIGENOUS STUDENTS

The following case study comes from a report examining the use of The Learning Federation's (TLF) digital resources with Aboriginal and Torres Strait Islander students in schools.

A school in the Northern Territory, part of the Kaltjiti community, is associated with Irintata and Watinuma Homelands. It is situated between the Everard and Musgrave Ranges and has a population of about 250 Anangu and 30 non-Anangu, who reside in town or on the associated homelands.

The school has one class in each level ranging from CPC [preschool] to secondary class (five classes in total), 14 staff members that include teachers, Aboriginal education workers and administration school support officers. The staff includes teachers with a range of ages and levels of experience. The school has 50 to 60 student enrolments: All students are Indigenous, come from a low socioeconomic background, are English-as-an-additional-language learners, and have health and family issues that affect students' attendance and academic levels.

ICT at the school

Each classroom has newly installed IWBs. The library is equipped with an IWB, a media centre PC and plasma screen TV. The secondary and upper primary classes have computers in the classrooms.

Most teachers enjoy using ICT and seek support from both the ICT coordinators at school and also from the Anangu Education Services office in Ernabella.

The teacher participant, Suria, has been teaching for two years full-time and has had experience using IWBs, incorporating the use of the IWB in numeracy and literacy lessons. She has had considerable experience with digital photography and digital video (including editing and producing photo stories and DVDs) to enhance learning experiences. She uses both PC and Mac computers daily and has attended and given sessions at the Mimili ICT Expo as well as attending other ICT workshops relating to software such as Clicker 5. She enjoys using ICT to enhance students' learning experiences and motivate and engage them in their learning.

Suria teaches a middle primary class (years 3, 4, 5). There are 14 students on the roll, with nine attending regularly. Attendance of some students is erratic, and a few students present with very challenging behaviours.

Students' abilities range from very low literacy and numeracy levels to intermediate (that is, the lowest level would be reception and the highest level would be year 3 or 4). Students have no ICT experiences at home and use the IWB in the classroom and programs such as PowerPoint and digital photography to present some of their work. The classroom has a newly installed IWB/projector and laptop. There are no computers in the classroom.

The project

Wishball tens TLF digital curriculum resource was used. The *Wishball tens* activity involves learning in the areas of place value, addition, subtraction, counting on, patterning and grouping.

Before attempting the *Wishball tens* activity, the students practised their skills in the areas mentioned above. This was done through giving the students concrete materials such as counters, tens and units and incorporating the activities with an IWB activity. For example, while working with computers and number lines on the floor, students would take turns to do the same activity using the IWB.

The students required a lot of support and help when completing the tasks, especially due to the range of their abilities. Photos were taken of the students working, and the teacher made a book for them to read, including representations they had made of numbers using the concrete materials. This helped in recapping concepts at various times throughout the day.

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When working with the class without an Aboriginal education worker, Suria tended not to use the IWB, as it was very difficult to keep all the students engaged and involved in the activity. Instead they practised skills already gained using concrete materials and worksheets such as addition and subtraction, counting on and patterning. Games were played both inside and outside the classroom, working in teams to get the right answers for counting on problems and using number lines drawn in chalk on the ground and various other games, such as relays.

Once the students became confident with skills in the areas mentioned above, the class started using the *Wishball tens* activity. At first, the students needed a lot of support and used concrete materials to help them problem-solve. Some still needed support in deciding whether to subtract or add, whereas others mainly needed support with the actual addition or subtraction sum. After performing the activity several times, two students were able to work out the '*Wishball* number' quite quickly and managed to get the target number in less than eight attempts. Students also experimented with calculators to problem-solve, which they enjoyed.

Results

Overall, the *Wishball* activity was motivating and engaging. It was important for the students to have some materials to work with on the floor to maintain their interest and to support them to problem-solve the answer. The students worked well together, helping each other and working as a team. To cater for the range of abilities, splitting the class into two groups (if two teachers were available) meant that support materials could be differentiated for each group, which helped the students successfully participate in the activity.

Students enjoyed the activity and using the IWB, and often requested to play *Wishball*. Suria thought all students would be able to access and use the learning object, provided they learnt the skills needed before the game was played, otherwise it would be too daunting and students would not want to try it out. Support materials (when using the learning object activity) and lead-up activities were vital throughout the process. These contributed to the success of the project, as did having two teachers working on the project together.

Suria expressed her willingness to use TLF content in the future. She believes it fits well into the curriculum, enhances student learning and helps identify students' strengths and weaknesses. Suria says that being involved in the project helped her reflect on her own teaching practice and helped her understand what knowledge and skills the students needed to acquire to be able to use the learning object. She felt it was important to identify the skills and understandings required to access, enjoy and complete the learning object.

Suria mentioned the importance of giving students explicit, regular experience in counting forwards and backwards, both in-decade/off-decade (10, 20, 30 ... and 26, 36, 46 ...) and century/off-century (100, 200, 300 ... and 146, 246, 346 ...). She found the students needed encouragement and to 'trust their head' when they were using *Wishball* as they got close to the target.

Implications for consideration

The students were successfully able to access the learning object and participate in the activity after careful planning and building up their skills in all the necessary areas. Without this process, the students would not have felt confident attempting the task. Team teaching also helped manage the range of abilities. Suria emphasised the need to 'backwards plan' before using learning objects, as it is fundamental to understand what the students need to learn first to be able to access, participate in and enjoy the activity.

(Suria commented that her Aboriginal education worker did not feel confident using the *Wishball* learning object, because her own sense of number was not strong.)

Suria found that student engagement increased over the life of the project, with the stronger students taking on a peer tutoring role with less confident students.

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Suria made effective use of her IWB, especially in conjunction with TLF digital curriculum resources, as a tool to present information, teach concepts and motivate students. She also found the combination of 'ever-present' hardware (IWB) along with digital content such as TLF to be a useful tool for probing and analysing students' understanding of fundamental mathematical concepts and then responding to their needs.

Source: © 2009 Education Services Australia Limited, ww.esa.edu.au. Reproduced with the permission of the copyright owner, Education Services Australia Limited.

ACTIVITIES

1 Explore the full report for other case studies. What commonalities do you notice?
2 How does Suria combine her knowledge of pedagogy, content and technology to use technology effectively for learning?
3 What factors were important for using technology to engage the students in learning?

TRANSFORMING STUDENT WELFARE

ICTs have introduced new questions for students to consider in relation to identity, as they deal with online identities, create new identities through avatars in gaming, and interact with others exclusively online. They have also introduced new issues of student welfare for schools and teachers to consider in relation to cyberbullying in particular.

Identity and psychosocial development

An important part of effective ICT use involves understanding its role in young learners' development in a range of areas. We have seen that computer technologies may be used to enhance learners' cognitive development by providing opportunities to solve problems with the help of scaffolding from the computer. Furthermore, there are opportunities for students to interact with others through computer technology (for example, using email) or to interact with their peers or teachers as they sit in groups at a computer and work through tasks. ICTs also have the potential to play a role in the personal, social and moral development of learners in the 21st century, depending on the extent of their involvement with the technology. The psychology of the Internet is a fast-growing area of study (Riva et al., 2012; Suler, 2006) because of the possibilities of Internet communications and the potential for identity experimentation that such communications offer. This branch of psychology is increasingly being referred to as **cyberpsychology**.

cyberpsychology
The study of psychology and behaviour associated with the use of ICTs and other technologies

Cyberbullying

The increasing popularity of online interaction and social networking also appears to be linked to the emergence of **cyberbullying**. Cyberbullying is a particular term coined to describe bullying by electronic means or through the use of ICTs such as online technologies (Juvonen & Graham, 2014). It should be noted that this does not imply that ICT *causes* bullying; rather, the new mediums of communication and interaction merely facilitate different forms of these behaviours (see Chapters 4 and 14 for more extensive discussions of bullying).

cyberbullying
The use of ICTs and other electronic devices to bully someone

Cyberbullying differs in some important ways from traditional bullying. Slonje, Smith and Frisen (2013) explained that cyberbullying may not rest with a single perpetrator. The potential of something posted on the Internet to 'go viral' means that a single post may be picked up and distributed by others, having a wider audience and impact on the victim than was originally intended. It also tends to have its effect without the perpetrator being present. Slonje and colleagues point out that this has both positive and negative implications: perpetrators have less opportunity to develop empathy for their victim, with the result

that cyberbullying is likely to go on for longer than traditional bullying might, but they also experience less satisfaction, if causing distress is their motivation. Anonymity and the speed and breadth of transmission of messages are other features particular to cyberbullying (Juvonen & Graham, 2014), and are linked to its negative effects for victims, as is discussed below. While bullying in general is reported by up to 94 per cent of students in schools, cyberbullying is less common, reported by around one-third of students (Cassidy, Faucher & Jackson, 2013). Given the effects on students, however, this is still of concern.

Cyberbullying can take many different forms – exclusion, harassment, threats, attacks on reputation, trolling or abuse, and rumours – and its means expands as new technology and applications are developed, with common means currently being texts, calls, images, video clips, Internet games, chat rooms, IM messaging and websites. This breadth has complicated research, with different findings in various studies depending on the definition and particular context studied (Cassidy, Faucher & Jackson, 2013).

Tokunaga (2010) found that cyberbullying occurs throughout childhood and extends into adulthood, although it peaks in adolescence, at 13–15 years of age. A New Zealand study of bullying in schools found teachers reported awareness of cyberbullying from the preschool years (Green, Harcourt, Mattioni & Prior, 2013). Relative to traditional bullying, girls are more likely to be involved, both as perpetrators and as victims, although boys are also involved in cyberbullying (Connell, Schell-Busey, Pearce & Negro, 2014). Connell and colleagues found that cyberbullies were likely to have been or to become victims of cyberbullying, and vice versa.

Cyberbullying has also been found to occur in cases where girls in particular might make disclosures in online journals and invite others to comment, leading to criticism and hostility from other respondents (Livingstone, 2008).

Unfortunately, the medium of cyberspace makes it particularly difficult to manage for the following reasons:

- *Anonymity*. Being anonymous on the Internet can lead to a sense of online self that is separate from real-life identity and responsibilities (Suler, 2004). As with all cases of bullying, the abuse of power is important and can be particularly assisted when the perpetrator remains anonymous. This may lead to a perception that it is 'safe' to bully online (Heirman & Walrave, 2008), as evidenced by one student's comment in a research study: 'I mean, I think it is safer to bully online, because who will find out that you were the bad guy sending the offending email?' (Vandebosch, 2003, as cited in Heirman & Walrave, 2008). The aspect of anonymity also has consequences for the victim, who cannot be sure who it is who is attacking them. Slonje, Smith and Frisen (2013) quote a 13-year-old girl as identifying this as the main aspect: 'Cyberbullying is probably the not knowing and the anonymity about those that bully. Well, that you don't really know what is happening. And you only know that it is someone that is out to get you'.
- *Widespread audience*. Social networking technologies allow for rapid and widespread dissemination to an unknown audience. As in other cases of bullying, online observers and recipients in effect become bystanders to bullying (see chapters 4 and 14). This can foster a heightened sense of insecurity in the victim and is a particularly damaging psychological consequence of cyberbullying (Heirman & Walrave, 2008).
- *24/7 attainability* (Heirman & Walrave, 2008). The online and distributed nature of cyberbullying means that the victim can never be assured that they are safe or free from bullying, and means that it is harder to monitor or police in school environments. It also means that bullying outside the school context can flow into the playground and vice versa.
- *Privacy*. Many online communications between individuals can remain private in that they can escape the supervision of adults. Many victims choose not to discuss this bullying with adults, in some cases because they fear a loss of Internet access or removal of their mobile phone.

This attachment to electronic connectivity means, in effect, that teenagers risk significant emotional harm because they delay seeking help (Heirman & Walrave, 2008).

- *Lack of social cues.* As discussed in Chapter 4, one of the most important social skills we have is our ability to accurately process social cues, such as facial expressions and emotions. The absence of these cues in online and non-verbal contexts can lead to 'toxic' disinhibition, and in some cases may mean that the perpetrators of this bullying may not realise the effect of their actions on others, as illustrated by these student comments in research studies: 'It's hard to remember that the other person is really seeing it' (Kowalski, Limber & Agatston, 2008, as cited in Heirman & Walrave, 2008), and 'It was a kind of joke to me, but when I saw him at school I realised that I had driven things too far' (Vandebosch, 2003, as cited in Heirman & Walrave, 2008).

These features of cyberbullying suggest that teachers and schools face a challenging task in managing these student behaviours, not least because they often move across the boundary between the school and outside-school lives of students (see Figure 12.10). The psychosocial consequences of bullying are severe (see Chapter 4), and some research suggests that cyberbullying has consequences for both its perpetrators and victims that go beyond those of other types of bullying, including links to depression and thoughts of suicide for adolescents (Bonanno & Hymel, 2013). Not all victims of cyberbullying experience such negative effects, however, with some reporting little or no distress. The type of cyberbullying seems to make a difference, with victims in one study reporting more worry from cyberbullying received on their mobile phones (texts, calls) than the Internet (Slonje, Smith & Frisen, 2013). Students have a right to feel safe and protected in their school environment, as we discuss in Chapter 14. Information about cyberbullying, and the strategies teachers and adults can use to help students, can be found on the Cybersmart website of the Australian Communications and Media Authority (ACMA) (see also Box 12.5).



Source: Matthew Duchesne, © Milk and Honey Photography, 2010.

FIGURE 12.10 How can you ensure that students do not use text messages, email or other forms of technology to hassle or bully other students?



THINK ABOUT

- Discuss the advantages and disadvantages of the Internet as a new psychosocial space that fosters social relationships and allows individuals to play different roles.
- How should schools represent cyberbullying in their school anti-bullying policies? Do schools have a particular responsibility to address this form of bullying?
- Can you think of classroom strategies teachers could use to make students more critical or metacognitive users of online environments? Could this protect students from cyberbullying or other online abuse?

CourseMateExpress

Online resources
Go further: Find resources on ACMA's Cybersmart site via the link on this text's website.

Ethics and safety

The use of ICTs poses several ethical issues for educators. These include the potential for:

- plagiarism – software such as Turnitin (2005) has been developed to examine digital text and check for similarities between students' work and existing text
- breach of copyright rules through downloading Web resources such as music, videos and graphics
- exposure to obscene or harmful materials (such as pornography) on the Web
- exposure to online interactions that may prove harmful (such as with online stalkers or paedophiles).



BOX 12.5 CLASSROOM LINKS

HELPING A CHILD WHO IS BEING CYBERBULLIED

One or more of the following signs and changes in behaviour could indicate that a student is being cyberbullied and/or other mental health issues. The signs should be considered in light of the student's usual behaviour.

- decline in social interaction; having less to do with friends
- dislike and avoidance of school, &/or absenteeism
- decline in academic performance
- increased loneliness &/or distress
- increased social exclusion and peer rejection
- sudden changes in friends or groups associated with
- difficulty focusing on schoolwork and/or sleepiness
- poorer physical health
- negative self-perception
- becoming withdrawn, appearing depressed or anxious, having mood swings, crying for no apparent reason
- having suicidal thoughts – this should be reported to the administration and the parents/carers immediately for appropriate action.

To help a child who is being cyberbullied, organise the following:

1 Ensure the student is safe; arrange support from the school counsellor or a teacher the student trusts. Kids Helpline can offer support outside school.
2 Discuss your concerns with the student and their parents.
3 Monitor the student's peer interaction, particularly at break times
4 Help them to make connections with other students through established student groups that operate at break times, or by recruiting appropriate students to support them
5 Put the school's anti-bullying policy into action if any student is being targeted or excluded by particular students.

Students can also be assisted in their response to online bullying:

a Don't respond to any further messages/postings from the bully
b Block further correspondence from them (block their mobile number or email address, and change privacy settings).
c Talk to others you trust about what is happening (a parent, older brother or sister, teacher, friend)
d Keep evidence of any bullying to assist with tracking down the bully and potentially reporting the matter to the service and police.
e Report any bullying concerns to the administrator of the service used
f Remember it isn't your fault
g Don't join in by commenting on or sharing posts that might be hurtful to others
h Support a friend who is being bullied. Let them know you don't agree with what the bully is saying or doing, and will stand by your friend.

Source: Adapted from Commonwealth of Australia 2015. Information about cyberbullying is available from Australia's Office of the Children's eSafety Commissioner website (formerly the Cybersmart program), http://www.esafety.gov.au.
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The ABS (2011) identified that only 3 per cent of children who used the Internet in the past year had experienced some form of safety or security problem. This represented 72 000 children, which is a concern in real terms, although the question combined safety and security concerns and so may overstate the dangers to children. Holmes (2009), Cranmer, Selwyn and Potter (2009) and Dunkels (2008) have all noted that online communication is much less risky than the media tend to portray it,

and that it is largely within young people's capacity to manage. The ACMA Cybersmart site (see the link at the end of this chapter) contains resources for examining issues and strategies with children.

TRANSFORMING EQUITY ISSUES

ICT has the potential to reinforce differences between economically advantaged and disadvantaged schools and students, and to entrench existing inequities. It costs a great deal to maintain adequate computer equipment and software in schools, and this contributes further to inequities. There are often disparities between students in terms of the types of ICT resources they have, or have access to, at home, as well as the extent to which they use them.

Several other potential sources of disadvantage, such as gender, language background and disability are discussed below.

Access and use of ICT

Lack of access or inequitable access to technology is a significant issue that influences the quality of student learning and learning outcomes. Learners' socioeconomic status and the financial resources of the schools they attend play a significant role in determining access to quality learning resources. This is particularly apparent in the area of ICT, as computer technology can be costly and there are complex access issues related to Internet use. In addition, the variable strength of Internet connection in various locations in Australia or New Zealand affects people's access to Internet resources. The term 'digital divide' was coined to highlight the inequitable distribution of ICT resources and Internet access across groups (NTIA, 2000; Smolenski, 2000). Two groups of students are particularly likely to suffer as a result of the digital divide:

1 students in remote rural or poor inner-urban areas where telecommunications are limited and/or expensive, and Internet connections are weak
2 students from low-SES homes that lack ICT resources.

In making decisions about how and to what extent to integrate ICT into the learning process, teachers need to consider factors such as students' access to computer resources at home, and the potential disadvantages that lack of access may cause.

Equitable access to ICTs means that all learners have equal access to ICTs regardless of socioeconomic background, gender, ability level, geographic location, ethnicity or language background. For some students, this may mean providing access to Internet through school. For others, it may involve providing a variety of adaptive devices designed to enable learners with disabilities to take full advantage of the power of technology to enhance personal freedom, or it may involve using a range of innovative resources to extend the more-able students' learning. All learners should have the opportunity to use ICTs for the full range of purposes for which they were designed, including information access and communication through a range of technologies.

ICT has the potential to transform the schooling experiences of children living in rural and remote areas by providing them with access to resources and connections to people and information that they would otherwise not have. Children living on rural properties or attending small or isolated schools have the opportunity to access an expanded range of courses through a combination of ICT and distance education.

Not all children in rural and remote areas benefit from access to new technology and improved communications infrastructures. Excessive distances can make it difficult for students to access necessary ICT resources, and mean that even if they have the hardware and technology, they do not have sufficient Internet connectivity to benefit from it. Moreover, the disadvantage brought about by remoteness of location is often compounded by the low SES of some students' families and by limited funding for computers in rural schools.

The Australian Government's Digital Education Revolution (2008–12) sought to address inequities of access by ensuring that all students in years 9–12 had a computer at school, and that all schools had broadband access (DEEWR, 2013). An independent review of the program found that it had achieved most of its objectives, including 1:1 availability of technology, and supportive infrastructure in schools

that has led to greater engagement with technology for education. Low-SES schools and their students benefited in particular. Challenges remain for teachers to capitalise on the technology through their teaching practice, to build on the momentum started by the initiative (DEEWR, 2013).

Access alone may not imply equivalence of use of ICT. The 2009 PISA study of access and use of ICT by 15-year-olds in Australia and New Zealand found that socioeconomically advantaged students were more likely to use computers at school than were disadvantaged students. This deepened inequities of use and access the students had at home (OECD, 2011). Further differences were found in gender and ICT use, as described below.

Gender and ICT use

Large-scale studies of computer and Internet use have not shown gender differences in Australia or New Zealand (ABS, 2011; MCEECDYA, 2010; OECD, 2011). This is a shift from studies of the 1990s which showed boys used computers at home and in classrooms more than girls did (for example, Scott, 1996). The studies show different patterns of computer use by boys and girls, with girls using the Internet more for social communication, while boys are more likely to use it for entertainment (MCEECDYA, 2010); also, girls are more likely than boys to use the Internet for educational purposes and social networking, while boys are more likely than girls to use it for online gaming (ABS, 2011). Girls seem to benefit from their computer use more than boys do in terms of academic outcomes, with girls showing higher scores in ICT literacy (MCEECDYA, 2010) and digital reading (OECD, 2012). Johnson (2011) suggested Internet use may benefit girls more due to a tendency to focus on accomplishment more than entertainment. And yet, girls are reported to have less positive attitudes towards computers than do boys, and to display less self-confidence in using them (OECD, 2011). One factor that appears to positively affect girls' attitudes is female teachers' use of computers (Meelissen & Drent, 2008).



THINK ABOUT

- Have you seen evidence of a 'digital divide' in your educational experience?
- What strategies will you put in place to minimise disadvantage brought about by ICT use?
- What disadvantages might there be in giving students the option of completing all their assignments on computer? Do you think there is merit in asking that all students submit at least one assignment in handwritten form, rather than in word-processed form?

TRANSFORMING INCLUSIVE EDUCATION

With its potential for addressing the needs of students on an individual basis, ICT can be particularly useful for extending students with high academic abilities, and catering for those with additional learning needs.

ICTs may be used in unlimited ways to enhance the motivation, intellectual stimulation and achievement of learners of all ages. Some of the benefits of ICT use to engage and stimulate more-capable learners in your class include the fact that ICT can:

- provide opportunities for gifted students to progress at a rate that is appropriate to their individual abilities
- accommodate students' individual learning preferences
- provide opportunities for students to develop and practice higher-level thinking skills
- enable students to communicate with other gifted and talented students around the world
- be used as a powerful and up-to-date information resource when researching any given topic
- provide structured opportunities for individual and small-group investigations of real problems
- provide opportunities to participate in collaborative learning experiences
- enable students to engage in distance learning programs for the exceptionally able (Western Australia Department of Education and Training, 2004).

BOX 12.6 CASE STUDY

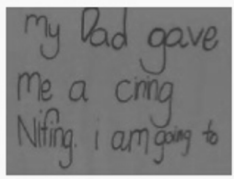
WORKING WITH CHARLIE: ICT IMPROVING THE WRITING PROCESS FOR A STUDENT WITH LEARNING DIFFICULTIES

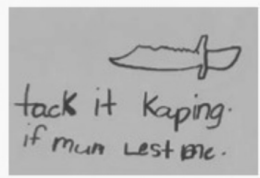
Charlie was a reluctant writer. He had difficulty with fine motor coordination, which made handwriting laborious and slow. Although he was in Year 6, his writing skills were still at an early level, with invented spelling and simple sentences. The sample below took him an hour to write. As a result, Charlie disengaged with school. He avoided any writing task, and had behavioural, emotional and self-esteem difficulties. Charlie's teacher noticed, however, that his oral language was well developed. He could tell stories, and pull her in with his descriptions. Clearly his language development was not the problem.

Charlie's teacher decided to try assistive technology to support Charlie in his writing. A predictive writing program reduced the number of key strokes he needed to make in typing, and the computer read back to him what he wrote, so that he could hear the errors that weren't evident to him visually. After two months working with the program, the results were nothing short of amazing. A PowerPoint presentation Charlie developed revealed complex sentences, advanced vocabulary, and considerable pride in his work.

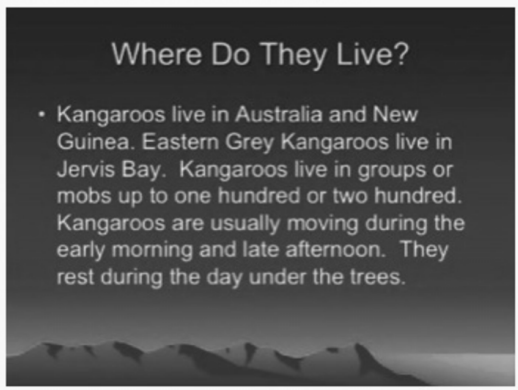
With the help of assistive technology, Charlie was able to produce a text that reflected his understanding, and to see himself as a capable student. His teacher was convinced of the power of technology for learning.

Charlie's writing, without the aid of assistive technology:





A page of Charlie's PowerPoint presentation on kangaroos:



Source: Adapted from a lecture by Alyson Whiteoak, 2012. 'Charlie' is a pseudonym.

There are several examples of how ICTs are being used to promote the learning of gifted and talented students in mainstream schools. Online or email mentoring is a very enriching experience, particularly when mentors are experts who are not able to visit the students face-to-face. In this way, experts from around the world can become mentors for gifted students in your class. In particular, this means that geographic isolation can be overcome, while the timing of the mentor–mentee interactions can be more flexible (for example, after working hours as well as during school) (Gross, 2005).

ICTs are also used in a range of ways to support students with diverse learning needs through the use of technologies to assist learning. In developing online teaching and learning resources, you are now required to apply international standards such as the World Wide Web Consortium for enhancing accessibility of online materials for all students, including those with disabilities (Millea, Green & Putland, 2005). Computers with assistive devices have the potential to support learners with physical disabilities, including those with cerebral palsy, spinal cord injuries and muscular dystrophy, providing them with learning opportunities that were previously unavailable. Assistive devices include voice-recognition software; translation of musical, science or maths notation into braille; virtual pencils; alternative keyboards and mouses for learners with physical disabilities; and digitised speech devices (Millea, Green & Putland, 2005). In addition, some regular devices such as tablets and smart phones have settings that allow them to be adjusted for particular needs (for example, voice-over and large fonts for vision impairments, autotext for literacy difficulties and assistive touch for motor difficulties).

There is a wide range of possibilities for using ICTs to enhance the learning of students with disabilities. For example, essay questions can be provided as audio files (podcasts) for learners with visual impairments, and podcasts may be transcribed for learners with hearing impairments (Millea, Green & Putland, 2005). Box 12.6 presents a case study of a teacher who used assistive technology to support a student's writing.

STRENGTHS AND LIMITATIONS OF USING ICT IN THE CLASSROOM

As we have seen, ICT is changing schools and classrooms in many ways. ICT promises a future that is faster, more exciting and better than anything that has gone before. But the mere presence of a computer or tablet (or IWB) in a classroom does not automatically guarantee improved learning and teaching. ICT may have many positive benefits for students' learning, providing it is used well. ICT may also carry disadvantages for learning, when it is not used so well. Research is still continuing to inform teachers of ways to integrate ICTs productively into learning and teaching.

Strengths of using ICT in the classroom

ICTs have the potential to enhance learners' academic achievement when effectively integrated into the curriculum. This has been confirmed by research that shows improved overall student achievement in English, mathematics and science in primary schools with good ICT resources (BECTA, 2008).

Wright (2010) found that improved learning outcomes from ICTs may occur through:

- facilitating students' motivation and engagement via co-constructive pedagogies, and matching learning activities to students' abilities and needs
- encouraging independent and personalised learning among students, with easy access of supports for their interests and needs
- critical thinking and multiliteracies, which are supported by student-centred pedagogies that allow students to develop deep understanding and metacognition while engaging with multiple texts; Wright argued that technological tools foster socially mediated learning and co-construction, which in turn develop these higher thinking skills



BOX 12.7 IMPLICATIONS FOR EDUCATORS

STRATEGIES FOR USING ICT IN CLASSROOMS

- *Decide your aims for the lesson/unit, and select software and online resources accordingly.* Be guided by what you know about how students learn best. If you want to focus on developing students' basic skills, use software that promotes mastery learning. If you want to encourage discovery learning, allow time for students to explore the Internet, but provide appropriate scaffolding and guidance to avoid time wasting.
- *Motivate students and develop their interests.* Databases of information available on the Internet allow students to examine a multitude of topics to find those of individual interest.
- *Build on students' background knowledge.* As students use computer applications, observe their problem-solving strategies and how they interact with the content. This will give you an indication of what students know. Ask questions about why students have chosen to explore a particular website or use a certain application. This gives opportunities for interaction and for dialogue about students' understandings and knowledge.
- *Encourage different approaches to problem solving on the computer.* Simulations, virtual environments and links to resources that extend well beyond the classroom all expand students' options for learning, and pose problems that engage students' interest, provide complex challenges and give learners opportunities to apply their knowledge.
- *Foster active learning.* When students use technology as a tool or as a means of communicating with others, they take an active role rather than passively receiving information that has been transmitted by a teacher, textbook or television. The student actively makes choices about how to generate, obtain, manipulate or display information.
- *Encourage collaboration.* Technology offers opportunities for student collaboration through social media. Wright (2010) suggests this may help Māori and Pasifika students' motivation and engagement in particular.
- *Support learners as the classroom structure and organisation change.* When technology is used to enhance learning environments, student roles change. Learners often become peer mentors and mentors for their teachers as well. Sometimes this is difficult for teachers and students. Students need help in learning how to function in such roles.
- *Adapt your classroom-management techniques.* Issues such as abuse of expensive equipment and student access to unacceptable material on the Internet must be addressed by teachers and schools as they change their practices. Managing group collaboration around computers and encouraging individualised learning using computers all require careful planning.

- rapid and flexible access to information, resources and experts; this offers students choice in how and when to work, and they are also able to produce their own texts for real online audiences
- collaboration in wide contexts, which can contribute to motivation as well as enhancing skill development; Wright says that 'in these kinds of contexts, students are learning about, with and through technology'.

Limitations of using ICT in the classroom

Despite the many potential positive effects of ICTs on student engagement and learning outcomes, concerns remain about these apparent benefits. Goodwin (2011) noted mixed results about the effect of IWB use on student learning, and that the role of the teacher is central to their level of effectiveness. Teacher professional development is key to the ongoing effective use of ICTs for learning and teaching, particularly as further research emerges into conditions for learning outcomes to ensue from use of particular ICTs. There are still few longitudinal studies measuring student learning over time and the role of ICTs in promoting learning outcomes.

The need for ICT information and literacy, equity issues, classroom management and student welfare issues discussed earlier in this chapter all highlight ways in which the relationship between ICT use and positive learning outcomes is not a simple one.



THINK ABOUT

- In your experience, have the advantages of ICT use outweighed the disadvantages?
- How do you plan to integrate ICTs into your teaching in light of the benefits and limitations outlined in this chapter?

CONCLUDING COMMENTS

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Online resources
Take a moment to consider your personal philosophy. You may wish to use the **Develop Your Philosophy** tool on this text's website.

ICTs are integral to our society and our schools in the 21st century. They offer powerful possibilities for learning and teaching, and are also complex realities that students must navigate as they access knowledge, communicate and create. ICTs are already transforming learning and teaching through the issues they raise, and which teachers and learners must address – issues of welfare, equity, ethics and management – alongside curriculum and pedagogy. This field is continually growing and evolving, and staying current with the research and its implications for your practice will be important.

CHAPTER REVIEW

- Information and communication technology (ICT) encompasses information technology (computer technology) and communications technologies such as videoconferencing and the Internet's capacity to facilitate both synchronous (real-time) and asynchronous (virtual time) communication.
- ICT is viewed as a key competence for learning and work. It is integrated throughout the Australian Curriculum and professional teaching standards, and is seen as an important tool for learning in the New Zealand National Curriculum.
- Although some views see the current generation of students as 'digital natives', other work shows considerable variability in use within this group, and the need for explicit instruction in ICT and information literacies.
- Use of ICT may transform learning by strengthening particular neural pathways, and building cognitive capacity in working memory and attention. This will be dependent on the particular use of ICT.
- ICTs have the potential to change teaching practices through curriculum, ways of learning and teaching, assessment, motivation, student welfare concerns and programs for students with diverse needs.
- ICT use may be informed by behavioural learning theories, which see the computer as a tutor and emphasise drill-and-practice activities.
- Cognitive and constructivist theories emphasise the interactive potential of ICTs and their role in scaffolding learning and promoting collaboration.
- From the point of view of humanist learning theory, ICT may be a useful tool for helping learners understand other cultures, for promoting awareness of the self and one's place in a global society, and for promoting tolerance and peace through understanding and communication.
- Use of ICTs in education has the potential to produce benefits which include enhanced motivation, increased student engagement and improved learning outcomes. These need to be balanced by considering limitations such as the potential for inequity, impacts on student welfare, and classroom-management issues.
- Teacher professional development is essential to the effective use of ICTs for learning and teaching.

ONLINE STUDY RESOURCES



COURSEMATE EXPRESS

Visit http://login.cengagebrain.com and use the access code that comes with this book for 12 months' access to the student resources for this text.

The CourseMate Express website contains a range of resources and study tools for this chapter, including:

- a **self-check quiz**
- **crosswords**, **flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.



SEARCH ME! EDUCATION

Explore Search me! education for articles relevant to this chapter. Fast and convenient, Search me! education is updated daily and provides you with 24-hour access to full-text articles from hundreds of scholarly and popular journals, ebooks and newspapers, including *The Australian* and *The New York Times*. Log in to Search me! through http://login.cengagebrain.com and use the search terms listed in the 'Education databases' section (page 492) as a starting point.

QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1 List as many examples as you can of ICTs that you use, and that you are aware of being used in schools. How has this changed learning and teaching?
2 Describe the shifts in the use of ICT in schools over time. What is the current emphasis?
3 Explain some considerations in teaching students to use ICTs effectively.
4 How are ICTs transforming learning and teaching in schools? Give some examples.
5 Comment critically on how behavioural, cognitive, constructivist and humanist theories of learning influence the ways in which ICTs are used in education.
6 List ways in which ICTs are contributing to assessment or motivation, and teaching students with diverse needs. Find and evaluate some ICT tools that do this.
7 What new challenges do ICTs present for learners and for teachers? How could learners and teachers be supported in meeting these challenges?
8 Critically evaluate the benefits and limitations of using ICTs in educational contexts.

KEY TERMS

avatar
computer-assisted instruction (CAI)
cyberbullying
cyberpsychology
digital natives
distributed cognition
distributed learning (computer-mediated instruction, or CMI)
hypermedia
ICT literacy
information and communication technology (ICT)
information literacy
mobile learning (or mlearning)
net generation
new literacies
simulation

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'ICT IN LEARNING AND TEACHING' AND MATERIAL IN OTHER CHAPTERS

- How do particular patterns of ICT use reflect various learning theories?
- Find two different educational software programs. Describe the learning theory or theories that have guided their design (Module II).
- What are the opportunities for ICT to create and resolve issues of inequity for people of different gender, SES, culture and ability groups (Chapter 11)?
- What issues does ICT present for classroom management? How would you address these issues (Chapter 14)?
- What opportunities does ICT offer for assessment of students' understanding (Chapter 13)?
- How can ICT contribute to motivation and engagement of students? What theories of motivation help to explain these effects (Chapter 8)?
- How can ICT contribute to the teaching and learning of students with additional learning needs (Chapter 10)?

FURTHER RESEARCH

RECOMMENDED READING

Coiro, J., Knobel, M., Lankshear, C. & Leu, D. (Eds). (2008). *Handbook of research on new literacies.* Marwah, NJ: Lawrence Erlbaum.

Howell, J. (2012). *Teaching with ICT: Digital pedagogies for collaboration and creativity.* Melbourne: Oxford.

Nettlebeck, D. (2005). *Computers, thinking and learning: Inspiring students with technology.* Melbourne: ACER Press.

Roblyer, M. D. & Doering, A. H. (2013). *Integrating educational technology into teaching* (6th ed.). Upper Saddle River, NJ: Pearson.

RECOMMENDED WEBSITES

Australian Council for Computers in Education: www.acce.edu.au

Cyberpsychology: http://users.rider.edu/~suler/psycyber/decade.html

Cybersmart: www.cybersmart.gov.au

Edublogs – advice on constructing blogs: http://edublogs.org

ICT school planning – Victorian Department of Education and Training: www.education.vic.gov.au/school/teachers/support/pages/planning.aspx

National Digital Learning Resources Network (NDLRN) – develops digital curriculum resources for Australian and New Zealand schools: www.ndlrn.edu.au

Ministry of Education New Zealand *Te Kete Ipurangi* (TKI) – The Online Learning Centre: www.tki.org.nz/e/tki

Murder under the Microscope: www.microscope.edu.au/index.aspx

Nesta Future Lab – research on ICTs in education: www.nestafuturelab.org/research/index.htm#p

Web 2.0 information from the Victorian Department of Education and Training: https://fuse.education.vic.gov.au/pages/View.aspx?id=3355664a-b5a9-4f7e-864f-adb18f52a0bb&Source=%252fpages%252fResults.aspx%253fs%253dWeb%252b2.0

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

- computer-mediated communication
- cyberpsychology
- distributed cognition

- distributed learning
- e-learning
- ICT
- information and communication technology
- information literacy
- information literacy AND school
- information technology AND learning.

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

Chapter 13

ASSESSMENT AND REPORTING

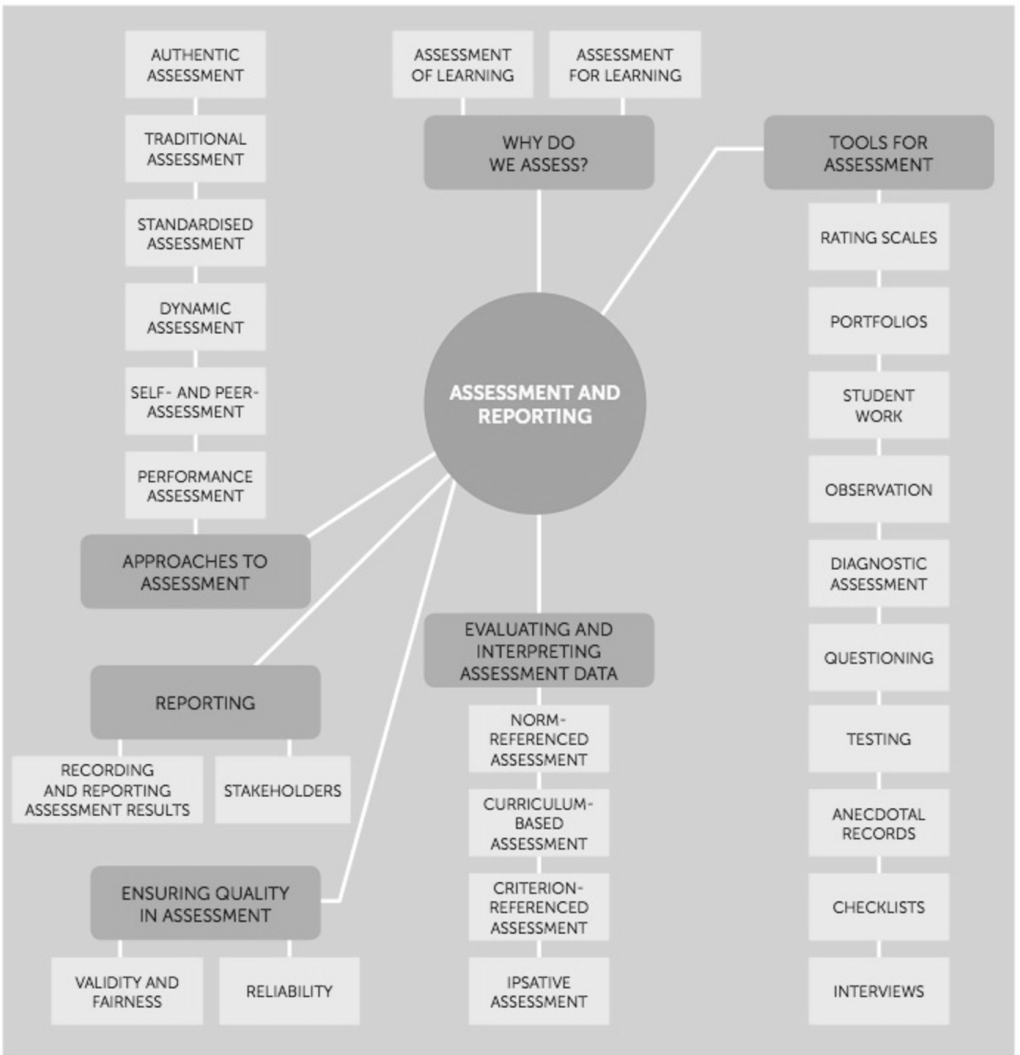

FIGURE 13.1 Chapter 13 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- Why do we assess?
- How do teachers, students, parents and governments use assessment information?
- What are some of the main forms of assessment teachers use to shape teaching and learning?
- How can I ensure assessment is effective?
- Who needs to be considered when reporting assessment information, and how will that affect what and how I report?
- What are the features of effective feedback to students?

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INTRODUCTION

A teacher is planning a series of literacy lessons, and in considering what skills to focus on, he thinks about his students – who is (and isn't) confident with particular skills, and the weaknesses that have shown up in their writing. A parent phones the teacher: she would like to know how well her child is achieving, and whether she will be ready for exams that are coming up. The student in question is looking at the current task set before them and wondering how she can improve her achievement from the previous time. Meanwhile, the school's deputy principal is evaluating test results to identify the school's strengths and weaknesses, preparatory to writing a report for the government. She will also use the results in a team that is working with staff to improve teaching practices.

Assessment in education guides decision making about learning and teaching, whether it is by teachers, students, parents or school systems (Masters, 2013). In this chapter we explore the purposes of assessment and teachers' reporting of the outcomes of assessment to students, parents and others. You may associate assessment with testing, and the reporting of results through marks or grades, but this is just one way in which assessment and reporting happen in schools. Choices teachers make about what and how to assess are influenced by their aims: What will the information gathered be used for? Similarly, reporting methods are influenced by the stakeholders interested in the assessment results, who may be students, teachers, schools, parents, employers or governments.

WHAT IS ASSESSMENT?

When teachers assess students' work, they tend to do several things: they gather some sort of information about what the student knows or can do; they interpret or analyse that information to make sense of what it tells them about the student and their learning; they make judgements about how well the student is achieving, and may record these to share with the student and others; and, generally, they use all of this to form plans for future learning and teaching.

Assessment refers to the gathering and analysing of information about student achievement. It is often used as a partner term with 'evaluation'. Assessment can be both qualitative (consisting of descriptions of what students know and can do) and quantitative (students' performance as measured by marks or positions on a scale), and may occur at any time before, during or at the end of a unit of

assessment
The purposeful gathering and analysing of information about student achievement

instruction. It can cover a broad range of learning outcomes – cognitive, affective and social – from the simplest to the most complex (Bloom, 1956). See Chapter 6 for more on this topic.

evaluation
The process of making judgements about the quality of something

Evaluation is the process of making judgements about the quality of students' learning and performance. We use the information from assessment to make these judgements, and it is the evaluation that is typically reported to students as feedback, as well as to parents and others.

WHY DO WE ASSESS?

Assessment can have a number of purposes. It can help teachers to:

- find out what students know and can do
- learn about a student's strengths and weaknesses
- evaluate their teaching
- evaluate students' learning
- plan future learning and teaching sessions
- report to others about students' learning and performance
- identify students who need special assistance with learning, and the types of help they need.

For students, assessment can:

- provide feedback on their performance
- help them to set learning goals
- motivate them
- provide information about how they can improve.

For schools and schooling systems, assessment can:

- provide information about a group of students
- help them to evaluate their programs
- give information to parents about their child's progress, relative to others
- identify students' progress relative to a particular benchmark
- help with identifying schools and students who need additional help.

Each of these purposes implies a different kind of assessment and reporting practice, and will determine our choice of assessment tool (Masters, 2013). One set of purposes relates to the goal of improving learning. Black and Wiliam (1998) called this **assessment for learning**. It typically happens throughout the learning and teaching process, and can also be called *formative* assessment. They distinguished it from another set of purposes related to accountability, and the summation of students' learning at the end of the year, which they called **assessment of learning**, also referred to as *summative* assessment. Lorna Earl (2003, 2013) added a third set of purposes, related to helping students to take responsibility for their own learning. She called this **assessment as learning**. It is the use of self- and peer-assessment to help students to become more conscious of their own thinking and learning processes. It is related to assessment for learning as it ultimately contributes to improvements in students' learning. It is important to realise that the same task may be summative or formative, used as assessment for learning or assessment of learning, or even both at once – it is not the task but the purpose for which it is used that determines what kind of assessment it is (Gardner, 2012). Earl (2013) suggests that teachers' programs contain a balance of the three types of assessment. Your philosophy of learning and teaching, and your approach to curriculum and assessment, will determine how that balance operates in your classroom. In Box 13.1, two contrasting models of assessment are discussed.

assessment for learning
Assessment with the goal of improving learning

assessment of learning
Assessment with the goal of judging what students know and can do at a particular point in time

assessment as learning
Assessment with the goal of helping students to become more conscious of their own thinking and learning processes



THINK ABOUT

- What was the balance of assessment for, as and of learning in your school experience? Give examples of each. What will the balance look like in your classroom?



BOX 13.1 IMPLICATIONS FOR EDUCATORS

THINKING CRITICALLY ABOUT THE PURPOSES OF ASSESSMENT

Masters (2013) challenged current approaches to assessment, arguing that traditional approaches are based on a model of assessment that is about judging student success, defined by how much students have learnt of what teachers have taught. This model links to our school curriculum, typically organised into units of work. As each unit is taught, it is assessed to determine how well students have learnt (or are learning) the content, or how completely they have achieved the outcomes. Masters argued that this approach does not take into account current understandings of learning, including that all learners have potential for further progress, and that learning should be matched to learner readiness (rather than all learners receiving the same instruction). Motivation is also involved, with students unable to see progress in their learning if they receive the same grade in successive years.

Instead, Masters suggested that assessment should be based on the need to understand where students are in their learning. This would entail drawing on maps of the progression of understanding or skill in a particular learning domain, such as the example in Box 13.3 (see page 503). These maps can be used by teachers to guide teaching, design relevant assessment tasks, develop rubrics for marking and feedback, identify misunderstanding, and provide feedback to a student and information for parents in reports about the progress the student has made over time, and how they can progress further. Masters acknowledged that such a model of assessment has implications for a number of aspects of teachers', schools' and systems' practice. He argued that such changes are necessary and can have considerable benefits.

Advantages of this model of assessment include that:

- teachers have information to guide them in where to target instruction
- teachers and students can monitor students' progress in learning
- students receive feedback on where they are now, where they're going and how to get there, which Hattie and Timperley (2007) identified as effective feedback
- it develops students' metacognitive skills
- it builds students' confidence in themselves as learners
- teachers and students develop a growth mindset, thinking beyond the current task.

ACTIVITIES

1 How might this conception of assessment change teaching practice?
2 What do think assessment should focus on?
3 How can you support your view from theory and research in educational psychology that you've read about in previous chapters?

Formative assessment and **summative assessment** are terms widely used in the literature to categorise the two main forms of assessment. Their names refer to the time at which the assessment information is gathered: formative, throughout the teaching–learning process, as learning is *forming*; summative, at a particular point in the process (often the end), in order to *sum up* what students know and can do at that point in time. The change to the terms *assessment for learning* and *assessment of learning* occurred in order to shift attention to the purposes of assessment – to improve learning, or to measure learning at a point in time, respectively. In this chapter, assessment for learning and formative assessment will be used interchangeably, and both assessment of learning and summative assessment will likewise be used interchangeably.

formative assessment Information gathered while students are learning, to give information about their progress; see also 'assessment for learning'

summative assessment Information gathered to give information about students' achievements at a particular time; see also 'assessment of learning'

ASSESSMENT FOR LEARNING

THE PLACE OF ASSESSMENT IN THE TEACHING–LEARNING CYCLE

Assessment is integral to effective teaching practice at every point (Masters, 2011). Masters (2013, p. 6) argued that 'the fundamental purpose of assessment is to establish where learners are in their learning at the time of assessment'. At the start of a unit of work, teachers assess what students already know and can do in order to make plans for what to teach, and to link new material to students' prior learning. They might look for misconceptions students hold that their teaching will need to address, and identify where on a developmental learning path each student sits. As they are teaching the new material, teachers assess students' understanding to ensure that what is being learnt is the same as that being taught. When students are given opportunities to practise, and to demonstrate what they know and can do, assessment of their efforts occurs to determine what additional support or explicit instruction they might need, to give them feedback about their progress, and to plan for what will be taught in the next teaching cycle.

Assessment *as* learning is a subset of assessment *for* learning, which is related to the process of metacognition discussed in Chapter 6. It is involved in the planning, monitoring and evaluating of their learning that effective learners engage in as they learn (Earl, 2013). Students may be involved in self-assessment in a number of ways while they are learning: deciding what they need help with, or what questions they need answered; considering how they can improve; and reflecting on their learning both during and after the process. Figure 13.2 represents this cycle of teaching and learning, and the place of assessment within it.

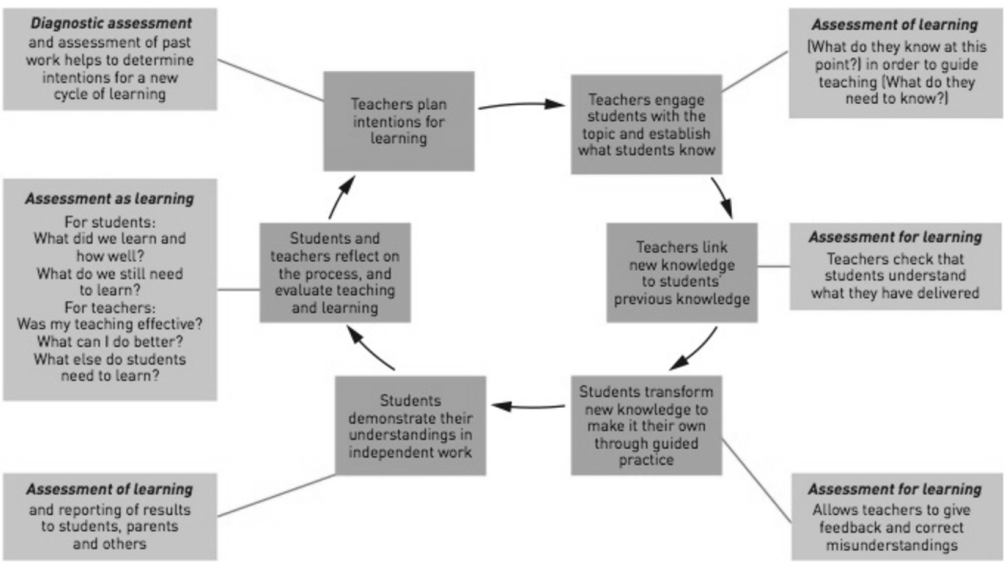

FIGURE 13.2 The place of assessment in the teaching–learning cycle.

KEY STRATEGIES IN ASSESSING FOR LEARNING

Drawing on Black and Wiliam's (1998, 1999) original research, Glasson (2009) suggests five strategies that teachers can implement to ensure that assessment is effective for learning. These are:

1 *sharing* with students what you want them to learn, and what will demonstrate that the learning has occurred (the criteria)

2 *strategic questioning* to find out what students know and can do, so that the information can be used to design teaching and learning experiences
3 *effective feedback* based on the learning goals and criteria, which tells students what they have achieved, as well as what and how they can improve – this feedback can come from peers as well as teachers, and avoids comparing students with one another
4 *student self-assessment* that focuses on students taking responsibility for their learning, identifying strengths and weaknesses, awareness of how they learn, setting learning goals, responding to feedback with action, and assessing their work using the success criteria
5 *the formative use of summative assessment* – summative assessments provide information that can be used for learning before, during and after the task (formatively).

These strategies underline how assessment is an integral part of the teaching–learning cycle. Box 13.2 provides some principles to further guide your classroom assessment practice.



BOX 13.2 CLASSROOM LINKS

PRINCIPLES OF QUALITY ASSESSMENT

New Zealand's Ministry of Education published a position paper in 2011 that shaped a system-wide assessment-improvement program for schools, to ensure that every student could reach their full potential. The key principles underpinning this program were as follows:

- *The student is at the centre.* While the curriculum spells out expectations of progress, this will not look the same for all students. Assessment should respond to individual student contexts and characteristics with the aim of helping all students to progress in their learning. This will involve the student in assessing their own learning, as well as ensuring teacher, peer, parent and *whānau* (family/community) interactions have a central focus on the student and their progress.
- *The curriculum underpins assessment.* Assessment practice should be consistent with the New Zealand curriculum, and should support teaching and learning of curriculum content. Success indicators and achievement standards against which student progress is measured are therefore drawn from the curriculum.
- *Building assessment capability is crucial to achieving improvement.* Effective assessment rests on assessment, curriculum and pedagogical knowledge, skills to use that knowledge effectively, and willingness to actively apply knowledge and use skills for the benefit of student learning. People across the whole system need to have appropriate knowledge and skills in assessment, not just teachers.
- *An assessment-capable system is an accountable system.* Whether looking at the performance of individuals or schools, outcomes must be evaluated in light of the context and the progress that is made, rather than being judged on performance alone.
- *A range of evidence drawn from multiple sources potentially enables a more accurate response.* At the system level, this will involve information from classroom, school and sector. At the classroom level, it will involve drawing a full picture of a student's progress by collecting a variety of information from multiple sources such as teacher observation, students' work, parents' view of the child, and peers' judgements. This rich information can then guide judgements, planning, decision making and future practice.
- *Effective assessment is reliant on quality interactions and relationships.* Valuing of the input of all those whose information can contribute to students' learning requires seeking, collecting, interpreting and using that information in sensitive ways. Quality relationships are thus at the centre of this process. Interactions need to be responsive, respectful, reciprocal and learning-focused. This need for collegial, collaborative and cooperative relationships that seek a common goal of improving all students' learning exists at all levels, but particularly at the classroom level.

ACTIVITIES

1 Map out what these principles will look like in assessment practice.
2 Do the principles challenge your ideas about assessment? Which ones, and in what ways?
3 How are the principles similar or different from what you are used to as assessment?
4 Compare these principles with the view of assessment described by Masters in Box 13.1 (see page 497). How are they similar, and how are they different?

ASSESSMENT OF LEARNING

Assessment of learning, or summative assessment, also plays an important role in learning and teaching. It provides information to teachers, students, parents and others about the outcomes of the learning process, and contributes to teachers' accountability. It can be done by an external body as, for example, in matriculation examinations, or using the National Assessment Program in Literacy and Numeracy (NAPLAN) tests in Australia; or by teachers themselves, such as in New Zealand's Overall Teacher Judgements (OTJ) of student progress and achievement, or when teachers develop assessments at the end of a unit, term or year. Formative assessment information can also be gathered and used for the purpose of *assessment of learning* (for example, in the use of a portfolio of student work to discuss a student's progress with the parents, or to present to a potential employer). The Assessment Reform Group (2006) worked with teachers in the UK, Australia and the USA to review summative assessment practices. They argued that teachers should be involved in summative assessment, particularly as this limits the role of testing, together with its potential weaknesses (discussed later in this chapter), in summative assessment. When teachers are involved in summative assessment, they need to ensure that their assessment is of a high quality, particularly if the assessment results will have an impact on the future of the students, as in matriculation final results. Aspects of quality assessment are discussed later in the chapter.

APPROACHES TO ASSESSMENT

TRADITIONAL ASSESSMENT

Traditional assessment aligns with the purposes associated with 'assessment of learning': accountability and reporting. Traditionally, assessment has focused on testing students as a means of determining 'how much' they have learned, and so has had a focus on measurement and on content rather than on the learning process. Being summative, it has taken a snapshot of students' learning at a particular point in time (usually the end of the year, or the end of a unit of work). Often, students have been assigned marks or grades by which they can be compared with other students ('norm-referenced' assessment). However, there has been a broadening of assessment beyond traditional forms of testing in schools and other educational institutions to include procedures that combine instruction and assessment. These changing assessment procedures are reflected in the increasing use of tests described as 'formative' or 'diagnostic', which contribute to the learning–teaching process, rather than tests described as 'summative' that are concerned with the final outcomes of instruction. Changes in assessment practices are also evident in the way in which test data are interpreted. Comparisons are made with a predetermined outcome in the form of a standard or criterion ('criterion-referenced' assessment) or curriculum objectives ('curriculum-based' assessment), rather than the more traditional procedure of comparing test data with the average performance of other students on the same test ('norm-referenced' assessment).

DYNAMIC ASSESSMENT

dynamic assessment
A form of interactive assessment that identifies potential for learning and interventions to help achieve this potential

The concept of **dynamic assessment** has its origins in Vygotsky's concept of the zone of proximal development (discussed in Chapter 3) and Feuerstein's Learning Potential Assessment Device (Feuerstein, Rand & Hoffman, 1979). It employs *interactive* assessment, as distinguished from *static* assessment, and involves the teacher giving pre-planned hints and prompts, based on the student's current achievement level, to find out the effect of instruction on what an examinee can do, with and without assistance, when given tasks of increasing complexity (Haywood & Lidz, 2007). It is based on the principle that we can learn more about a child's thinking by working with him or her than we could simply by observing the child working unassisted. This allows the teacher to probe the child's reasoning as well as their final answer, and by observing their response to hints and prompts, to understand their thinking processes,

rather than simply the product of their thinking. Dynamic assessment has learning as its aim – assessment is never done for its own sake. A key characteristic of dynamic assessment is that both instruction and feedback are incorporated into the testing process, contingent on the examinee's performance and response to any instruction given. Another important feature of dynamic assessment is the active role of the child in the process. Questioning, feedback from the teacher, and discussion are encouraged. Both teacher and student work together in the assessment process (Lauchlan & Carrigan, 2013). This can be contrasted with more traditional assessment procedures that provide limited initial guidance, with contingent feedback discouraged on the grounds that it will invalidate the test's standardisation.

Two forms of dynamic assessment have been identified: the sandwich and the cake formats. In the sandwich format, a pre-test is given without assistance and, on the basis of the examinee's responses, contingent instruction is provided, followed by the administration of a second version of the pre-test to measure change after instruction. The cake format does not involve pre- and post-tests, but instead uses a series of items with standardised (a predetermined set of hints) or individualised assistance provided immediately the examinee encounters a problem, with the next item presented once the problem is resolved (Sternberg, 2013).

Dynamic assessment is based on several assumptions:

- Accumulated knowledge is not the best indication of one's ability to acquire new information.
- Everyone functions at less than their full capacity, so everyone can do better.
- The best test of a performance is a sample of that performance, so assessment should involve the use of learning tasks that involve teaching, as this is a characteristic of school learning.
- The ability to function intelligently is masked by obstacles such as ignorance, impulsivity, impoverished vocabulary, cultural differences in learning styles, poor self-concept, and inadequate development of cognitive and metacognitive structures and strategies (Haywood & Lidz, 2007).

Dynamic assessment involves one-to-one testing using clearly specified tasks with more than one level of achievement or degree of complexity, with the teacher expecting success (refusing to accept ignorance as an indicator of inability to do a task) and noting the effect of prompting on the student's performance on the tasks. Special attention is paid to affective or motivational factors that appear to interfere with learning. If the prompts help the student to complete a task, then it is likely that the student will benefit from appropriate instruction.

Some research suggests that dynamic assessment provides more valid results for students from varied social and ethnic backgrounds, closing the gap between middle-class Anglo students and students from other backgrounds that can be observed in traditional assessment; see Sternberg (2013) and Lauchlan and Carrigan (2013) for reviews. Lauchlan and Carrigan (2013) also argue that dynamic assessment allows for emotional and motivational factors to be assessed alongside academic achievement, to give a more rounded picture of the child as a learner.



Source: Steve Debenport/iStockphoto

FIGURE 13.3 In dynamic assessment, a teacher and student work together on a task. This provides opportunities for teachers to assess students' motivation, reasoning and readiness for future learning.

AUTHENTIC ASSESSMENT

When the tasks students are given during assessment are concerned with the quality of students' work, are connected to real-life situations, employ a range of tasks rather than just one to get at students' thinking as well as their learning, and position learners as active participants in their learning, they are said to be examples of **authentic assessment** (Brady & Kennedy, 2012). Portfolios, problem-based and performance assessment are sometimes called authentic assessment (Brady & Kennedy, 2012).

authentic assessment
A mode of assessment that uses tasks similar to those performed in the real world

In problem-based learning, assessment and feedback are integrated into the task itself – if the problem is solved successfully (the machine works or the patient lives), the students know that their learning has been successful. Authentic assessment uses assessment tasks as learning tasks rather than viewing assessment as the measurement of learning at the end of the learning process. An important element of authentic assessment is the role of the teacher, who should scaffold and support students in their learning as they undertake the task. Authentic assessment is a feature of constructivist classrooms (see Chapter 6), which emphasise the importance of students constructing their own knowledge and meaning within real-world contexts. Authentic assessment tasks may involve integrating knowledge and skills from different areas of the curriculum.

PERFORMANCE ASSESSMENT

performance assessment
A mode of assessment that requires a student to engage in a complex task

In **performance assessment**, students apply what they know, or demonstrate skills in complex tasks. This method is commonly used in curriculum areas in which application of knowledge and skills is important, such as creative arts, foreign languages, physical education, and design and technology. It has also been used in subjects such as English, Science and Mathematics, where students may apply writing skills in writing a persuasive essay, design and conduct an experiment, or solve a problem and explain their reasoning. In each of these instances, students are assessed on their performance of a task, and on specific skills and knowledge that are demonstrated in that context.

Performance assessment typically has a greater degree of validity than traditional assessment methods, as it assesses a total, complex activity rather than discrete knowledge or skills. Such assessment tasks require students to use their knowledge and skills in conditions that are similar to those they might encounter in real life (Lane, 2010). In this, performance assessment often overlaps with authentic assessment. Its weakness may be in reliability, as there are multiple factors that might influence the performance of the task on a particular day. Developing portfolios over multiple tasks or performances can assist with this, as can careful construction of marking rubrics. Validity and reliability are discussed further later in this chapter.

In designing performance assessment, teachers need to have a clear set of knowledge and skills that will be assessed in the task, and develop a clear set of criteria for its marking, preferably with a series of levels of expertise described. This improves reliability, and ensures that students know the criteria against which their performance will be assessed. Having examples of expert performances helps to make the standard clear to students and markers. Performance assessment requires careful design and planning. Assessment may be integrated with teaching, as students prepare for, develop and work through tasks. The teacher's role here is that of a coach.

In early childhood settings, performance assessments are linked to observation, and checklists are often used. Here, assessment is more informal, and focused on students' everyday performance of particular skills or knowledge.

Lane (2010) reviewed research on best practice in performance assessment, finding that students' results in performance assessments can be improved by opportunities to work on meaningful real-world tasks during instructional sessions.

Darling-Hammond and Adamson (2010) called for wider use of performance assessment to tap higher-order thinking and performance skills that traditional testing programs find difficult to reach, and identified a number of schooling systems that use performance assessment to assess such complex sets of skills. Examples of large-scale performance assessments include the PISA tests that compare 15-year-olds across OECD countries, and the International Baccalaureate.

Potential benefits of performance assessment include:

- assessment of learning outcomes
- transfer of skills and knowledge to multiple contexts

- integration and alignment of assessment and teaching
- deeper processing of content through a focus on application of knowledge and skills in a task
- a focus of teachers on teaching essential skills (Darling-Hammond & Adamson, 2010; Lane, 2010).

ASSESSMENT TOOLS

There are many different tools that can be used to gather information for assessment purposes. They vary within the dimensions of formal–informal, direct–indirect and qualitative–quantitative. Masters (2013) argued that the key factor influencing choice of tool or method for assessment should be its ability to provide useful information about the domain being assessed. Research suggests that the best approach is to draw on a range of assessment types to build up a picture of student achievement, rather than relying on a single measure (Masters, 2011; New Zealand Ministry of Education, 2011a). The New Zealand Ministry of Education (2011a) recommends that teachers make overall judgements about student learning and achievement by drawing on three kinds of information source: observation, including observations of behaviour, work samples, and student or peer assessments; conversations with students, including interviews, conferences, questions and explanations and discussions; and gathering of results from formal assessment tools such as standardised tests.

OBSERVING STUDENTS

Teachers observe their students for various reasons, which may include, for example, monitoring behaviour, evaluating their own communication effectiveness, and checking students' progress. To provide information that will inform learning and teaching, observation needs to be purposeful and focused on particular indicators of learning or understanding. These indicators may be guided by the learning intention of the lesson, the desired assessment outcomes defined by a syllabus or school system, or by a learning development map (see Box 13.3).

An example of direct observation is when a teacher scans a classroom, looks purposefully at what students are doing and listens to what they are saying as a reflection of their understanding or skill development, and provides immediate feedback related to the desired learning. **Direct observation** – or purposeful and focused looking and listening – is a most effective form of assessment. It is particularly useful for aspects of learning that the teacher cannot access through products such as essays, written examinations, projects or homework assignments. It is also useful for verifying assessment data collected in other ways (see Box 13.4).

direct observation
Purposeful and focused looking and listening



BOX 13.3 CLASSROOM LINKS

DEVELOPMENTAL MAP

Maps such as the one on the following page can help teachers to pinpoint through observation and work samples where students are in their learning development, and where they will take them next. Masters (2013) explained that such maps allow progress in learning to be charted and monitored, guiding teaching to respond to students' readiness and learning needs – see Box 13.1 on page 497.

ACTIVITIES

1 Observe a child reading and then use the map to determine where they are in their development. What activities might lead them on to the next stage?
2 Look for, or devise a similar map for a different learning area, drawing on research. The SOLO Taxonomy (Biggs & Collis, 1982) might help with devising a map of concept development for older students.

>>

Reading: Developmental Continuum / Individual Student Profile

Indicators For Reading Developmental Continuum

Teachers can identify a child's phase of development by observing that the child is exhibiting all the key indicators of a phase. It should be noted, however, that most children will also display indicators from other phases.

Student's Name _____

I. D. _____

School _____

Phases

Phase 1: Role play reading

Making meaning at text level

- **displays reading-like behaviour**
  - **holding the book the right way up**
  - **turning the pages appropriately**
  - **looking at words and pictures**
  - **using pictures to construct ideas**
- **realises that print carries a message but may read the writing differently each time, e.g. when 'reading' scribble to parents**
- **focuses on the meaning of a television program, story, or other text viewed, listened to or 'read'. Responses reflect understanding.**
- **makes links to own experience when listening to or 'reading' books, e.g. points to illustration, saying 'My dog jumps up too.'**
- uses pictorial cues when sharing a book or 'reading', e.g. pointing to a picture in The Three Little Pigs, says 'The three little pigs left home.'
- turns the pages of a book, telling the story from memory
- knows that writing and drawing are different, e.g. 'Mummy reads the black bits.'
- selects favourite books from a range, e.g. chooses a book saying 'I want The Three Little Pigs.'
- can talk about favourite stories and enjoys hearing them
- is beginning to use some book language appropriately, e.g. 'Once upon a time...' The child may use a 'reading voice'
- responds to and uses simple terminology such as: book, right way up, front, back, upside down

Making meaning using context

- **uses pictorial and visual cues when watching television, listening to or 'reading' stories, i.e. talks about a television program, advertisement or picture in a magazine or book, relating it to own knowledge and experience**
- reacts to environmental print, e.g. noticing a fast food sign the child says 'I want a hamburger.'

Making meaning at word level

- **recognises own name, or part of it, in print**
- is beginning to recognise some letters, e.g. Sam says 'That's my name', pointing to 'Stop' sign

Attitude

- displays curiosity about print by experimenting with 'writing' and drawing and asking 'What does that say?'
- wants to look at books
- offers to 'read' writing and points to test while 'reading', indicating the beginning of having-a-go
- expresses enjoyment by joining in orally and responding emotively when listening to familiar stories
- eagerly anticipates book-reading events that are part of daily routine

Phase 2: Experimental reading

Making meaning at text level

- **realises that print contains a constant message, i.e. that the words of a written story remain the same, but the words of an oral story may change**
- **is focused on expressing the meaning of a story rather than on reading words accurately**
- knows that print goes from left to right and from top to bottom of a page
- responds to and uses terminology such as: letter, word, sentence, chapter
- is beginning to demonstrate awareness of literary language, e.g. 'a long, long time ago...', 'by the fire sat a cat', 'No, no, no', said the...'
- identifies the subject matter of a story through the use of titles and illustrations, e.g. 'I want the story about the big black cat'
- shows an ability to connect ideas and events from stories heard or viewed by retelling events in sequence, using pictures, memory of the story and knowledge of story structure
- expresses personal views about the actions of a character and speculates on own behaviour in a similar situation, e.g. 'If I had been... I would have...'
- sub-vocalises or whispers when reading 'silently'

Making meaning using context

- **uses prior knowledge of context and personal experience to make meaning, e.g. uses memory of a text to match spoken with written words**
- demonstrates understanding of one-to-one correspondence between spoken and written words, for instance, the child slows down when dictating to an adult
- asks for assistance with some words. May be aware that own reading is not accurate and may seek help, re-read or stop reading
- uses patterns of language to predict words or phrases

Making meaning at word level

- **recognises some personally significant words in context, e.g. in job roster, weather chart or books**
- **matches some spoken words with written words when reading a book or environmental print**
- is developing the ability to separate a word from the object it represents. For instance, the child realises that 'Dad' is a little word, not that 'Dad' is a big word because Dad is big
- recognises some letters of the alphabet and is able to name them
- demonstrates some knowledge of letter-sound relationships, for instance, the sound represented by the initial and most salient letters in words
- points to specific known words as they are read
- uses initial letter sounds to predict words in texts

Attitudes

- is beginning to see self as a reader and talks about own reading
- may ask for favourite stories to be read
- joins in and acts out familiar stories if invited to do so
- selects books to read for pleasure
- self-selects texts on basis of interest or familiarity

Phase 3: Early reading

Making meaning at text level

- **is beginning to read familiar texts confidently and can retell major contents from visual and printed texts, e.g. language experience recounts, shared books, simple informational texts and children's television programs**
- **can identify and talk about a range of different text forms such as letters, lists, recipes, stories, newspaper and magazine articles, television dramas and documentaries**
- **demonstrates understanding that all texts, both narrative and informational, are written by authors who are expressing their own ideas**
- identifies the main topic of a story or informational text and supplies some supporting information
- talks about characters in books using picture clues, personal experience and the text to make inferences
- provides detail about characters, setting and events when retelling a story
- talks about ideas and information from informational texts, making links to own knowledge
- has a strong personal reaction to advertisements, ideas and information from visual and written texts
- makes comparisons with other texts read or viewed. The reader's comments could relate to theme, setting, character, plot, structure, information or the way the text is written
- can talk about how to predict text content, e.g. 'I knew that book hadn't got facts in it. The dinosaurs had clothes on.'

Making meaning using context

- **may read word-by-word or line-by-line when reading an unfamiliar text i.e. reading performance may be word centred. Fluency and expression become stilted as the child focuses on decoding**
- **uses picture cues and knowledge of context to check understanding of meaning**
- generally makes meaningful substitutions, however over-reliance on graphophonics may cause some meaning to be lost
- may sub-vocalise when reading difficult text 'silently'
- is beginning to use self-correction as a strategy
- uses knowledge of sentence structure and punctuation to help make meaning (syntactic strategies)
- sometimes reads-on to confirm meaning
- re-reads passage in order to clarify meaning that may have been lost due to word-by-word reading. May re-read a phrase, a sentence or a paragraph.
- can talk about strategies used at the sentence level, e.g. 'If I think it doesn't sound right, I try again'
- is beginning to integrate prediction and substantiation

Making meaning at word level

- **has a bank of words which are recognised when encountered in different contexts, e.g. in a book, on the blackboard, in the environment or on a chart**
- **relies heavily on beginning letters and sounding-out for word identification (graphophonic strategies)**
- carefully reads text, demonstrating the understanding that meaning is vested in the words
- may point as an aid to reading, using finger, eyes or voice, especially when reading difficult text
- locates words from sources such as word banks and environmental print
- when questioned can reflect on own word identification strategies, e.g. 'I sounded it out'

Attitude

- is willing to have-a-go at reading unknown words
- enjoys listening to stories
- reads for a range of purposes, e.g. for pleasure or information
- responds sensitively to stories read
- discusses favourite books
- talks about favourite author
- selects own reading material according to interest, purpose and level of difficulty and, with teacher support, can reconstruct information gained

Year: _____ Teacher: _____ Year: _____ Teacher: _____ Year: _____ Teacher: _____ Year: _____ Teacher: _____

Year: _____ Teacher: _____ Year: _____ Teacher: _____ Year: _____ Teacher: _____ Year: _____ Teacher: _____

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BOX 13.4 CLASSROOM LINKS

USING DIRECT OBSERVATION IN THE CLASSROOM

- Direct observation is a practical way of collecting information about student behaviour in natural settings, although care needs to be taken to ensure that data collection is not haphazard, unsystematic or subjective.
- Procedures used to collect data can be quite informal, with the observer simply watching ongoing events and observing more carefully anything that attracts attention.
- When used as part of an assessment process, observation is usually more structured and purposeful, with behaviour observed more systematically.
- To use direct observation in a classroom, begin by watching some children and noting anything that seems interesting or unusual.
- To understand what is happening in the classroom, focus on individual students, on a small group of students, or on a specific aspect of classroom activity.
- Forster and Masters (1996, p. 9) suggest that 'spotlighting', or watching just a few aspects of behaviour, helps to focus on 'significant events as they relate to relevant learning outcomes'.
- Information derived from direct observation can be recorded in the form of anecdotal records, diaries, checklists, rating scales, or an A–B–C record (antecedent–behaviour–consequence; see Chapter 5).
- The recording system should be organised, easy to use and time-efficient (Forster & Masters, 1996, p. 11).

ACTIVITIES

Teachers often have difficulty in knowing how well children function in problem-solving situations. Simply asking children how they solved a problem may underestimate or overestimate how much they contributed to the solution, whereas observation can provide a large amount of detailed information. Try the following activity, adapted from Siegler (1976):

1 Set a problem-solving task such as the following from nrich.maths.org for a group of 10- to 11-year-olds:
   > Amy has a box containing ordinary domino pieces but she does not think it is a complete set. She has 24 dominoes in her box and there are 125 spots on them altogether. Which of her domino pieces are missing?
2 Have an observer rate each child on factors such as:
   > leadership
   > cooperation
   > focus on the task
   > identification of rules to solve the problem
   > originality and relevance of ideas
   > willingness to listen to others' ideas.
3 Collate the information collected on each child and summarise the main findings. Identify which aspects of each student's problem-solving skills could be improved. Suggest ways in which these changes could be achieved.

CourseMateExpress
Online resources
Go further: Find an observational activity to try on this text's website

CourseMateExpress
Online resources
Go further: Read the anecdotal record of Kim's first day at school on this text's website.

ANECDOTAL RECORDS

Anecdotal records are objective descriptions of behaviour at a particular time and place, recorded as soon as possible after the behaviour has occurred. Teachers often find it helpful to keep brief notes about any unusual or significant occurrences during the school day, sometimes in a journal or diary. Such notes can be useful in documenting the actions of a particular child whose behaviour is causing concern, as a first step in designing some form of intervention or as a basis for report writing or discussions

anecdotal record
Objective description of behaviour at a particular time and place, recorded as soon as possible after the behaviour has occurred

with parents. Anecdotal records are often used in early-childhood settings and in situations involving children who are having social, emotional or behavioural problems. They can also be helpful to primary and secondary teachers to record learning events for each individual child, and can be drawn upon in reporting to parents, and in developing overall assessment judgements. Similar records can also be kept to document parent or teacher behaviour.

CHECKLISTS

checklist
A set of descriptions of specific behaviours that an observer records as present or not present

A **checklist** comprises a list of descriptions of specific behaviours that can be systematically identified and tallied by observers as they occur ('event sampling') or during a specified period ('time sampling'). Checklists are often used by teachers to collect information about easily observed behaviours such as motor skills ('can hop on one leg for five seconds') or literacy skills ('can find a word in a dictionary'). Checklists are a simple and useful tool for recording observations of a range of behaviours with a number of students.

STUDENT WORK

Student work samples are a prolific source of assessment information and come in many forms, from classwork to formal assignments. They can be assessed individually or as a collection, such as in a portfolio (see below). Work samples can be assessed at all stages of their production. Drafts may be self- or peer-assessed, or assessed in a 'conference' with the teacher, to refine a piece of work; finished work may be assessed, commented on by the teacher, and then reworked and resubmitted for further assessment – or left as is. At each point, students' work gives teachers information about their learning progress, and can provide opportunities for further learning.

PORTFOLIOS

portfolio
A collection of samples of student work used to demonstrate achievement

A **portfolio** is a collection of samples of a student's work that can be used to assess students' progress over a term or year by comparing, after the fact, work taken from different stages throughout the given period. Portfolios are often used for self-assessment, parent–teacher conferences and parent–teacher–child conferences.

Portfolios can be built up in different ways. A teacher may say, 'Today's work is for your portfolio'. However, Brady and Kennedy (2012) suggested students be involved from the start in selecting samples of work for inclusion in their portfolio, so that the portfolio is a helpful 'assessment as learning' activity, with students working to improve their work in readiness. Building a portfolio involves the purposeful collection of work samples that reflect a prescribed curriculum standard or criterion, that show evidence of the learner being able to apply knowledge in innovative ways, and that give the learner opportunities to reflect and self-evaluate when selecting work to be included. Brady and Kennedy (2012, p. 64) cite Valencia and Place's (1994) classification of four types of portfolios:

1 the showcase portfolio containing examples of the student's best work
2 the evaluation portfolio that contains samples of marked work
3 the documentation portfolio that has examples of unmarked work
4 the process portfolio that contains examples of ongoing work with student reflection.

Portfolios have become a form of self-assessment, as students negotiate with their teachers about the contents. At the same time, portfolios have been linked to outcomes-based assessment, leading to an increase in teacher understanding of the student and opportunities for negotiation between student and teacher, coupled with enhanced opportunities for student self-assessment. The greatest risk in using the portfolio in student assessment is that it simply becomes a collection of work samples rather than a coherent representation of student achievement over time.

RATING SCALES

Rating scales are used to record the degree to which a particular skill has been achieved, or the strength of a particular trait or characteristic in terms of a particular dimension. Rating scales are similar to checklists in that they provide a method for recording the degree to which a specific behaviour or characteristic is present, but they have the added advantage of including a quantitative component in the resulting judgement. Instead of simply recording the occurrence of a specified behaviour (yes/no), a value judgement is also made about the behaviour as the record is compiled ('On a scale of 1 to 10, I would rate John's public speaking skill as 5, Mary's as 3 and Ken's as 9'). Rating scales can take a numerical form, as in the example just cited. They also can be graphic, as in the 'semantic differential' where the judgement is recorded by placing a mark on a point between two opposing descriptors (such as 'simple argument–complex argument' or 'distracted–attentive') to indicate the relative strength of that characteristic in the individual or their performance being assessed (Osgood, Suci & Tannenbaum, 1957).

rating scale
A procedure for recording the degree to which a specific behaviour or characteristic is present

TESTING

This is likely to be the mode of assessment you are most familiar with from your own schooling. It can take place before, during or after a unit of work. If set before, tests tend to be used to find out what students know and can do, and can be diagnostic in nature (diagnostic tests are discussed later in this chapter). If used during a unit, tests can give students feedback about what they still need to learn and to focus their learning goals. For example, after working through test answers, students can make judgements about their learning using a self-assessment sheet such as the one presented in Box 13.7 (see page 513). At the end of a unit, tests tend to be an *assessment of learning*, or summative in nature. This does not have to be the only function of an end-of-unit test, however: teachers can give students feedback from summative tests about how they could improve, to help them to set learning goals for the future (Glasson, 2009). Final-year exams, the NAPLAN tests in Australia or asTTle tests in New Zealand are examples of tests that are assessments of learning. Because the NAPLAN and asTTle test results give information about the kinds of questions the student answered well, and those they had difficulty with, there is also opportunity for these tests to be used to improve learning – as *assessment for learning*.



THINK ABOUT

- How could you give feedback on a summative test (perhaps a spelling, Maths, Science or History test) that would improve students' learning?

Preparing for tests can have positive benefits for student learning by engaging effective long-term memory strategies such as organisation and rehearsal of knowledge, and development of automaticity (Bennett, 2011). Return to chapters 3–6 to consider how these strategies work to improve memory and learning. Rohrer and Pashler (2010) report a number of studies demonstrating that the act of taking a test strengthens the representation of the information in memory, and slows forgetting. You can try this yourself by using the review questions at the end of the chapter to help you remember key information about assessment.

Harlen (2005, see also ARG, 2006) warned that overuse of tests, particularly 'high-stakes' tests, can have negative effects. These include demotivation and a drop in self-esteem, particularly in low-achieving students; test anxiety, particularly in girls; a focus on performance goals rather than learning goals; an extrinsic orientation towards grades as status (see Chapter 8 for a discussion of the effect of these orientations); and a tendency for teachers to teach in a transmission style, rather than using more creative and active approaches. High-stakes tests such as final-year examinations can lead to teachers 'teaching to the test' rather than to students' learning needs. Teachers can avoid these negative effects by

using varying assessment tools; by ensuring that students are encouraged to monitor their own learning using a variety of sources, not just the tests; and by giving feedback on how to improve their learning – in short, by ensuring that tests are assessments *for* learning as well as *of* learning.

CONVERSATIONS WITH STUDENTS AROUND LEARNING

Interviews

Interviews may be formal or informal, structured or unstructured. A formal or a structured interview using a defined procedure and a prepared set of questions is used in many intelligence tests where the interviewer is given precise instructions about the procedure to be followed. An informal or an unstructured interview has no set procedure or questions, and the interviewer is free to interact with the interviewee in a natural, conversational way. Piaget used an informal interview technique to collect information about the way in which children think about and solve problems (see Chapter 3). Teachers may use structured interviews such as the Schedule for Early Number Assessment (SENA) test in mathematics assessment to determine students' use of strategy, and unstructured interviews or conferences in assessment of writing, which combine an interview with feedback from the teacher. Interviews have been used successfully with children of all ages (think about Piaget's interview technique described in Chapter 3, and the insights it has given us to children's thinking). Numeracy assessment programs such as SENA also use interviews effectively with young children around activities. Interviews with students from cultural backgrounds that have different rules about adult–child verbal interaction may need to be carefully designed to take account of these cultural communication differences.

Questioning

Questions form a large part of classroom practice. Their effectiveness varies, however. Drawing on research, Glasson (2009) identifies a number of key aspects of questioning for assessment purposes:

- Be strategic. Identify key questions for your lesson. This involves planning ahead for the questions you will ask to assess students' knowledge and understanding.
- Use a mix of open-ended questions that require higher-order thinking, and closed questions which require a set answer (see the text on Bloom's taxonomy in Box 6.3, on page 226). Fit the question type to your assessment purpose, but remember that open questions give you a broader picture of students' understanding – closed questions tend to tell you about their knowledge. The type of question may vary depending on the purpose of the assessment and its place in the teaching–learning cycle. For example, the Primary Connections 5E model suggests that teachers use questions to *engage* and elicit prior knowledge, for students to *explore* the phenomenon and *explain* what is happening (in the formative assessment stages), and to *elaborate* (or make connections) and *evaluate*, reflecting on their learning journey and summarising what they know (in the summative stages) (Australian Academy of Science, 2008).
- Leave sufficient 'wait' time before requiring an answer. Most teachers wait only one to two seconds, but it may be better to wait for three to five seconds or more (Rowe, 1986). This encourages students to think about their response, rather than blurting out their first thought, and allows for greater participation – some students need longer than others to consider their answer. Wait time does not need to be silent – it can be filled by students talking with each other about the answer (as in a 'think–pair–share' strategy), or writing down an answer.
- Use prompts to encourage students to elaborate on a response, or to help the student to clarify their answer.
- Use 'wrong' or faulty answers to develop ideas and probe thinking, within a supportive classroom environment.

- Model positive listening. Allow students to see that you are interested in and listening to their answers by responding with more than a 'Good answer', 'OK' or 'Yes' (especially if it is wrong!).
- Distribute questions around the class. Ensuring that all students have opportunities to answer, to display what they know, is important. This may mean avoiding the age-old tactic of calling on those with raised hands. Another way to do this is with a ball of string that is rolled to a student as the question is asked, and is then rolled back to the teacher – or to another student – as they answer. Another is to move around the room as you ask questions, ensuring that those 'hiding up the back' are also in focus.
- Encourage students to ask questions. Their questions not only help to develop their thinking, they also provide insight into the students' understanding (Glasson, 2009).

Black and Wiliam (2012b) discussed the role of classroom dialogue in formative assessment, emphasising the importance of interactive feedback in questioning sequences. They found that teachers in their project who focused on assessment for learning designed questions and tasks to create 'teachable moments', with an aim to have students do more of the thinking in the class than the teacher. They argue that typical initiation-response-evaluation sequences, such as 'What is four times four?', '16' and 'Right, well done' may provide summative information, but they do not encourage learning, when teachers' evaluations take centre stage, rather than students' thinking. In the example just given, the student supplied an already known answer, and the teacher's response did not take the student's learning forward. Feedback is discussed further later in this chapter.

Marzano and Simms (2014) developed a questioning sequence drawing on Bloom's taxonomy, to develop higher-order thinking. They suggested that classroom questioning start with questions that activate student knowledge, then ask students to categorise that knowledge, as a way of developing some claims about the topic. The next set of questions would ask for elaborations, or justifications of claims, while the final set would ask for evidence to support their justifications. This kind of sequence uses questions for learning, but could at the same time be used as formative assessment of students' thinking and understanding at each stage of the process.

STANDARDISED ASSESSMENTS

Assessments are called 'standardised' when they are administered and scored according to a standard set of procedures. They have generally been rigorously designed and pre-tested to ensure that the test is valid and reliable. Because they are given to large numbers of students, a distribution of scores can be reported, along with an individual's score relative to other students in his or her grade. Standardised assessments may be used for diagnostic assessment purposes, for formative assessment purposes, to place students along a continuum of learning, and for summative assessment.

Increasingly in Australia and New Zealand, and in many other countries, standardised assessment of performance has been introduced to measure student achievement at particular points in schooling, in order to compare the performance of students in different countries and also to identify groups of students who may not be reaching a particular benchmark of performance. Examples are the NAPLAN tests in Australia and asTTle in New Zealand. In the Australian tests, results are reported to parents, usually along a scale, and schools receive an aggregated report of their students' results. In New Zealand, teachers can select items from a test 'battery', to develop tests that will give them information relevant to their teaching goals. Results can be reported to parents and evaluated by teachers to improve their teaching–learning programs. It is important to distinguish between standards (against which students' progress is measured and reported – discussed later in this chapter) and the *standardisation* of testing, which refers to specific types of tests.

BOX 13.5 RESEARCH LINKS

THINKING CRITICALLY ABOUT HIGH-STAKES TESTS

In Australia, the NAPLAN tests were introduced in 2008, through which all students in years 3, 5, 7 and 9 are assessed nationally in reading, writing, language conventions and numeracy. The results of these tests are published school by school on the My School website. They also form the basis of an annual report on Australian schooling (see www.nap.edu.au for the most recent of these reports). The Australian Government argues that the tests make schools accountable for student results, and bring transparency to the education system in Australia, informing parent choice about schooling. Through the testing program, individual students and schools requiring assistance can be identified so that funding can be targeted at those most in need. Schools receive detailed reports that can be used as diagnostic tools – although the lag between the time when students take the test (May) and when the reports are sent to schools and parents (October) limits the usefulness of this data. As the results of the tests are used in the media and by parents to compare schools, and by governments to determine funding of special programs in schools, they may be said to be 'high-stakes tests'. Matriculation exams may also be termed 'high stakes' as their results determine students' entry into university courses.

Polesel, Dulfer and Turnbull (2012) reviewed the literature on impacts of high-stakes testing on students and families as part of a wider research project that will investigate this in Australia. They found that although there is limited data available in Australia thus far, international studies show that such tests negatively influence the wellbeing of children, with a potential to negatively affect students' self-esteem and confidence, and lower teacher expectations. Students have also been found to experience stress, fear, pressure and anxiety from such tests. The quality of students' learning experience was also found to be affected, with narrowing of skills developed, focus by teachers on measurement and reporting rather than learning or the needs of the child, and narrowing of the curriculum. There is some evidence in the limited Australian data that exists to suggest that similar effects may be felt by students here.

Klenowski and Wyatt-Smith (2011) identified the following consequences of the Australian testing program because of the high stakes involved for schools: narrowing of the curriculum as teachers focus on the skills and knowledge assessed in the test at the expense of other skills; stress for students and their teachers; and focus in assessment on measurement rather than learning. Some results for schools have been teachers cheating on the tests, low-achieving students being asked to stay at home on the day of the test, focusing of resources on those students likely to show most change, and teachers coaching students on the test. How then to gather and report evidence of students' achievement of national standards?

New Zealand takes a different approach to the reporting of students' progress against the national standards, avoiding high-stakes testing in favour of a range of evidence drawn upon to develop an Overall Teacher Judgement (OTJ) (New Zealand Ministry of Education, 2011a). Standardised tests are used in New Zealand, but as they are combined with other forms of assessment, the score on an individual test has less impact – they do not hold such 'high stakes'.

ACTIVITIES

1 Debate the use of national assessment programs such as NAPLAN. What do they offer? What dangers do they pose?

2 How would you develop an assessment program that met both learning and reporting needs?

THINK ABOUT

- What advantages and disadvantages can you identify in each of the information-gathering techniques just discussed?
- Are there any assessment methods listed that you definitely would not use in your classroom? Why?
- Some tools of assessment focus on numerical values and scores for achievement. Are there some forms of learning you cannot measure? How do you deal with this problem in teaching?

DIAGNOSTIC ASSESSMENT

'Diagnostic' is generally understood to be a medical term, since doctors diagnose disease. Teachers, however, use **diagnostic assessment** to pinpoint exactly what a student knows and can do, and to identify any gaps or misconceptions in their knowledge in a particular area of learning. It is typically used at the beginning of, or before starting, a unit of work, to guide decisions about instruction for particular students, and may also be used when a student is identified as experiencing difficulty. The SENA test used to gauge students' strategy use in early mathematics is an example of a diagnostic test. Teachers using diagnostic assessment are not just attempting to find out what the students can or cannot do, but why they make particular mistakes. Diagnostic assessment is particularly useful in literacy and numeracy instruction for pinpointing areas of student difficulty (see Box 13.6).

diagnostic assessment Assessment to determine what a student knows and can do, and why a student might be making particular errors

Tests used for diagnostic purposes cover a narrow range of skills and sample these skills in some depth. They often take the form of mastery tests, focusing on the degree to which specific learning outcomes have been achieved or 'mastered'. Understanding the cause of student difficulties is an important first step in helping students overcome them. Mastery tests can also indicate the need for tests of hearing, vision and general health, or alert teachers to problem behaviour and related social- and family-background factors (see Chapters 10 and 11).

CONSIDERING THE ROLE OF STUDENTS IN ASSESSMENT

Students, the learners, are at the centre of what happens in classrooms: the learning–teaching process. Quite separate from their abilities, students' attitudes and behaviours will influence the outcome of any assessment. It is therefore vital to consider and involve students in the assessment process by:

- *informing students.* Students should be informed of when we plan to assess them, as well as how and on what aspects of performance they will be assessed. Teachers should likewise share the results of any assessment with their students
- *motivating and engaging students.* Consider design of assessment tasks to engage students. The role of motivation and engagement in learning is discussed in detail in Chapter 8
- *involving students.* Involving students in designing assessments can help them to set and monitor learning goals. Students can also be involved in assessing their own and their peers' work.



Source: Susan Chiang/iStockphoto

FIGURE 13.4 Involving students in the assessment process through self- and peer assessment can contribute to engagement, learning and achievement.

Self-assessment and peer assessment

Encouraging students to assess their own work is a good way of increasing their motivation and of helping them to gain insight into their own learning. Assessing peers' work can help students to clarify what is expected in a task. It also can extend students' learning and develop reflection and self-regulation skills (Earl, 2013).

A review of self-assessment and peer assessment in secondary schools found that these forms of assessment positively affect students' achievement, self-esteem and engagement with learning. Impacts were most positive when teachers were able to discuss learning with students, give effective feedback, and adjust their teaching in response to student feedback (Sebba et al., 2008).

CourseMateExpress
Online resources
Go further: Try an example of self-assessment on this text's website.

Black and Wiliam (2012a) argued that student self-assessment is essential to the formative assessment process. For teachers, student self-assessment is useful because it provides an additional source of information to supplement more conventional assessment information for instruction planning, and

BOX 13.6 CASE STUDY

DIAGNOSING A YEAR 2 STUDENT'S READING PROBLEM

Max was in his third year at school (Year 2) and his mother was worried about his progress in reading. At school, Max was in one of the higher reading groups and his teacher saw no problems, but although an avid listener, Max refused to read on his own at home. Max's father had a history of reading difficulties and this heightened Max's mother's concern about his progress in reading. The teacher thought that the books provided at home did not interest Max, and that his mother should look for reading material that did interest him. Max was able to read all the books in the Year 2 series reading program. Perhaps the mother was overanxious.

The teacher talked to a reading consultant who advised using a diagnostic strategy to assess Max's reading. She suggested that the teacher select a graded Year 2 passage that had no illustrations and that Max had not previously seen. She should then ask Max to read the text, telling him that he would be asked questions about it when he had finished. If he could answer about 75 per cent of the questions correctly, then the suggestion that the books at home did not interest him would be validated. However, if he had problems answering the questions, it was possible that he had a comprehension problem, a fluency problem, a word-recognition problem or a combination of all three.

To eliminate the possibility of a comprehension problem, the teacher read a passage to Max and asked him some questions about it. The boy had no difficulty in answering the questions, though he had earlier refused to read the passage himself and answer queries. Apparently, listening comprehension was not a problem. Next, the teacher timed Max while he read a grade-appropriate passage. His fluency was 30 words per minute (60–90 wpm was accepted as appropriate for early Year 2 students). Poor fluency can result from the inaccurate decoding of words, lack of speed or difficulties in word recognition.

Max's difficulty in word recognition was finally pinpointed when the teacher gave him an appropriate unseen passage to read. This showed that he had difficulty fully sounding out long or unfamiliar content words, though he could easily read common function words. Through repeated readings and contextual assistance, Max had learned to distinguish a number of words based on strategies such as recognition of the first and last letters, but this strategy failed when he encountered novel words in an unfamiliar passage. The teacher confirmed this diagnosis when she presented Max with more complex, less familiar words taken from class readers. Without the help of cues such as context, position in text and illustrations, Max made many errors. It was concluded that Max was still at a partial alphabetic phase in his development of reading skills. His high intelligence, verbal skills and ability to remember whole words without knowing how the graphemes represented individual phonemes had allowed him to progress to Year 2 without his problem being identified.

Max's teacher now needed to use a word-attack skills test to identify his specific difficulties in letter/sound translation, and to then implement a program involving explicit instructions in the letter/sound correspondences that he had failed to learn. These sound/symbol combinations would be practised in connected text. A writing program could also be introduced to help Max begin to attempt to invent the spelling of unfamiliar words. This would provide an opportunity for him to analyse words in order to spell them. It also gave the teacher an opportunity to help him understand that each word could be identified through a unique sequence of letters that distinguished it from other words with similar spelling.

Source: Adapted from Center (2005, pp. 230–4). Used by permission.

ACTIVITIES

1 Identify the sequence of steps Max's teacher followed to diagnose his reading problem.
2 What intervention might Max's teacher introduce to help the boy overcome his problem?
3 Are you familiar with a student who is experiencing difficulty in a specific subject area? Plan a set of steps that can be used to diagnose the exact nature of the problems the student is experiencing.
4 Once you have pinpointed the precise nature of the problem, what will be your next step?

provides an insight into individual students' learning styles. Self-assessment enables students to become aware of their own strengths, weaknesses and needs, allows them to take an active part in the assessment process, builds metacognitive and self-regulation skills, and contributes to improving self-esteem and realistic notions about self-worth. It requires thinking skills to be taught, clear goals and success criteria for assessment, and self-efficacy beliefs (see Chapter 8) (Earl, 2013). Participation in building up a portfolio is a form of self-assessment. This and examples of other forms of self-assessment are presented in Box 13.7.

STRENGTHS AND LIMITATIONS OF DIFFERENT ASSESSMENT TOOLS

Traditionally, assessment in schools was concerned with giving teachers, students and parents quantitative or norm-referenced information about a given student's performance in particular aspects of the curriculum during the school year. This resulted in the use of assessment strategies that provided a grade or score, as students (and more particularly parents) usually understood this type of information most easily. Interest in more qualitative forms of assessment led to the use of alternative methods for gathering information about student learning, focusing directly on classroom activities and involving observation of a student at work in class, collection of work samples, demonstrations of skill mastery, informal records, checklists, rating scales, interviews and self-assessment.

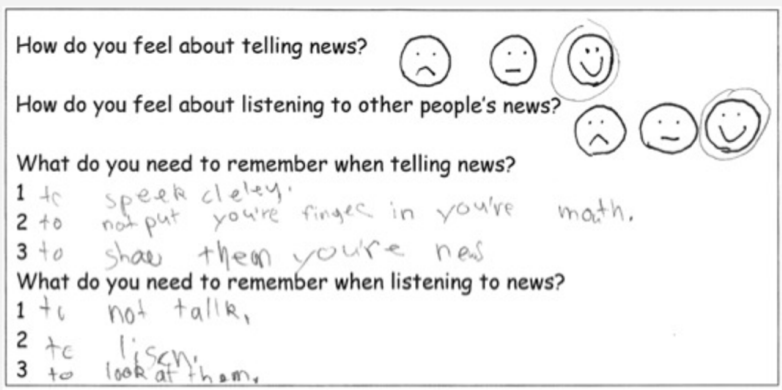
The strength of these alternative approaches to assessment lies in their increased validity, in that the process of assessment is more closely tied to the real-life performance of the task or skill being assessed (NSW Department of Education and Training, 2005). Such assessment is directly linked to learning outcomes identified in the syllabus, providing information about student achievement that informs current teaching programs and contributes to the diagnosis of both student strengths and student weaknesses. Teachers can use varied assessment strategies to give students opportunities to demonstrate their learning in different contexts. Alternative assessment strategies are fair, providing all students with opportunities to succeed based on current syllabus outcomes, and students are engaged



BOX 13.7 CLASSROOM LINKS

SELF-ASSESSMENT

Self-assessment (and peer assessment) by students is an important component of an *outcomes approach* to learning. It ensures that students are aware of instruction goals and that they learn to monitor their own progress towards achieving these goals. Examples of self-assessment formats are listed here.



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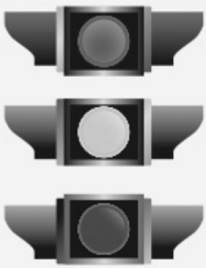

Got it! I found this easy.

I'm on my way but would like you to check that I got it.

I found this hard and would like some help.

Study strategies	I use these	I'm working on these	I don't use these...	...because...
Study timetable or schedule			✓	I just do what I feel like
To do list		✓		
Using test or assignment feedback to work out what I need to learn		✓		
Nightly revision of what was covered that day in class		✓		
Practice examples	✓			
Working with a partner to test our knowledge and teach each other	✓			
Drawing concept maps or mind maps		✓		
Thinking aloud	✓			
Flashcards			✓	I dont learn vocab anymore (italian)
Highlighting or underlining notes and key sections in textbooks	✓			
Writing summaries	✓			
Listing key points	✓			
Taking notes from the textbook	✓			
A reading system like SQ3R (Survey, Question, Read, Recite, Review)			✓	I have never heard of it before

ACTIVITIES

1 The sample self-assessment sheet about telling news above is designed for use in primary school settings. Design a similar self-assessment form that can be used with students in the lower secondary level in a curriculum area of your choice.
2 Have you ever been required to use a self-assessment instrument in a learning context? If so, how effective was it for you? Try the self-assessment task on the CourseMate website. Do you think tasks like this would help you in your learning?
3 As a teacher, would you include student self-assessment in your own teaching program?
4 As a parent, how would you view the value of this procedure?

in the assessment process by actively monitoring their achievement and progress. Through careful planning, teachers can ensure that they have the time and skill required to design and implement such procedures. In addition, it needs to be acknowledged that there is variability in the level of reliability attained from assessments that are based on procedures such as student-performance observation and review of work samples. Such variability needs to be compensated for by using information from multiple rather than single sources.

Issues that might affect educators' decisions regarding modes of assessment are set out in Box 13.8.

Assessment involves teachers making choices between assessment types and tools, as well as the timing of assessment, which all relate to the purposes the teacher has for a particular assessment event.



BOX 13.8 IMPLICATIONS FOR EDUCATORS

DECIDING ON ASSESSMENT TOOLS

When deciding on a mode of assessment, teachers need to consider the following:

- The tool should be appropriate for a particular teaching program.
- A range of assessment practices should be used.
- Information should be gathered from a variety of sources, ranging from formal examinations to direct observation of students engaged in an activity.
- The tools of assessment to be used in a unit of instruction should be pre-planned.
- Any resources required for specific assessment procedures should be prepared beforehand.
- Teachers should endeavour to develop the competencies required to document and interpret assessment results.

CourseMateExpress

Online resources
Take a moment to consider your philosophy of learning and teaching. You may wish to use the **Develop your philosophy** tool on the textbook's CourseMate website.

ENSURING QUALITY IN ASSESSMENT

In a classroom situation, teachers need to ensure that the procedures they use are reliable, valid and fair (Brady & Kennedy, 2012). This section discusses the concepts of 'reliability' and 'validity', and how these apply to assessment methods and procedures. Teachers also need to ensure that the students are aware of the criteria against which they are being assessed, and the standard of work that is expected.

RELIABILITY

Those who use test results need to know that such results are not the product of chance. **Reliability** is concerned with the dependability of assessment results. If an assessment is repeated, either by giving a test a second time or by re-marking test protocols, the assessment procedure's reliability is demonstrated if the same results are obtained on both occasions.

reliability
The extent to which a test or measurement device obtains the same result when used on successive occasions

Furthermore, for a test or assessment method to be considered reliable, it needs to yield the same results not only if given on separate occasions (also known as 'test-retest reliability'), but also if different people mark or score it ('scorer reliability'); that is, if the same piece of work is given to two independent markers, they should produce much the same result – they should both give an 'A' to the same essay, for instance. Multiple-choice tests, which measure single skills or content identified from a specific program of instruction, are an objective form of assessment that should be 100 per cent reliable because correct answers are invariable and are identified at the time the test is constructed, with items being 'framed' to allow students to select the best option from an array of alternatives. However, forms of assessment that require more subjective judgements (such as essays or portfolios) tend to be affected by examiner judgement, so marks can vary widely. A reliable system for marking an essay or portfolio therefore requires two independent markers, with neither marker being aware of the grade given by the other. The two marks are then averaged to achieve an improved level of scorer reliability.

A single test or assessment task can never measure every aspect of a skill, domain or theoretical construct unless the scope of that skill, domain or construct is very restricted. This means that results from separate tests that measure different aspects or elements of the same skill, domain or construct need to be comparable for such tests to be considered reliable measures. In the same way, results of tests that are purported to be of comparable difficulty – whether or not they measure content from the same or different areas – should also be comparable for the tests to be considered reliable measures of that degree of difficulty.

Chance factors can affect test results and compromise the reliability of a test or assessment method. Such factors include those associated with:

- *the student* – fatigue, boredom, lack of motivation and carelessness
- *characteristics of the test* – ambiguous items, trick questions, poorly worded directions and unfamiliar formats
- *conditions of test-taking and marking* – poor examination conditions, excessive heat or cold, carelessness in marking, disregard or lack of clear standards for scoring, and computational errors.

VALIDITY

validity
The extent to which a test or measurement device measures what it purports to measure

face validity
The degree to which a test appears to measure what it is intended to measure

content validity
A measure of the link between a test and relevant curriculum objectives

construct validity
A measure of the link between a test and underlying knowledge, attitudes and skills

consequential validity
Intended and unintended consequences of assessment interpretation and use

A second technical aspect of assessment concerns the notion of **validity**, or truthfulness. A test or assessment procedure's validity relates to its purpose: Does the test or procedure measure what it is designed to measure? If assessment is to give information to teachers and students about what students have learnt, it needs to align with the purposes (the planned outcomes) of that learning, and with the learning and teaching activities the students have experienced. This is an aspect of fairness. (If you haven't been taught about calculus, it would be unfair to have it included in a test of your learning.)

Several kinds of validity are desirable in any test or assessment. **Face validity** is achieved if a test *appears* to measure what it is intended to measure. A test is said to have **content validity** if it can be demonstrably linked to relevant curriculum objectives. **Construct validity** is demonstrated if a test measures the knowledge, attitudes and skills (the 'constructs') that underlie the curriculum objectives.

A valid assessment allows students to demonstrate broad understanding of the curriculum area being assessed, rather than simply recording their performance on a specific set of tasks. In addition, Messick (1995) argued that assessments that are valid may have unintended consequences as well as the ones they were designed for, and can have social consequences – a form of validity known as **consequential validity**. He argued that validity goes beyond the test itself, to the interpretations made of the results. Some of the concerns about the effects of high-stakes testing (see Box 13.5 on page 510) are about consequential validity. It may involve the interpretations people make from assessment results (such as ranking schools on the basis of their results).

Validity is a crucial aspect of assessment. In practical terms, if you give a test of number facts, is it only students' knowledge of number facts that influences their performance on the test, or are other factors involved? For example, do the questions require literacy skills for students to understand what is being asked? If so, then the test results may measure literacy rather than being a valid test of number skills.

Test bias

test bias
Where particular groups are disadvantaged by factors associated with a test's content and the interpretation of results

When judging an assessment procedure's validity, attention needs to be given to its fairness, or lack of 'test bias'. **Test bias** occurs when an unfair advantage is given to some students. This might occur when the knowledge or skills required to do well on a test are likely to be found more in particular groups of test-takers (such as boys, children living in urban areas, or children who come from a particular religious background) than in other groups. Lack of bias is established in a test if it can be shown that neither the test content nor the interpretation of its results disadvantages specific groups of students. For example, students who have reading problems will be at a disadvantage in text-based assessments, but not in assessments where no reading is required.

CULTURE-SENSITIVE AND CULTURE-FAIR TESTS

In developing the first intelligence test, Binet and Simon created items that tapped the practical knowledge of children living in Paris at the end of the 19th century (see Chapter 9). The test was later adapted for

use in the USA. Subsequent use of the Stanford–Binet Intelligence Scale and similar tests of intelligence with children from other cultural backgrounds (for example, the children of immigrants who moved to the USA at the beginning of the 20th century) highlighted the inappropriateness of many of the test items for some children. Apart from language differences, the immigrant children often lacked knowledge about objects familiar to American children, such as postage stamps, telephones, pianos or mirrors (Anastasi, 1976). For these children, intelligence tests such as the Stanford–Binet were neither **culture-sensitive** nor **culture-fair tests**. Children from socially disadvantaged or minority-group backgrounds may also experience difficulties with tests that include items requiring unfamiliar, culturally based knowledge.



Source: Monkey Business Images/Shutterstock

FIGURE 13.5 In order for assessments to be valid, they must be culturally sensitive. This may involve varying assessment strategies for different students in a class.

Mahuika, Berryman and Bishop (2011) argued that culturally responsive assessment must form part of a culturally responsive pedagogy. They cautioned that Māori learners (and, we would add, learners from any other cultural group) are not all the same in culture or learning needs, so cultural sensitivity in assessment will come down to knowing your students, and adapting assessments accordingly, in order to gather meaningful information about where they are in their learning. Cultural sensitivity impacts upon both reliability and validity of assessment. Some assessment strategies that Mahuika and colleagues identified from research as effective for Māori students included formative assessment, particularly when it involved quality academic feedback, and the use of interviews, portfolios and student journals rather than written tests.

culture-sensitive or culture-fair test
A test that does not require culturally based knowledge

It is important to note that each technical aspect of a test or assessment procedure – such as reliability, validity, test bias and cultural bias – needs to be evaluated separately because, for example, a test can be highly reliable but lack validity. The implications for educators that may arise from technical issues in the different modes of assessment are summarised in Box 13.9.



THINK ABOUT

- How will you check to make sure assessment methods are reliable, valid and fair in your classroom?



BOX 13.9 IMPLICATIONS FOR EDUCATORS

TECHNICAL ISSUES IN ASSESSMENT

In using different modes of assessment to monitor student learning, teachers need to be aware of issues associated with reliability and validity:

- Attention needs to be paid to the reliability of an assessment procedure, with provision made to improve reliability if it is judged unacceptable.
- The reliability of an assessment can include factors associated with the examinee, characteristics of the assessment procedure, and the conditions under which the assessment is administered and marked.
- An assessment procedure can be judged to have validity if the consequences of its use are as expected.
- Indications of validity in a test include the absence of test bias and content that is culture-sensitive.

EVALUATION OF ASSESSMENT DATA

Assessment and evaluation are inseparable. When teachers gather information about students' achievements (assess), they also make judgements (evaluate) about what the information tells them about students' learning, and their own teaching. Assessment is not just a matter of collecting evidence of learning, but will also involve interpreting that evidence, and using it to adapt instruction (Bennett, 2011). For example, if a student makes an error in an assessment task, the teacher needs to ask how they got to that point, and why they answered as they did. The teacher will make a hypothesis to interpret the evidence they have collected. Both the quality of the evidence collected and the skill in forming hypotheses are important to assessment quality.

Quality assessment, therefore, must involve making quality judgements about the information gathered. It involves three key elements: alignment, or ensuring that judgements relate to what was intended for the learning; consistency of judgement; and transparency of judgement. These correlate with the elements of quality assessment discussed above – validity, reliability and fairness.

So first, ***judgements must be aligned*** with the aims of learning and assessment.

ALIGNMENT AND THE USE OF STANDARDS

Assessment, learning goals and what is taught (curriculum) need to be aligned to ensure validity and fairness. One approach to this is in curriculum planning, to start with the standards in order to develop clear learning goals. Teachers next spell out what this learning will look like and determine how they will assess whether students have reached the goals. Finally, they plan teaching and learning activities to support students to develop the knowledge and skills needed for the assessment. This is sometimes called 'backwards mapping' or 'backward design' because planning starts rather than ends with assessment (McTighe, 2010). Wyatt-Smith and Bridges (2007) described this approach to alignment undertaken by teachers in Victoria.

Judgements of assessment performance must also be aligned with the standards, which both ensures validity of judgements, and provides opportunities for learning conversations with students around quality of work, and progress (Klenowski & Wyatt-Smith, 2014). Publication of exemplars of student work demonstrating the standards assists teachers to align their judgements with the standards, and for judgement to be consistent across many teachers, which is the next concern.

CONSISTENCY THROUGH MODERATION

criteria
The particular indicators that are being assessed to indicate knowledge or understanding

standards
Detailed descriptions of student achievement used to measure progress within a set of sequentially ordered learning outcomes

moderation
The process of teachers comparing and discussing judgements with each other in order to improve consistency of judgement

For reliability of evaluation to exist, there must be a ***consistency of judgement***. For example, two teachers are evaluating their students' work. One gives everyone top marks because she judges that they all 'are striving to do their best, and have done a great job'. The other, however, gives considerably lower marks because she judges that although some have met her expectation for the task, others are still working towards it, and a few have done an outstanding job, beyond what she had expected for the class. The two teachers are using different **criteria** and different **standards** to judge the work. This can lead to confusion for the students and their parents, as they in turn try to evaluate how well the students are progressing with their learning at school. One approach taken by education departments in Australia and New Zealand to improving the consistency of evaluation across different teachers has been to publish exemplars, or samples of students' work for each of the standards. Teachers are encouraged to discuss the samples and standards together to help develop consistent use of the standards for evaluating student work. New Zealand schools moderate OTJs of student progress, with a team of teachers independently judging the range of evidence for a particular student, and then discussing any differences to reach an agreed decision (New Zealand Ministry of Education, 2011a). **Moderation** ensures consistency across teachers, schools, states and time. This moderation of teacher judgement is important in ensuring reliability of

assessment. It can also contribute to teachers' practice – as they develop stronger understandings of the standards and what progression through them looks like, they can guide students' progress more effectively (Klenowski & Wyatt-Smith, 2014).

On the CourseMate website, you can try this yourself. Look at the work sample and determine what level it represents, then compare your judgement with that of a peer.

CourseMateExpress
Online resources
Go further: Use standards to judge students' work on this text's website.

USING RUBRICS TO PROVIDE TRANSPARENCY

Third, there must be *transparency of judgement*. Students should be informed about the purpose, criteria and standards by which they are to be assessed. Informing students about the purpose of assessment allows them to determine the importance of the test for them. The criteria refer to the particular skills and knowledge the teacher is looking for in assessing a performance or piece of work. The standards indicate how well the students have achieved those criteria. One way to do this is with a rubric, an example of which is given below in Table 13.1.

When provided with a **rubric** for a task, students know what they have to achieve, and how well they have to achieve it to gain a particular mark or grade. Rubrics are also useful for feedback purposes: students can see how well they performed and what they need to do to improve.

rubric
A tool for marking and giving feedback about student work against particular criteria and standards

INTERPRETING ASSESSMENT INFORMATION

How should assessment information be interpreted? Traditionally, test results have been interpreted by comparing them with the average performance of other students on the same test, with results reported

TABLE 13.1 Rubric for a narrative writing task

	STANDARDS				
	Limited – please come and see me for some help	Satisfactory – keep working on it!	Good – you have done just what was asked	Excellent – your narrative is even better than expected at this stage	Outstanding – you are working well above expectations!
CRITERIA					
Accuracy of spelling and grammar	Major spelling and grammatical errors. Difficult to read	Some spelling and grammatical errors. Meaning can be followed	Few errors in spelling and/or grammar. Easy to read	Minor errors in spelling or grammar. Easy to read	No errors in spelling or grammar. Pleasant to read
Appropriate use of the narrative genre structure	Does not tell a story	May be missing an orientation, complication or resolution	Has an orientation, complication and resolution	Has an orientation, complication, resolution and coda	Orientation, complication, resolution and coda are engaging
Appropriate use of the narrative genre language features	Words in the story do not connect. Characters or places in the story are not described; no indication of sequence; no indication of what characters are saying, thinking or feeling	Uses simple noun and verb groups; time or causal connectives may be missing	Uses word chains, action verbs, past tense and noun groups to describe the character or setting; time connectiveness to sequence of events; indicates what characters are saying and thinking or feeling	Uses word chains, complex verb groups effectively; uses adjectives and adverbs to add interest to noun and verb groups; beginning to experiment with the genre (for example, organising the time sequence differently) and complex sentences	Successfully manipulates the standard features of the genre narrative to introduce interest (for example, use of present tense to indicate the events are in a dream)

in the form of a grade (such as 'A', 'B' and 'C'). This procedure 'places' each student in relation to other students ('norm-referenced' assessment). However, the shift from using traditional summative forms of assessment to using formative and diagnostic assessment procedures has given rise to alternative approaches to test-result interpretation. For example, comparison with a predetermined standard or criterion (referred to as 'criterion-referenced' assessment) is used, as is comparison with a curriculum (known as 'curriculum-based' assessment). Alternatively, test results are sometimes compared with the student's own previous performance ('ipsative' assessment).

Norm-referenced assessment

norm-referenced assessment
Used to compare the performance of individuals or groups with the performance of a comparable group on the same task

norm
The mean or average performance of a group of people

If teachers need to collect information about their students' progress in relation to others' in the class, the school or region, they use 'norm-referenced' (or 'normative') assessment procedures. **Norm-referenced assessment** occurs when one student's score on a test is compared with the average score gained on the test by students of similar age and learning background. In this situation, the mean (or average score) of students who have taken the test provides a standard of performance, or **norm**, against which the scores of individual students on the same test can be compared. Teachers use information from norm-referenced tests to find out if a student has done better than other comparable students and is thus above the norm, or if the student has done worse than other students and is thus below the norm. Norms can be based on student scores drawn from a class, a school, a school district or a wider area.

Most tests of achievement used in classrooms are prepared by teachers and are norm-referenced, with norms based on the scores of the whole class. However, norm-referenced tests can also be designed for use with larger groups, with norms based on the scores of a large group of students who are similar to those taking the test, such as Queensland students aged around 14 years who have studied biology for a year. Many of the norm-referenced tests used in schools in Australia and New Zealand were developed by specialist psychometricians (psychology-test designers) and are published by agencies such as the Australian Council for Educational Research (ACER) and the New Zealand Council for Educational Research (NZCER). These tests are sometimes described as **standardised tests** because they have been designed according to strict rules, must be administered under uniform conditions as specified in the test manual, and have standard procedures for scoring and interpreting results and comparing these with the test norms. The main feature of norm-referenced assessment, whether the tests are standardised or not, is that they provide information about individual students' level of achievement when compared with students of similar age and educational background in a specific area of learning. Graham et al. (2010) warned that norm-referenced assessments are not appropriate for Māori, Pasifika or many Indigenous Australian students, as they emphasise competitive goals (doing better than the next person) which clashes with collectivist beliefs. Chapter 11 (see page 408) explores individualism, collectivism and education in more detail.

standardised test
A test designed in accordance with set rules, administered under uniform conditions, and scored and interpreted in terms of identified norms

Criterion-referenced assessment

criterion-referenced assessment
Where achievement is compared against a specified criterion or standard

If a teacher's main interest is to pinpoint how well students have mastered a particular skill, the most appropriate form of assessment may be **criterion-referenced assessment**.

The growing democratisation of education in Western societies culminated, in the final decades of the 20th century, in increasing pressure on schools to provide appropriate education programs for all students regardless of their social, religious or ethnic background, and regardless of disability. One outcome of this change was that educators' focus shifted from normative evaluation of student achievement by means of peer comparison to evaluation based on an identified standard or according to prescribed curriculum goals or outcomes. Norm-referenced tests have been gradually supplemented or replaced with *criterion-referenced tests* that compare individual performance on a set of test items with a specified or predetermined level of performance that is typical of students who are competent

on these items (Piper, 1997; Ward & Murray-Ward, 1999). Performance levels are usually organised sequentially in terms of a developmental hierarchy, with student progress measured in terms of achieving progressively higher levels in the sequence. Regardless of class or grade level, students are working towards the achievement of outcomes that are located sequentially along a learning continuum. This has been described as an **outcomes approach** to assessment, with student achievement measured against a set of standards (NSW Department of Education and Training, 2005).

outcomes approach
Students work towards the achievement of outcomes located sequentially along a learning continuum

The advantage of using criterion-referenced assessment is that the standards used remain constant over time and place. This can be contrasted with norm-referenced assessment, where norms can vary depending on the achievement level of the group of students on which the norms are based.

Curriculum-based assessment

Traditionally, classroom assessment has had the purpose of discovering how well students have learned what they have been taught. In order to do this, assessment will be based on curriculum objectives and content. Masters (2013) (see Box 13.1 on page 497) identified a shift in thinking about the purpose of assessment, towards assessment for learning, occurring throughout the teaching learning cycle, as an integral part of the curriculum. In this conception, assessment would always be curriculum-centred. (As we saw in Box 13.1, Masters went further, arguing that assessment should go beyond curriculum to the learning domain, seeking to understand where learners are in their long-term learning journey within that domain.) Assessments derived from the curriculum and carried out as part of the teaching process give vital information about what students have learned and how effective teaching has been. They can also combine teaching and assessment, with students learning through working on and receiving feedback on assessment tasks. Such **curriculum-based assessments** can be used to diagnose students' strengths and weaknesses, and to plan future teaching programs. This type of assessment is usually carried out by a classroom teacher for the purposes of:

curriculum-based assessment
Assessment that compares individual students' performance with curriculum goals

- obtaining information about the level of students' entry skills, so as to decide where to place them within the curriculum
- defining and planning appropriate teaching objectives
- determining the degree to which these objectives are met by monitoring students' progress through an instructional sequence
- developing students' skills and knowledge towards the learning objectives
- evaluating and refining teaching techniques.

profile
An ordered sequence or continuum of learning descriptors that can be used to chart progress

The type of assessment used by teachers in curriculum-based assessment varies widely. It can include a weekly spelling test of 20 words compiled by the class teacher, or a checklist of gross motor skills for kindergarten children (for example, 'Hop in a straight line', 'Ascend and descend stairs using alternate feet', or 'Kick a ball'). It often involves task analysis of a curriculum area and the preparation of a scope-and-sequence chart. The Curriculum Bands and associated learning areas (Curriculum Scope) and outcomes (Standards) in the SACSA Framework, Literacy and Numeracy Frameworks K-10 (NSW DEC) and Western Australian First Steps Developmental Continua are examples of this process. Curriculum **profiles** such as these provide teachers with an ordered sequence or continuum of descriptors of learning outcomes that they can use to chart students' progress. Data derived from profiles provide information about what students need to know and the logical order of this material.



Source: MBI/Alamy

FIGURE 13.6 Curriculum-based assessments can help both students and teachers to focus on students' progress towards curriculum goals. What will be important for these students to know about the task, themselves and the assessment process?

The main advantages of curriculum-based assessment are that it provides for:

- direct monitoring of the content being taught
- precise feedback about the effectiveness of teaching
- frequent modification of teaching strategies in response to student performance
- a sensitive measure of change
- the possibility of repeated administrations, which can yield more information than could be generalised from a single administration.

Ipsative assessment

If the interest is in how much progress an individual student has made, then 'ipsative assessment' is used. Employed most often to assess performance skills outside a school setting (for example, in sports such as swimming or skiing), **ipsative assessment** can also be used in educational contexts, where it involves an individual's performance in a particular aspect of learning being compared with that person's previous performance. When people talk about their 'personal best' or their 'best performance', they are referring to ipsative assessment. This type of assessment is concerned with an individual's own performance and whether this has improved or deteriorated over time.

ipsative assessment
Assessment that compares an individual's current achievement with a previous achievement

The procedures used to collect the information required for ipsative assessment can include formal paper-and-pencil tests, or informal methods such as direct observation, checklists and rating scales, interviews, and appraisal of work samples (written, performed or created). Information derived from such sources can be used to compile profiles of student achievement, as part of both ongoing and final assessment.



THINK ABOUT

- In what ways will knowing the difference between norm-referenced, criterion-referenced, curriculum-based and ipsative forms of assessment help make you a better teacher?
- What connections do you see between effective assessment and student motivation (see Chapter 8) and self-esteem (see Chapter 4)?

STRENGTHS AND LIMITATIONS OF NORM-REFERENCED, CRITERION-REFERENCED, CURRICULUM-BASED AND IPSATIVE ASSESSMENT PROCEDURES

Traditionally, assessment data have been interpreted by means of norm-referenced assessment, a method that is useful for describing individual or group performance relative to that of other, similar individuals or groups. Norm-referenced assessment is generally understood in the community and is widely used by teachers in classroom practice; however, it has the disadvantage that it does not always provide information about what individuals have learned or what they can and cannot do. The overall level of ability of different groups can also vary widely, meaning that a student's performance on a norm-referenced test may be considered outstanding if comparison is made with a low-ability group, or poor if comparison is made with a high-ability group. Tests that combine norm-referenced and criterion-referenced characteristics, such as NAPLAN, overcome some of these weaknesses.

Interpreting data in criterion-referenced assessment has the advantage of focusing attention on individual students' performance. Those who fail to demonstrate 'mastery' of a specified level of performance can readily be identified and provided with further opportunities for learning. However, a risk with criterion-referenced assessment is that developing a coherently ordered set of tasks to represent the achievement sequence for proficiency in a particular area, or in line with a curriculum, can be a difficult task, requiring skills that may be outside an individual teacher's competency. Widespread

implementation of criterion-referenced assessment depends on the availability of such sequenced materials in relevant curriculum areas.

The strength of curriculum-based assessment is its concern with the **direct assessment** of student performance on a set of identified, sequentially ordered objectives that are derived from the curriculum. Assessment occurs frequently and takes place in the classroom as part of daily instruction. Assessment tasks given to each student are derived from the point in the instructional sequence at which the student is currently working, meaning each assessment is tied directly to the student's current learning goals. Information derived from such assessments helps teachers identify exactly what a given student can and cannot do, and teaching can then be tailored to the student's current needs. Curriculum-based assessment is particularly useful for students who are at risk of experiencing problems in some aspect of learning. A limitation of curriculum-based assessment is that it can be time-consuming in terms of collecting assessment data (students can be involved in this task), recording and interpreting the data, and planning specific teaching objectives to ensure student progress.

direct assessment Criterion-referenced or mastery tests that assess specific content from a clearly defined curriculum

Ipsative assessment is useful for helping students to become motivated and independent learners. Strategies such as setting personal goals, deciding what needs to be done and monitoring personal progress have been shown to have a positive impact on achievement levels. Students learn to use their own frame of reference in assessment. The process of ipsative assessment is concerned not with common goals shared by other students, but with personal goals and with students 'learning to learn' (Griffin & Nix, 1991, p. 94).

REPORTING THE RESULTS OF ASSESSMENT

Assessment is undertaken for a specific purpose, and that purpose guides decisions about when and how to assess. In the same way, the reporting of assessment results is guided by particular purposes, and by the intended audience.

Who might need information from assessment results? At the most immediate level, such information will be of interest to those involved directly: students and their parents. Tests that provide information for these groups are part of the teaching process. The types of assessments used are usually informal rather than formal, and formative rather than summative in nature. Feedback, particularly for students, is often immediate and given to the student personally. Others who may have an interest – particularly in the results of more formal assessments – include school administrators, potential employers and, in some cases, politicians. These groups require information from tests for administrative purposes such as determining eligibility for a special program, in job selection and in government policy formulation. The reporting of this type of test information tends to be impersonal and by means of official documents and publications, with interested groups often remote from the assessment process. Table 13.2 shows who assessment stakeholders might be and what information they might require.

REPORTING TO STUDENTS

What is the first thing you look at, as a student, when you collect an assignment? For most students it is the mark or grade. This indicates how well you did in the task. After that, what do you look at? If the assignment is a piece of written work, you will look for comments. If the grade is good, you will probably get few comments, but if it is poor, there are likely to be more comments; that is, feedback is usually given on perceived strengths and weaknesses, as seen by the marker, who pays greater attention to weaknesses than to strengths. The marker's aim is to have an impact on the student's next piece of work. This is most likely to occur if the feedback is given to students so that it:

- clearly sets out planned instructional outcomes
- identifies student strengths (what has been done well) and weaknesses (what they need to work on)

TABLE 13.2 Stakeholders and their information needs

STAKEHOLDERS	INFORMATION NEEDS	ASSESSMENT AND REPORTING METHODS
Students	Feedback from teachers	Informal, personal, immediate, formative, instructional
Parents	Feedback on performance of their child	
Teachers	Feedback on teaching and student performance; diagnosis of student strengths and weaknesses	
Psychologists	Information on student strengths and weaknesses for programming, placement, advising and counselling purposes	
School administrators	Information for screening, eligibility, certification and annual reporting to parents and the community	
Employers	Information about skills and personal characteristics	
Government	Information about standards and for determining funding priorities	Formal, impersonal, remote, summative, administrative
Community	General information on operation of schools	

Source: Adapted from Griffin and Nix (1991, p. 35).



Source: © Jim Wileman/Alamy

FIGURE 13.7 Compared with other strategies, feedback has one of the strongest effects on student achievement. Effective feedback answers the questions: 'Where am I going?', 'How am I going?' and 'Where to next?'

- gives full feedback on specific errors and poor strategies, with suggestions for how to improve
- contributes to student motivation (Black & Wiliam, 1998; Linn & Gronlund, 1995, p. 334).

In a large meta-analysis of thousands of studies of interventions in teaching and learning, Hattie (2005, 2009) found that feedback had one of the strongest effects on student achievement (see Table 1.2 on page 12). The form of the feedback makes a difference: Black and Wiliam (1998) found that grades were less effective than comments, particularly in terms of student motivation, while Belanger, Allingham and Bechervaise (2004) found that giving grades and comments together was also ineffective – students looked at the grade and either didn't read the comment, or read it as explaining the grade rather than giving them feedback on their learning. Comments alone are shown in this research to be the most effective form of written feedback on a task. While grades may be needed for other reporting purposes (see the section on reporting to parents, below), once again, purpose must be considered, and if the intent is to provide feedback to improve learning, the most effective form should be selected. See Table 13.1 on page 519 for an example of a format (a rubric) that can be used to give feedback about how to improve in terms of the standard of work expected.

Box 13.10 summarises a review of research on effective feedback.

REPORTING TO PARENTS

What do parents want from the assessment process? Most parents would say 'Good marks'! They want to know what their child can and cannot do. Parents also want to know where their child comes in class; that is, where the child ranks in relation to others. They prefer norm-referenced assessment, and there is a

BOX 13.10 RESEARCH LINKS

EFFECTIVE FEEDBACK

Hattie and Timperley (2007) reviewed research on feedback to students to develop a model of how feedback can contribute to students' learning. They proposed that the purpose of feedback is to reduce the gap between students' current level of understanding or performance, and an aimed-at level of understanding or performance: the learning goal.

In this model, effective feedback can operate in terms of three key questions, and at four levels. The questions are:

1. *Where am I going?* (assisting with goal setting, or *feed up*) Feedback at this level is effective when goals are clear and challenging, so that students know what and how well they are to achieve; when students share commitment to the goals, so that they care about and seek the feedback; and when feedback gives information related to the goals, so that, for example, if the goal is 'to write an engaging story', feedback is not just about spelling errors but relates to elements of engaging narratives: vocabulary, structure and ideas.
2. *How am I going?* (or *feedback*) At this level, effective feedback gives information about progress, and about how the student can improve, so that it links to the next question, 'Where to next?' Information can compare students' current level to the goal, which can be done using a specific standard such as an ideal performance, or to their prior performance; it may also relate to success or failure on a particular component.
3. *Where to next?* (or *feed forward*) Hattie and Timperley argue that feedback relating to this question can have some of the greatest impacts on learning. It can lead, for example, to better understanding of the goal, to improved self-regulation, and to deeper understanding.

In answering these questions, teachers can direct feedback at four levels: feedback relating to tasks, processes, self-regulation and the student. Hattie and Timperley argue that the particular focus of feedback determines its effectiveness:

- *Task feedback* gives information about the task itself and how well it has been achieved. Continuing our example of 'write an engaging story', an example of task feedback is: 'Your story is quite engaging but could include more interesting words to describe the characters'.
- *Process feedback* is directed at the process of learning or undertaking the task. An example is: 'When editing your work, consider whether your story could be made more interesting or whether the reader's questions are answered, not just whether your spelling and grammar are correct'.
- *Self-regulation–directed feedback* centres on developing students' confidence to engage more deeply in the task and self-evaluation skills. An example is: 'You have obviously thought carefully about describing the setting of your story in an interesting way. Think about whether you have also done this when describing the characters in your story, and how you could develop their descriptions to make your story even more engaging'.
- *Self-feedback* focuses on the students themselves. An example is: 'I always love reading your stories. You are an imaginative writer'.

According to Hattie and Timperley's findings, the least effective form is feedback about the self, while feedback about process and self-regulation are most effective for deep processing and mastery of tasks. Task feedback can be effective when that information also contributes to processing and self-regulation knowledge and skills. Its effectiveness is reduced when combined with feedback about the self.

ACTIVITIES

1. Consider feedback you have received (or given) for a range of tasks. What type of feedback was it? How effective was it for your learning?
2. Use the three questions detailed above to give yourself feedback about a recent task.
3. Hattie and Timperley also state that stickers and praise are not effective forms of feedback. Explain why this would be, in terms of their model. What further function might praise serve?
4. Read the full report of the study to consider effective forms of feedback in more detail.

CourseMateExpress
Online resources
Watch a **video** of a parent talking about her ideal report on this text's website.

good reason for this. A good mark may seem high, but may not really be so when compared with the marks of others in class. Most parents want to see their child's performance not just in terms of a single score or grade, but in the broader context of the class as a whole. They need to have such information reported in a form that is understandable and meaningful. Remember that many parents understand norm-referenced assessment procedures because that is what they remember from their own experiences at school. They often need assistance in understanding information from other types of assessment. Box 13.11 contains a case study of one teacher's reflections on the reporting process.

BOX 13.11 CASE STUDY

ASSESSMENT AND REPORTING

The annual or biannual report card can fill the hearts of teachers (and students) with dread. The thought of having to assign a grade for each student in each strand of each subject can seem overwhelming; however, many teachers are coming to realise that with comprehensive assessment throughout the semester, the formal report card needn't be such an onerous task. One teacher from a small, regional school in NSW finds the task of report writing to be a systematic process rather than an overwhelming burden. She recognises the formal report card as an opportunity to consolidate the assessment data she has gathered and values the opportunity to provide feedback to her students and their parents.

For this teacher, the process of report writing begins by bringing together all the assessment data she has gathered. Work samples are matched with checklists, cross-matched with observations and so on. On a class list, the teacher notes the results for each task so that in reading 'across the list', a general sense of each student's performance can be gained. The teacher then refers to the Board of Studies website and clicks into the Assessment Resource Centre, where work samples for each grade are displayed with explicit criteria. 'I've been reporting using A–E for several years now,' she explains, 'but I always like to refer back to those benchmarks, especially when I begin my report writing. It reminds me of what the standards are for each grade. and it also reminds me that I'm not comparing the students in my class against one another; I'm measuring each student against the syllabus criteria'.

National high-stakes testing can cause teachers to question their credibility as assessors. However, it is important to recognise the value of the teacher as a human-instrument: able to assess over time, within varied contexts, monitoring both process and progress. For this teacher, national tests remain just another tool in her toolbox of assessment. Students' test results are acknowledged as she brings together assessment information, but those results are seen in their appropriate context and are not given greater value than other assessment she has conducted: 'National tests are like snapshots of assessment. They tell me what my student could do on that particular day when they were faced with that particular task'.

As the assessment data is brought together and formal grades become evident, this teacher also takes the opportunity to make notes about each student. These notes later form the basis of her report comments and are related to the learning, skills, content, values and attitudes associated with the subject and strand. Comments about each student's demeanour, personality and nature are kept to a minimum and are reserved for the broader general comments box at the end of the report: 'Parents and students want to know what they're doing well, where they can improve and how they can improve. Telling them that their son or daughter has a "sweet nature" and giving them a D in reading doesn't help anyone'.

Source: Gabrielle Stroud.

ACTIVITIES

1 What assessment tools can you identify that this teacher draws on?
2 How has the quality of the assessment data been checked in terms of reliability and validity?
3 How has the teacher considered the needs of parents and students in reporting?

Overall, parents get information about their child and the school itself from a variety of sources, including:

- the child and other children and parents
- school newsletters
- regular student–teacher, parent–teacher and three-way (student–parent–teacher) interviews
- report cards
- notes, telephone calls and personal visits to the school
- homework (involving parent confirmation), student diaries and communication sheets
- speech nights, social occasions and formal school meetings (school council and parents' groups)
- school assemblies and public performances
- open days, information days, classroom visits and in- and out-of-school displays and performances
- results from standardised tests, external examinations and tertiary entrance scores (Brady & Kennedy, 2012; Cuttance & Stokes, 2000; Griffin & Nix, 1991).

The New Zealand Ministry of Education (2011a), in its position paper on assessment, sets out the following principles of good reporting:

- *Reporting processes promote student ownership of their learning*, with active participation in all aspects of assessment, including reporting of results. The three-way reporting process described below is one way to do this; children's letters home to parents, as described in Box 13.12 (see page 530), are another.
- *Students should feel ownership of the information that is reported.* This ensures that students understand the basis and content of the report, and how it links to their learning experiences. It enables students to explain, discuss and elaborate on reports to their parents, and builds the three-way partnership between school, family and student.
- *Reporting must meet the needs of parents, family and whānau.* Teachers must ensure the clarity of the information for its audience, catering for diverse families' language and literacy abilities, as well as cultural concerns. They must also consider the desire of parents for feedback, information on their children's progress and about how they can help with their children's learning, and participate in partnership with the school.
- *What is reported is the responsibility of the teacher and school.* While students may be involved in development of the report, it is important that teachers and schools ensure the information reported is dependable.
- *The quality of reporting must be monitored to ensure that it meets these principles.* This involves monitoring of the effectiveness of the communication to families – Did they interpret it correctly? It will also involve monitoring a student's engagement with learning as a result of the report – whether they have achieved great or little success. While areas for improvement should be highlighted, every student should also be given the opportunity to celebrate aspects they can be proud of.

The NSW Department of Education and Training (2005, 2007) identified **three-way reporting** (involving teacher, student and parent input) as a useful strategy for reviewing student achievement. New Zealand's TKI found that the majority of schools using this method reported a rise in parent attendance at conferences, and in parent satisfaction with school. Such reporting may be in the form of students taking home examples of their work that have already been assessed and commented on by the teacher and student. Parents can then respond in turn with their own comments on their child's work. Alternatively, teachers, students and parents can meet and review a portfolio of work. Students can lead these conferences, discussing their work and the activities that were involved, or the discussion can be structured around particular learning goals, with parents, student and teacher contributing to discussion

three-way reporting
Reporting that involves student, teacher and parent input

of the child's progress towards their goals. While three-way conferences can be valuable for students' self-evaluation of their learning, as well as parents' engagement in their child's schooling, training for students and teachers in three-way conferencing is essential to facilitate the process.

Common reporting standards are used across Australia, supported by work samples, to establish a common understanding of each standard across schools, and between teachers within each school. These inform parents of their child's progress in terms of the following scale:

- A – well above the standard expected at this time of year
- B – above the standard expected at this time of year
- C – at the standard expected at this time of year
- D – below the standard expected at this time of year
- E – well below the standard expected at this time of year.

CourseMateExpress

Online resources
Go further: Visit some standards sites in Australia and New Zealand via the links on this text's website.

The report cards are intended to be written in 'plain language' to help parents understand the information provided by the schools about their child's progress.

In addition, in Australia, schools are instructed to provide parents with information about how their child's achievement compares with others in the grade if the parent requests it. This may be done in terms of quartiles (top 25 per cent, next 25 per cent and so on).



THINK ABOUT

- In reporting to parents, should information on student progress be based on grades (that is, norm-referenced tests), standards (that is, criterion-referenced tests), lesson content (that is, curriculum-based tests) or a student's previous results (that is, ipsative assessment)?
- What type of data (norm-referenced, criterion-referenced, curriculum-based or ipsative) would you, as a teacher, prefer to use when reporting to parents on student progress? Would your answer differ if you were teaching in lower or upper primary, or lower or upper secondary grade levels?
- Should reporting focus on academic achievement or on student effort?
- Should assessment results be compared across classes at each grade level in a school, across schools in a community, and/or across States or nationally? Who should have access to this information? Why?
- Watch for ongoing discussion and debate about issues in assessment and reporting in the media, and for any ongoing changes in requirements for reporting at local, State and national levels in response to this debate.

CourseMateExpress

Online resources
Design a user-friendly format for school reports with the **Interactive Activity** on this text's website.

Annual school reports are another component in the process of reporting outcomes and achievements to parents, as well as the wider community. Many parents are interested in information such as individual school results from national literacy and numeracy tests (for example, NAPLAN tests given in years 3, 5, 7 and 9 in Australia) when making decisions about the enrolment of a child.

REPORTING FOR TEACHERS

For teachers, one of the main purposes of student assessment is to obtain feedback on their teaching. It is also used to guide the teacher's decisions regarding the next piece of work. On the basis of assessment results, study topics are changed, materials that have been covered but not yet fully understood are revised, or a current topic that has been adequately covered is abandoned in order to begin the next.

Criterion-referenced or curriculum-based assessments carried out as part of the instructional process give teachers vital information about what students have learned and how effective the teaching has been. Such data can be used to diagnose students' strengths and weaknesses, and to plan future teaching programs. It is also helpful to the teacher who will be teaching the students in the following year. This type of assessment begins with the careful analysis of a specific area of teaching in order to identify the skills

and subskills that must be mastered by all students who study it. The level of students' entry skills can be measured at the beginning of a new program to decide where to place each student within the curriculum. Assessment data are used to identify appropriate teaching objectives, and ongoing assessment provides a basis for monitoring individual students' progress through a learning sequence. At the end of the learning sequence, student achievement is assessed and the results are used to evaluate and refine teaching methods.

Reporting of results to teachers generally happens in the form of results from standardised or external tests. Teachers can then use that information to evaluate their teaching, and to plan for the future for a particular group of students – but do they? Hattie (2005) argued that 'schools are awash with data', and that teachers are selective in the data they use to evaluate their teaching, concluding that this process should start in the classroom. AsTTle was developed in New Zealand to develop a national assessment program based in classrooms, rather than in external tests. You can read more about it at the Assessment Online website (assessment.tki.org.nz).

REPORTING FOR SCHOOL PSYCHOLOGISTS, COUNSELLORS AND GUIDANCE OFFICERS

Most schools have access to the services of an educational psychologist or school counsellor who is trained to administer and interpret standardised tests of intelligence, aptitude (talent) and personality (see Chapter 9). These tests are often administered to students individually, and the results are used to make decisions about future school placements or to develop classroom-management plans. Information derived from such tests is used to advise and support teachers, parents and students in making informed decisions about instructional programs, behaviour management, student placement and other issues related to learning and teaching.

REPORTING TO SCHOOLS AND SCHOOL ADMINISTRATORS

For teachers and parents, the primary focus of assessment is on the individual student. However, at the school level, information from assessment gives important feedback about the curriculum as a whole and about overall progress in learning and teaching within and across grades, and within and across subject areas. At another level, some analyses of school-wide assessment data, particularly at the secondary school level, are used to examine the relative performance of different subject departments to see if one department is more effective than others. Other information of interest to schools is obtained from more formal testing programs such as the NAPLAN tests of reading, writing, spelling, number, space, measurement, and chance and data conducted in years 3, 7 and 9 in Australian schools (MCEETYA, 2008), and the assessment of essential learning areas and skills in a sample (about 3 per cent) of 8-year-olds and 12-year-olds every four years in New Zealand (NEMP, 2005). These programs provide comparative information about one school's performance in relation to other schools in the district or state. There is a competitive element in such programs, but they provide valuable information for schools about the relative standard of their students. In Australia, there has been a move to communicate this comparison of school performance to parents as well (Gillard, 2008). It has been widely opposed by educators, who are concerned that publication of school comparison data in the media can be misinterpreted. It can also have negative impacts on school communities and on curriculum when 'teaching to the test' takes up a higher proportion of school time as schools seek to uphold their reputations. School-wide assessment data are also used in the preparation of a school's annual report to parents and the community.

Information from often large-scale assessment programs is used by schools and school systems for such varied purposes as screening, selection, classification, placement, eligibility and certification. Screening, for

instance, may involve a quick, simple check of large numbers of students to identify specific characteristics or conditions. This information might then be used to find students who have the potential to become Olympic-standard rowers or champion chess players, those with sensory impairments, or those who are exceptionally gifted in areas such as mathematics, languages, art, music or dance.

BOX 13.12 CASE STUDY

IMPLEMENTING ACCOUNTABLE ASSESSMENT

It was during the second term when Janet, a Year 1 teacher who had joined the school at the beginning of the year, became aware of staffroom discussions about the type of information given to parents in school reports. At Janet's previous school, student results were reported to parents twice a year. These reports gave an indication of each student's progress relative to the levels identified in the seven essential learning areas of the National Curriculum. At that school, the teachers felt they were responsible for their students' achievement and that the reports they prepared twice a year were a form of accountability to the parents. The teachers made an effort to educate parents about the school's teaching and assessment practices, ensuring that the parents understood what the school was doing and why it was doing it. However, at the new school, teachers seemed to consider that students' results should be reported in terms of what the students could do, rather than how they compared with the standards identified in the National Curriculum levels. The teachers did not see themselves as accountable to the parents and did not want to be judged badly by the results presented in school reports. For example, one teacher put everyone as 'excellent', thinking that to do otherwise would reflect poorly on her own teaching. Most of the teachers believed that the parents were uninformed about what happened at school and accepted the teachers' authority.

Janet's old school was in a predominantly middle-class area of the town, and the students' achievement was around average or above the levels set in the National Curriculum. The new school was in an area that had mainly socially disadvantaged families, with a high proportion of recent immigrants for whom English was a second language. The teachers were not surprised when an assessment of reading achievement carried out the previous year in this school and in neighbouring schools had shown that one year after school entry, the students' average achievement in reading was nine months behind the level achieved by a nationally normed comparison group.

Janet looked at the school policy on reporting to parents to see if teachers were required to report the standards that were being used to assess the progress of each student. She found that, unlike in her previous school, there was no reference to the standard against which student performance should be evaluated. Individual class teachers could decide what was appropriate. Talking to the other teachers, she found that some used terms such as 'average' to describe student achievement, but it was unclear whether this referred to the class average, the grade average or the national average. The top students in some classes were often given an 'excellent' or 'achieved high standard' when the whole class was one or two years behind the national average, while some teachers gave particular students an 'excellent' simply because they felt the students were achieving at their full potential.

Janet asked some of the parents what they understood the rankings of 'excellent' and 'average' on school reports to mean. Some said that they understood it represented their child's achievement in comparison with the rest of the class, while others thought that it referred to all the children of their age, or to a national standard for that grade level. When she quizzed other teachers about the parents' views, one said: 'Do they really think that? They know they live here, and the newspapers make it quite clear when they report negatively about the quality of schooling in this area – so when we say *do well* we mean *doing well for here*'. Janet decided that in this school, teachers were free to decide which standard they would use when reporting student results to parents. She also realised that the parents did not understand which standards were being used. As a result, they were less likely to realise, or blame the teachers, for the gaps that existed between the levels achieved by their children and national standards, though they had high regard for education and wanted their children to enter occupations that required success in national examinations and tertiary study.

Listening to the teachers discussing student reporting in the staffroom, Janet began to understand

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why the teachers acted as they did in preparing reports for parents. It was partly because of a desire to be positive about the progress of students at that particular school. The deputy principal described the dilemma between honesty and accuracy in this way:

> Most of the students arrive at school lacking a whole set of skills that middle-class teachers can just take for granted. These students start a year of so behind and you can't tell parents that. It's a self-esteem thing. I've always taken the children from where they're at and accepted them – now let's get on with it. If the child feels secure, then mum is on his side and learning occurs. We foster the child feeling safe, secure and happy before we start the learning process. We communicate positive messages to the parents and that means not discussing the children's entry levels, so that the confidence of the parents and the self-esteem and security of the child are maintained.

The school's reporting practices were influenced by the social and economic circumstances of the families and their limited educational resources. Teachers were also worried about student safety, recounting how several students had been beaten when they brought home unfavourable reports. School staff were also worried that negative results might affect the image and reputation of the school, leading some parents to enrol their children in other schools in neighbouring suburbs. As the principal described the situation to Janet: 'It's quite unprofessional really – but I would be a fool to report against national standards if neighbouring schools used local ones'.

After thinking about the problems associated with reporting to parents at her new school, Janet decided that she empathised with the teachers and understood their reasons for reporting to parents as they did. However, she felt that some information about national standards should be given to parents so that both teachers and parents had a benchmark for their own assessment standards. Local benchmarks should not be abandoned, for if individual students' results were reported solely against national standards, it was likely that the gap would be seen as the fault of the student or the family. If comparison was made with both a local and a national standard, parents would see that the problem was not just with their child, but with the group as a whole. Then parents could join with other parents and the teachers to decide what was a realistic aspiration and what could be done, individually and collectively, to reduce the gap. She began to float the idea that accountability become a central focus of the school's reporting to parents, and that the parents helped to support their children in achieving their desired goals. Such a proposal would involve considerable effort from teachers at the school, but all agreed that the effort would be worthwhile in terms of the benefits to students and the outcomes of their schooling.

Source: Adapted from Robinson and Timperley (2000). Reproduced by permission of Taylor & Francis Group LLC. (http://www.tandfonline.com)

ACTIVITIES

1 Hold a debate, arguing both sides of the dilemma faced by Janet when she began to understand the assessment practices of her new school.
2 Think about your own schooling. What type of information was provided in the reports your parents received? Were they aligned with national or State-based standards? What was the reaction of your parents to the information provided in the reports?
3 If you were a parent of a child who was among 'the 25 per cent of students [who] will always lie in the bottom quartile' (Allum, 2005, p. 15), what type of information would you want to see in the child's school report?
4 Under what conditions might increased accountability in reporting student achievement lead to improvements in academic achievement? What are the disadvantages of this approach to school reporting?

REPORTING TO EMPLOYERS

There are two main issues in student assessment that are of interest to prospective employers: What can students do, and are they employable? Employers want to know about fundamental skills such as whether or not recent graduates know the basic number facts, or how well they can spell. Employers also want to know about students' personal characteristics.

CourseMateExpress
Online resources
Go further: View the latest PISA and NAP reports via the links on this text's website.

REPORTING TO GOVERNMENT

What does the government want out of student assessment? Data from State-based or national assessments provide information about school standards across each of the States and/or across the nation. An example in Australia is the annual national collection of benchmark data in reading and writing literacy, and numeracy by ACARA for the federal government. Such information may be used to decide funding priorities, or to identify areas where outstanding progress has been achieved or where special initiatives need to be taken. Alternatively, towards the end of a period in office, a government may want to be able to claim that standards have risen, so voters will continue to support it. International comparisons of schooling are also of interest to governments as measures of the nation's progress against international norms. PISA assesses a sample of 15-year-olds in OECD countries every three years. Many of the changes in testing seen over the last decades of the 20th century were related to the needs and interests of all levels of government.

REPORTING TO THE COMMUNITY

How do you find out what the community wants from student assessment or from other information related to education? Look at the daily newspapers and weekly magazines and monitor the amount and type of information given to the community at large about the operation of their schools. Most Australian city and national daily newspapers have a weekly section that focuses on current educational issues, and community views on current controversies in education can be found, for example, on the Letters to the Editor pages (see Allum, 2005). Education is likely to figure most often during key times in the school year, such as at the start of a school year or during the administration of NAPLAN tests. Other times when education-related issues receive heightened public attention are during the period preceding an election and at times of major change, such as the introduction of a new format for annual school reports by the federal government, or introduction of new curricula, as commenced in Australia from 2014 (ACARA, 2014).

Box 13.13 discusses some implications stakeholders' assessment-information needs may have for educators.

RECORDING AND REPORTING ASSESSMENT RESULTS

Having decided what should be assessed and how this information will be collected, the next task is to decide how the results of assessment should be recorded and then reported to students, their parents and other interested stakeholders. Changes in the way that assessment information is collected, together with developments in technology, have resulted in an array of strategies being available for recording assessment data, together with a range of formats for reporting results.

Issues to consider in the collection of information concerning students include privacy and consent. Teachers must be alert to students' and parents' right to privacy in relation to personal information. In addition, parents and students (aged 16 years or older) must be informed in writing of any procedure that involves collecting or disseminating personal information or other information about a student that is not directly relevant or essential to the student's school program. The written consent of parents or older students indicating that they understand the purpose of the procedure and how it will be carried out (**informed consent**) must be obtained. (See also the discussion of ethical issues in Chapter 1, page 17).

informed consent
Agreement given by a parent or student for the collection and/or dissemination of information not directly relevant to the student's school program

A further issue associated with school reporting to parents concerns accountability, either in relation to the teachers' responsibility for the achievement of their students, or the responsibility of both students and parents to contribute to progress in learning at school. Reporting to parents provides



BOX 13.13 IMPLICATIONS FOR EDUCATORS

STAKEHOLDERS' ASSESSMENT NEEDS

In thinking about assessment and the specific needs of different stakeholders, educators need to remember the following:

- For students, assessment feedback is motivating, helps identify strengths and weaknesses, highlights specific errors and indicates areas for improvement.
- Parents want information about student performance that they can understand and that compares individual results with those achieved by other students. They may need help to understand other types of assessment information.
- Teachers want information about instruction outcomes so they can evaluate their own teaching, monitor student learning, identify appropriate teaching objectives and plan further instruction.
- School psychologists, counsellors and guidance officers use assessment information to support teachers, design behaviour-management strategies and make decisions about program placement.
- Schools and school administrators use assessment information to monitor teaching and learning progress within and across grades and curriculum areas. Data from large-scale assessment programs are used for purposes such as screening, selection and certification.
- Employers are interested in assessments that provide information on school leavers' basic competencies and personal characteristics.
- Government bodies are interested in the outcomes of large-scale assessment when this gives comparative information about school standards. Such information helps identify areas where there has been progress and areas where special initiatives are needed.
- The community is interested in assessment results when major changes are introduced or when education becomes a focus of political interest.

an opportunity for teachers to strengthen the partnership between home and school, and to develop a shared understanding of the responsibility and contribution of teachers, students and parents to educational outcomes. An example of the dilemma faced by teachers in relation to accountability and the preparation of school report cards occurs when there is conflict between the need to maintain student confidence and parental trust, while at the same time reporting student progress in terms of State or national standards (see the case study illustrating this dilemma in Box 13.12, page 530).

CONCLUDING COMMENTS

Effective assessment and reporting is the key to promoting quality learning and teaching, and involves choices between a wide range of approaches, strategies and tools. Your choice of assessment strategies should be guided by your knowledge and understanding of your students' needs. This chapter should be viewed in light of the development and learning theories presented earlier in this text. For instance, how might an outcome-based approach to instruction or the use of collaborative learning strategies lead to the use of different forms of assessment? Consider also how you might use assessment to promote students' low self-esteem (Chapter 4) or enhance their motivation (Chapter 8). Or think about how you might vary your assessment strategies depending on such factors as the way in which learning experiences are organised (Chapters 6 and 7), gender distribution in the class, students' language backgrounds (Chapter 11) or students' abilities (Chapters 8 and 9). Also reflect on how your style of assessment and reporting might be influenced by your philosophy of teaching and your view of how students learn best (Module II).

CHAPTER REVIEW

- Assessment is the gathering of information about students' learning or achievement. Evaluation is the judgements made about that information.
- The primary purposes of assessment are:
  - improvement of learning: *assessment for learning* or *formative assessment* (providing feedback for students on their progress in learning, and teachers on the effectiveness of their instruction) – this can include assessment as learning (students reflecting on their learning processes as they assess their own and others' work)
  - accountability and reporting: *assessment of learning* or *summative assessment* (providing information on learning outcomes).
- The procedures used in assessment can take many forms depending on the purpose of assessment, including traditional tests and examinations (summative information), direct observation and anecdotal records, portfolios containing examples of student work, the direct assessment of performance and student self-assessment (formative information). Teachers should use a range of tools to gather assessment data.
- Reporting of assessment results takes different forms depending on the particular audience.
- Information derived from the assessment process is of immediate interest to teachers and students who want feedback on their teaching and learning, and to parents who want to know how their children are progressing at school.
- School psychologists use assessment to make decisions about school placements and to assist teachers in developing classroom-management plans.
- School principals and other administrators use this type of information for screening, selection, classification, placement, eligibility and certification.

ONLINE STUDY RESOURCES

COURSEMATE EXPRESS

Visit http://login.cengagebrain.com and use the access code that comes with this book for 12 months' access to the student resources for this text.

The CourseMate Express website contains a range of resources and study tools for this chapter, including:

- a **self-check quiz**
- **crosswords**, **flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.

SEARCH ME! EDUCATION

Explore Search me! education for articles relevant to this chapter. Fast and convenient, Search me! education is updated daily and provides you with 24-hour access to full-text articles from hundreds of scholarly and popular journals, ebooks and newspapers, including *The Australian* and *The New York Times*. Log in to Search me! through http://login.cengagebrain.com and use the search terms listed in the 'Education databases' section (page 536) as a starting point.

QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1. List the features of quality assessment. How will you ensure that assessment in your classrooms adheres to these principles?
2. Take an assessment tool such as tests, observations or interviews. List the advantages and disadvantages of your tool, and ways to maximise its effectiveness.
3. Explain why a range of assessment methods is necessary for effective assessment.
4. How would you ensure that assessment is valid and reliable? Think about this in relation to the design, conduct and evaluation of assessments.

5 What is students' role in assessment? How should teachers involve their students in the assessment process?
6 Collect a resource bank of ideas for reporting assessment information to parents. How might this vary to meet the needs of different cultural groups?
7 Identify the main groups who are interested in the outcomes of assessment in schools. Distinguish between the types of information they are interested in.

KEY TERMS

anecdotal record
assessment
assessment as learning
assessment for learning
assessment of learning
authentic assessment
checklist
consequential validity
construct validity
content validity
criteria
criterion-referenced assessment
culture-sensitive or culture-fair test
curriculum-based assessment
diagnostic assessment
direct assessment
direct observation
dynamic assessment
evaluation
face validity
formative assessment
informed consent
ipsative assessment
moderation
norm
norm-referenced assessment
outcomes approach
performance assessment
portfolio
profile
rating scale
reliability
rubric
standardised test
standards
summative assessment
test bias
three-way reporting
validity

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'ASSESSMENT AND REPORTING' AND MATERIAL IN OTHER CHAPTERS

- Think about how approaches to assessment link to the various models of learning and teaching presented in Module II.
- Consider how different forms of reporting impact upon students' motivation (see Chapter 8).
- How might theories of development (Module I) influence what and how you assess?
- How do ICTs facilitate assessment and reporting? What new challenges might they present for assessment (Chapter 12)?

FURTHER RESEARCH

RECOMMENDED READING

Brady, L. & Kennedy, K. (2012). *Celebrating student achievement: Assessment and reporting.* French's Forest, NSW: Pearson Education.

Gardner, J. (Ed.). (2012). *Assessment for learning* (2nd ed.). London: Sage Publications.

Glasson, T. (2009). *Improving student achievement: A practical guide to assessment for learning.* Carlton, Vic.: Curriculum Corporation.

Masters, G. N. (2013). *Reforming educational assessment: Imperatives, principles and challenges.* Melbourne: ACER. Retrieved from http://research.acer.edu.au/aer/

New Zealand Ministry of Education (2011). *Ministry of Education position paper: Assessment.* Retrieved from www.minedu.govt.nz/theMinistry/PublicationsAndResources/AssessmentPositionPaper.aspx

RECOMMENDED WEBSITES

Investigate the approach to assessment and reporting at your local department of education.

Australian Council for Educational Research (ACER): www.acer.edu.au

Australian Curriculum Assessment and Reporting Authority (ACARA): www.acara.edu.au/assessment/assessment.html

Queensland Department of Education and Training: http://education.qld.gov.au

New Zealand Council for Educational Research (NZCER): www.nzcer.org.nz

New Zealand Ministry of Education: http://assessment.tki.org.nz – This website has helpful resources, examples and guidance for teachers around multiple aspects of assessment.

NSW Board of Studies: http://arc.boardofstudies.nsw.edu.au/ – The Assessment Resource Centre of the NSW Board of Studies, Teaching and Educational Standards supports professional practice in assessment and reporting with exemplars (student work samples, with teacher annotations) linked to the standards from K-12.

NSW Department of Education and Training: www.curriculumsupport.education.nsw.gov.au/timetoteach/assess/index.htm

Assessment for Learning: www.assessmentforlearning.edu.au – This professional development module includes video clips of teachers and students putting strategies into action.

South Australian Department for Education and Child Development: www.decd.sa.gov.au

Tasmanian Department of Education: www.education.tas.gov.au

Victorian Curriculum and Assessment Authority: www.vcaa.vic.edu.au

Western Australian Department of Education and Training: www.eddept.wa.edu.au

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

- assessment
- assessment for learning
- assessment of learning
- benchmarks
- criterion-references assessment
- diagnostic assessment
- formative assessment
- norm-referenced assessment
- outcomes
- portfolios
- reliability
- school achievement
- school reporting
- standardised test
- summative assessment
- test bias
- validity.

Combining these terms with words such as 'schools', 'students', 'learners' and 'classrooms' (as in 'assessment and schools') will limit your search to material related to schools and young students.

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

Chapter 14

MANAGING CLASSROOMS FOR EFFECTIVELY WORKING WITH STUDENTS

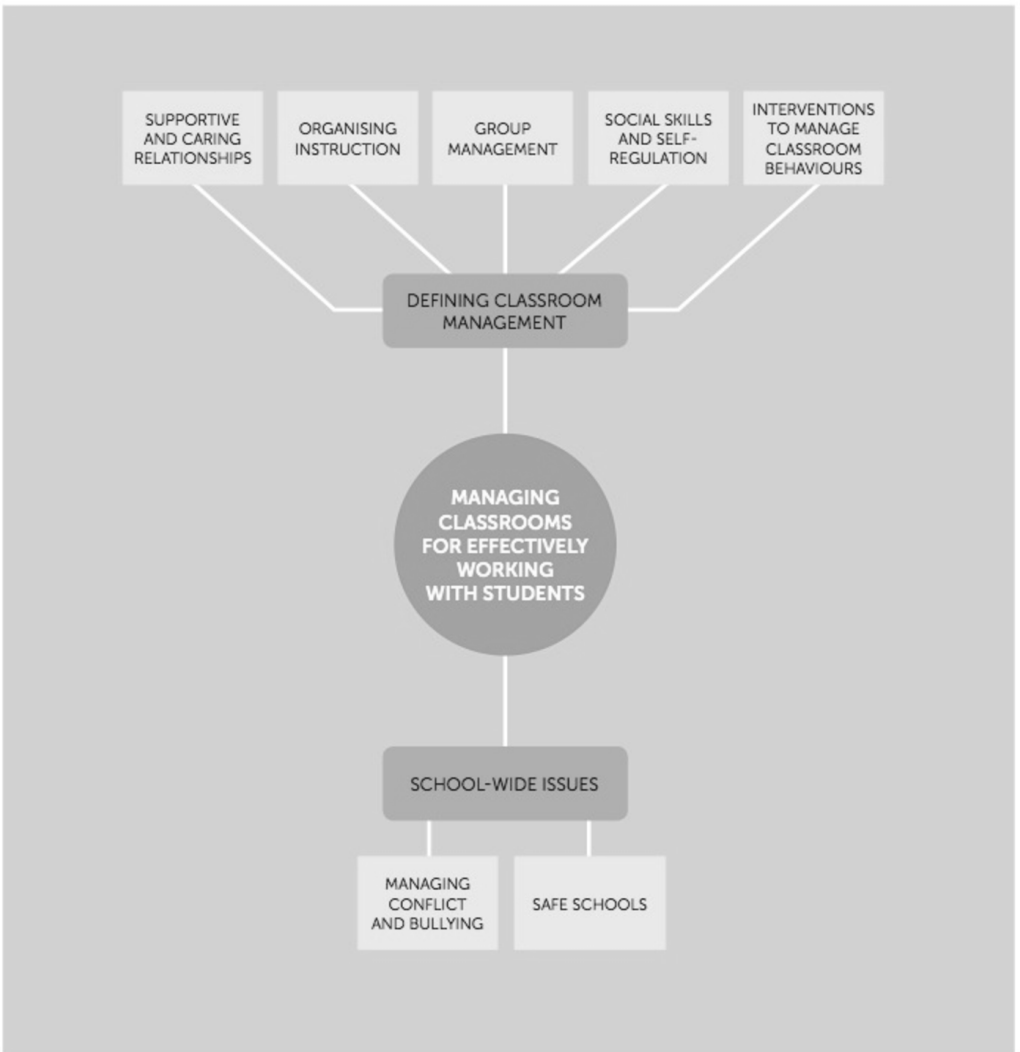

FIGURE 14.1 Chapter 14 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following questions:

- What is classroom management?
- What are the different views of what constitutes classroom management?
- Can you describe your own philosophical approach to classroom management?
- Can you identify key features of a comprehensive approach to classroom management?
- What is the teacher's role in promoting a safe school?

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INTRODUCTION

When you think about classroom management, what is it that comes to mind? Often we think of managing student behaviour, but how often do we think about managing our own work as teachers and the 'behaviour' of teaching itself? In this chapter, we consider the teacher's role of managing classrooms for ensuring effective work with students. First, we examine the concept of 'classroom management' from the perspective of the work of teachers. This includes acknowledgement of the broad and varied approaches applied in schools and classrooms today. The second element considers a comprehensive approach to classroom management, including the relationships developed with students, the pedagogical practices and skills employed, and the strategies used to ensure that classrooms provide a context to support and facilitate learning.

Teaching is also concerned with the welfare of students, usually referred to as a 'duty of care' involving the protection of students from harm. Issues arising from this responsibility, and from the ways in which teachers create 'safe' schools, are important for teachers to consider as we think about classroom management.

DEFINING CLASSROOM MANAGEMENT

What makes an effective school and classroom? What part of **pedagogy**, or the art and science of teaching and instruction, is concerned with classroom management? To what extent is effective teaching the product of classroom order?

pedagogy
The art and science of teaching and instruction

Do your answers to the questions posed above simply refer to controlling behaviour? If you compare your answers with those of your peers or other teachers, you may find a wide variety of answers to these questions. At a minimum, a definition of **classroom management** must include the planning, management and organisation of learning, and the creation of an environment that facilitates learning and brings out the best in learners; it must be broad enough to consider the development and management of behaviour of the whole individual, including their cognitive and socioemotional needs.

classroom management
The actions of teachers to create a planned and organised classroom environment that supports student learning and socioemotional needs

Definitions of classroom management vary widely and reflect many different social, cultural and historical influences. Teachers' individual approaches to classroom management may also be influenced by their own personal experiences. For example, Kagan (1992) surveyed 156 preservice teachers about their approach to classroom management, finding that students personal 'punishment histories' in their

own families predicted their approach to classroom management. Unfortunately, it is also known that the beliefs that student teachers bring into teaching are highly resistant to change, reflecting long-held beliefs and attitudes towards teaching and learning (McPherson, 2007). As such, it is important for teachers to recognise the source of their beliefs about classroom management and to start exploring other ways of thinking about and defining this important area of teacher practice.

Wolfgang (2001) identified three different philosophical orientations towards classroom management: the rules and consequences philosophy, the confronting–contracting philosophy, and the relationship–listening philosophy. These philosophies reflect very different views about children and provide a useful framework for thinking about questions of teacher authority and power. How do we expect children to behave in schools? Why do we believe children should behave in certain ways? Who has the power to determine how children should behave? Perhaps most importantly, how should this power be used?

interventionist philosophy
A belief that children's learning and behaviour is an outcome of external factors

interactionalist philosophy
A belief that children's learning and behaviour results from an interaction between internal and external factors

non-interventionist philosophy
A belief that allows for children's learning and behaviour to occur naturally

- *Rules and consequences* – known as the **interventionist philosophy**. Teachers subscribing to this philosophy believe that learning only occurs as a result of external factors such as rewards and punishments; teachers decide on the desired behaviour and reward or punish accordingly.
- *Confronting–contracting* – known as the **interactionalist philosophy**. Teachers who apply this philosophy believe that disruptive behaviour results from conflict between the child's ability to control their needs and the external demands of the classroom. The teacher would 'confront' the child about their behaviour and then allow the child to decide how they would change, making a 'contract' with the child to encourage better behaviour.
- *Relationship–listening* – known as the **non-interventionist philosophy**. Teachers who subscribe to this philosophy also view discipline problems as arising from the struggle between the child's individual needs and the needs of the class and curriculum. These teachers view children as inherently good, but in need of supportive adults who listen and provide empathy and understanding. Teachers help children balance their needs in relation to the wider needs of classroom life. (Adapted from Woolfolk Hoy & Weinstein, 2006, p. 194.)

Interestingly, some research has shown that Australian students report different classroom-management approaches among primary and secondary school teachers, with secondary teachers more likely to use 'traditional' and 'punitive' forms of classroom management, as we discuss later in this chapter (see Lewis, Romi, Xing & Katz, 2005).

As you can see, approaches to classroom management are certainly concerned with the management of behaviour, but can also be defined more broadly. As noted by Woolfolk Hoy and Weinstein (2006), few 'real people' ever adhere to only one set of beliefs or orientation (p. 198). Instead, most teachers adopt beliefs from several different orientations. Similarly, Jones and Jones (2007) believe few teachers could ever stick to one program of classroom management because classrooms are far too complex. Instead, it appears that comprehensive approaches to classroom management are essential (Jones & Jones, 2007).



THINK ABOUT

- Which of these classroom-management orientations are you most familiar with from your experience as a student?
- Which approach would you most prefer to adopt as a teacher?
- Can you recognise the influence of behaviourism, humanism or social learning theories in each perspective?

In adopting a broad and comprehensive perspective, Evertson and Weinstein (2006, p. 5) suggest that classroom management is made up of five specific tasks. These are:

1 the development of supportive and caring relationships with and among students
2 the organisation and implementation of instruction that optimises students' access to learning
3 the use of group-management techniques that facilitate student engagement with tasks
4 promoting the development of self-regulation and social skills
5 the use of appropriate interventions to help students with behaviour problems.

Clearly, classroom management is about more than managing behaviour. It is a complex and multifaceted task that includes the teacher's pedagogical work of delivering appropriate instruction, providing an appropriate instructional climate, and ensuring students receive appropriate care and support. The remainder of this chapter explores the five tasks listed above and illustrates linkages with the orientations we have discussed.

SUPPORTIVE AND CARING RELATIONSHIPS

Teacher Anna has a typical Year 4 classroom, with the usual range of students whom she fondly describes to her colleagues: there is Skye, her 'little star', who is sure to top the class this year, and Caleb, who 'tries so hard' but still worries her. She describes other students less fondly: Amelia is just another student and 'I can't think of anything to say about her on parent–teacher night', and Kyle seems to misbehave a lot and 'constantly annoys me with the silliest questions'.

Do you think that Anna's beliefs about her students are likely to influence her teaching of those students? What if Anna's positive hopes for Skye and negative beliefs about Kyle were known to other students? Could these teacher beliefs actually influence the students' achievements?

Relationships between teachers and students are at the core of every classroom. If you consider the daily work of Anna in her Year 4 classroom, she is a teacher of 25 or more students with different support needs and personalities; she, too, has her own beliefs about young people and classroom management. A wide range of research has closely examined this very sensitive area of classroom life. Questions such as those asked above have been examined in many studies, leading to some clear implications for classroom practice.

TEACHER–STUDENT RELATIONSHIPS

In the earliest studies, many hours of observations of teacher–student interactions in typical classrooms were conducted (Good & Brophy, 1972, 1974; Silberman, 1969). These studies demonstrated that teachers not only developed personal beliefs and attitudes about their students, but that relationships with these students also varied in quality. They described this variation as **differential teacher–student interactions**.

differential teacher–student interactions Qualities of the interaction between a teacher and student that lead to different types of relationships

These differential behaviours were described in terms of the attitudes teachers held about different students. They labelled these attitudes:

- attachment
- concern
- indifference
- rejection.

The nature of these differential interactions can be matched to Anna's descriptions of students in her classroom (see Table 14.1).

TABLE 14.1 Differential teacher attitudes towards students

TEACHER ATTITUDE	DIFFERENTIAL TEACHER–STUDENT INTERACTIONS
Attachment *Skye*	• These are 'model' students who are compliant and follow teacher requests. • Teachers report the greatest joy in teaching these students. • There is a high level of positive teacher–student interaction. • Teachers exhibit a subtle but not exclusive favouritism.
Concern *Caleb*	• These students are low achievers who ask for and receive high levels of teacher support. • These students experience the highest level of supportive interactions between teacher and student. • Teachers see the high level of support as necessary and appropriate.
Indifference *Amelia*	• These students seem to escape teacher attention. • Interactions with these students are fewer and briefer. • Teachers would be less prepared to talk about these students if their parents dropped into school to discuss their child's progress.
Rejection *Kyle*	• Teachers would be relieved to see these students removed from their classroom. • These students may have behavioural problems. • These students are perceived by teachers to be low achievers who also ask for a lot of help. • Teachers do not respond positively, and see requests as inappropriate and overwhelming. • There are high levels of negative interactions, designed to manage and control their behaviours.

As you can see, the interactions between teachers and students can differ according to the teacher's attitude towards the student and some elements of the student's behaviour. Students such as Skye are compliant and obedient, and fit the teacher's idea of the 'model' student. Students like Kyle, however, might be disobedient and take up a lot of teacher time and energy in negative interactions designed to manage their behaviour. Although it may be obvious that teacher–student relationships matter in the classroom, the effects of these relationships can be difficult to tease out and often raise controversy. One of these areas concerns the power of teacher expectations over student achievement.

Teacher expectations

There is clear evidence that beliefs about students are associated with teacher expectations for those students. For example, very early studies demonstrated that 'rejected' students may not, in fact, be low achievers like those in the 'concern' category. Rather, it appears that teacher perceptions of the student's abilities were tainted by a negative 'halo' around the student; quite simply, the teacher *expected* the student to be a low achiever (Willis & Brophy, 1974).

Quite a lot of evidence suggests that the expectations teachers hold for students are reflected in students' achievement. Some researchers believe that this is because many teacher expectancies are based on incorrect beliefs or bias about students. Bias may be based on social stereotypes of gender, race or even social class. This leads to a concern that favourable treatment enhances the performance of students who are valued more positively. For example, there is evidence that teachers do seem to behave differently towards students for whom they hold high or low expectations. They give greater emotional warmth and support to high achievers, as well as more and clearer feedback, and expose them to more challenging materials (see review by Jussim & Harber, 2005). In classrooms where teachers expose students to high expectations, these students tend to achieve more and have higher self-esteem and a greater resistance to problem behaviours (Pianta, 2006).

There is disagreement, however, about the effect of differential expectancies on students. As summarised by Jussim and Harber (2005), some researchers have claimed that expectancies lead to student achievement because they create a self-fulfilling prophecy in which students come to believe their teacher's expectations and start to behave accordingly. Other researchers claim that expectancies do predict achievement, but only because teacher expectancies are actually correct (Good & Brophy, 2003). Jussim and Harber (2005) concluded that self-fulfilling prophecies do indeed exist, but that their effect on students is typically small. They also concluded that teacher expectancies are usually based on correct assumptions about the student's ability.

Troublingly, the capacity for teacher expectancies to create a self-fulfilling prophecy appears to be stronger for students who are already stigmatised, including students from certain racial backgrounds and low socioeconomic class. Although Jussim and Harber (2005) found that teacher expectations for student achievement were more likely to be accurate, students may also feel stigmatised and harshly treated in other ways. For example, studies indicate that students from minority racial backgrounds in the USA are expelled or excluded from schools at much higher rates than other children. These children also report that they are disciplined more severely, are given less opportunity to explain themselves, and some had even given up on the hope that they would be treated fairly (Fenning & Rose, 2007; Sheets, 1996, 2002; Sheets & Gay, 1996). In the Australian context, a range of studies have reported that Aboriginal students are similarly over-represented in school suspension data (see Graham, 2012; Zubrick et al., 2005). Some teachers hold low expectations for Indigenous students and provide them with less encouragement to continue their education (Godfrey, Partington, Harslett & Richer, 2001; Munns, 1998). Other studies have suggested that teachers may lack knowledge and understanding of how to address culturally diverse practices and beliefs in Indigenous learners and communities (Santoro, Reid, Crawford & Simpson, 2011). In New Zealand, similar findings have been reported for Māori students (Rubie-Davies, Hattie & Hamilton, 2006). In a comparison of teacher expectations for NZ European, Māori, Pacific Islander and Asian students, Rubie-Davies and colleagues found teacher expectation was high for all but the Māori students. Although Māori students' achievement was the same as other groups' at the start of the year, by the end of the school year they had made the least gains in achievement compared with other students. As Jussim and Harber (2005) concluded, much more research is needed to tease out the interactions between teacher expectancies and student outcomes.

Expectations in the classroom

Regardless of the effect of expectations on students' achievement, an unfortunate consequence of teacher–student interactions is their visibility and impact on other students. Elisha Babad and colleagues have strongly argued that the crux of the problem lies with teachers' differential 'affect' in the classroom, which leads to low morale and student dissatisfaction (Babad, 2005).

Babad and colleagues have shown that young students (Babad, Bernieri & Rosenthal, 1991) and teenage students (Babad, 2005) can accurately detect differential teacher behaviours, including the emotional qualities, after viewing just 10 seconds of video footage of the teacher. These findings are even more remarkable considering that the video footage was 'silent', only showing the teacher's non-verbal behaviours such as body language and facial expressions. Moreover, the short video segments did not show the classroom or students to whom the teacher was talking – only the teacher's face and body.

High school students who perceived differential teacher behaviour were deeply concerned about this behaviour and teacher fairness in their classrooms (Babad, Avni-Babad & Rosenthal, 2003). Student morale also declines when teachers show favouritism towards selected students. This was particularly apparent when students perceived that teachers were giving more emotional and learning support to favoured students and not giving enough support to low achievers (Babad, 2005). The CourseMate link 'The "teacher's pet" phenomenon' describes how students reacted in classrooms where there was a 'teacher's pet'.

CourseMateExpress
Online resources
Go further: Read about the 'teacher's pet' phenomenon on this text's website.

Some research has identified some forms of teacher behaviour as 'bullying' (Twemlow, Fonagy, Sacco & Brethour, 2006). These 'bullying teachers' engaged in acts of humiliating students, hurting students' feelings and being spiteful. Fellow teachers reporting their colleagues as bullies believed that teachers who bully students do so for a range of reasons: they may feel burnt out, may be poorly trained, or even envious of 'smart students' (p. 193). Some teachers in this study also admitted to bullying their students, being victims of bullying themselves when they were students, and also working with bullying teachers. Unfortunately, schools with bullying teachers also had higher suspension rates of students (Twemlow & Fonagy, 2005).

What conclusions should we draw from this research? First, the evidence that teacher expectancy is actually associated with differential treatment of students might cause some alarm. Although it has been difficult to prove the effect on achievement, there is little doubt that the school experience of low-expectancy students who are subject to negative teacher behaviours is probably a miserable one. Indeed, Babad's (1995) research has shown that classroom morale declines when students think differential teacher behaviour is unfair. We also know that bullying, whether at the hands of other students or a teacher, is an extreme form of differential behaviour and has very negative consequences for child development and wellbeing (see Chapter 4). As such, evidence of differential behaviours should cause concern in school communities.

Second, if teacher expectancies are usually accurate predictors of student achievement, shouldn't this mean that teachers could use this information to enhance the school experiences of low-achieving students? For example, if teacher expectancies for indigenous students in Australia or New Zealand are low, shouldn't this mean these teachers react with interventions and support to enhance the achievement of these students? As Good and Brophy (2003) caution, when there are low expectations for a student *and* the teacher does little to assist them, then the student is doubly disadvantaged in the classroom.

Third, the fact that other students can see and detect these differential treatments (and bullying behaviours) raises questions about the wider effects on peer relationships and school climate. As we discussed in Chapter 4, a student's social standing with their peers can have an impact on their academic wellbeing and compliance with classroom goals.

SUPPORTIVE PEER RELATIONSHIPS

In Chapter 4 we learnt that students who are subject to peer rejection and bullying also suffer a decline in academic performance, and may be too fearful and distracted to focus well in class. As discussed in Chapter 8, student motivation is closely associated with the social goals they set for themselves. However, these goals also have important implications for classroom management. For example, students' prosocial goals for peer relationships are closely linked with prosocial goals for academic work (willingness to work with other students). Social-responsibility goals are also linked to academic-responsibility goals (willingness to follow teacher directions) (Wentzel & Brophy, 2014). As such, positive peer-relationship goals can be associated with positive classroom goals (Wentzel, 2006), and teachers can foster both types of goals to support their classroom management and the development of more positive classroom behaviours.

Teachers have an important role to play in determining the social standing of students in their classrooms and how students react to peer-relationship problems. Some research suggests that teacher classroom practices serve as a source of social information for students in the class (Donohue, Perry & Weinstein, 2003). Students seem to be aware of the way teachers view students. Those perceived to be more troublesome or difficult are more often rejected, and those who are deemed 'smart' more often accepted. Teachers in classrooms with fewer sociometrically accepted students seem to differ in their practices and relationships with students (Ben-Yehuda, Leyser & Last, 2010). Classrooms lower in peer acceptance of students had teachers who made fewer supportive comments to students, were less interested in the student's background, and had negative views about the inclusion of all students. As

discussed in Chapter 4 and later in this chapter, teachers can assist students by developing positive peer relationships , but they must also consider the impact of their own attitudes and behaviours.

A SENSE OF SCHOOL BELONGING

There is little question that positive teacher–student relationships and positive peer relationships are associated with a greater sense of school belonging (Juvonen, Espinoza & Knifsend, 2012) and greater compliance with classroom goals (Wentzel & Brophy, 2014). In particular, there is strong evidence that feelings of belonging are associated with academic achievement and students' mental health and wellbeing (Anderman & Leake, 2007). Unfortunately, school belonging and a feeling of 'fitting in' suffers a decline when students make the transition to high school. More than two decades of research has shown that this transition is associated with declines in academic achievement (Chung, Elias & Schnieder, 1998) and reductions in academic and social self-concept (Bolognini, Plancheral, Bettschari & Halpon, 1996; Wigfield & Eccles, 1994). Eccles et al. (1989; 1993a) have referred to this as a problem of **stage–environment fit**. This term describes the extent to which the school environment matches the student's development stage and the needs of early adolescents.

stage–environment fit The extent to which the school matches the needs of the developing adolescent

When students enter high school, they find a different set of expectations and a very different classroom climate. Eccles and colleagues cite increased competition between students, an increased level of adult control and reduced quality of the teacher–student relationship as the key sources of student difficulty in the early years of high school (Eccles & Midgley, 1989; Eccles et al., 1993a, 1993b). These years also coincide with a dramatic increase in bullying and peer harassment (Espelage, Holt & Poteat, 2010), which may explain the high rates of suspension and expulsion in the early years of high school. In 2012, 74 per cent of all school suspensions in NSW public schools occurred in years 7 to 10. Almost half (48 per cent) of these suspensions were for persistent misbehaviour (not including violence) (NSW Department of Education and Communities, 2013).

One of the clearest conclusions we can reach after reviewing these studies is that teachers and students have a challenging set of relationships to manage in the classroom. As shown in Box 14.1, when we listen to the voices of students, they tell us that they value teachers who are warm and supportive, but they also value teachers who are firm and directive. Students also tell us that they appreciate an orderly and well-managed classroom – the importance of good classroom organisation is discussed in the next section.

BOX 14.1 RESEARCH LINKS

WHAT DO GOOD TEACHERS DO?

Students have very clear beliefs about the sort of relationships they want with their teachers. Corbett and Wilson (2002) asked 400 low-income, inner-city high school students about these beliefs. Their responses indicate that 'good teachers' are those who show the following skills and characteristics:

- *They push students to learn* – they do not accept excuses for missed or late work.
- *They maintain an orderly and well-run classroom* – they don't need to shout or yell.
- *They are always available to provide help* – they provide help 'in whatever form the student needs it'.
- *They strive to ensure that students understand materials* – they do not rush through materials, and take time to offer help in a step-by-step fashion.
- *They use a variety of instructional techniques* – this includes group work, lectures, worksheets and hands-on activities.
- *They make an effort to understand student behaviour* – they make an effort to learn about the students' personal and after-school lives.

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THINK ABOUT

- Look closely at the students' answers. Are they more concerned with instruction and pedagogy or behaviour management?
- Do any of these student responses surprise you? If so, which answers would you not expect to hear from students?
- Do any of these good teacher skills seem challenging to you? If so, which skills might be hardest to practise and why?

ORGANISING INSTRUCTION FOR ACCESS TO LEARNING

Organising instruction refers to the thoughtful plans and strategies a teacher uses to ensure that lessons run smoothly and learning goals are achieved. Many different perspectives have been adopted to explain how instruction should be organised to manage classroom behaviour. As explained in Chapter 5, behaviourist perspectives focus on corrective strategies, rote learning and careful control of instruction. As we examined in Chapter 6, cognitive views of learning led to the idea that learners are active participants in the learning process, signalling a significant change in the way in which we think about classrooms and the nature of learning. In this chapter, we explore another perspective, one that focuses on the interaction between learners and their classroom environment. Doyle (1986, 2006) adopted an **ecological perspective** from which to consider teaching and learning interactions in the entire classroom environment. From this perspective, classrooms are complex instructional climates with many different features that affect classroom management.

ecological perspective
A view of the classroom as an environment with unique purposes, dimensions, features and processes that have consequences for the behaviour of people in that environment

The study of classrooms as ecological systems has alerted us to the fact that classrooms are busy places. The complex nature of classroom ecologies suggests that special attention must be paid to organising instruction so that students can access learning within this environment. Table 14.2 outlines the six ecological features that Doyle (2006) believes are in place in classrooms before students even arrive. This table also summarises the instructional implications arising from each feature.

Many studies have explored the complexity of the classroom environment and have provided ideas about how the classroom should be organised to provide access to learning for all students. In this sense, access to learning refers to the steps a teacher can take to ensure all students have an opportunity to learn and feel supported in the busy classroom environment.

GOOD BEGINNINGS

One of most important steps in organising instruction occurs in the very earliest days of the school year, and in the first moments of each class. It is at these times that classrooms establish the routines and norms of classroom life. There is a high level of need for students to feel there is a supportive teacher–student relationship and, as shown in Box 14.1 (see page 545), students actually prefer teachers who set clear directions but who also show warmth and support. Evertson and Emmer (2009) suggest that, like all people, children need a sense of belonging and actually feel safer when they know there is a source of authority in their classroom. They suggest four simple steps you can take to establish such a sense of belonging:

1 *Speak politely and calmly.* Students need to hear teachers using polite language such as 'please' and 'thank you'. A calm voice is reassuring to students and shows that the teacher is in control of their emotions. Teachers act as models for the type of behaviour they expect from their students.

TABLE 14.2 Features of the classroom environment

CLASSROOM ENVIRONMENT FEATURES	IMPLICATIONS FOR ORGANISING INSTRUCTION
Multidimensionality – classrooms are crowded places with many different events and tasks, and students of different abilities	• Develop strategies for addressing the wide range of ability levels, preferences and social, emotional, cultural and linguistic backgrounds of students in your classroom.
Simultaneity – many things happen at the same time in a classroom	• Be aware of what is happening at every level; monitor the class and respond to calls for help. • Learn to have 'eyes in the back of your head'. • The challenge of simultaneity may contribute to high levels of stress and burn-out unless you develop coping strategies (see, for example, Brouwers and Tomic, 1999).
Immediacy – the speed at which events in a classroom unfold, with little time to reflect before responding	• Manage time at both micro and macro levels. • Give immediate feedback to students during face-to-face interaction. • Learn to allocate time appropriately for planned learning activities. • Behavioural problems are most likely to arise when students' attention, interest and motivation begin to ebb as a result of poor timing.
Unpredictability – carefully planned classroom activities do not always proceed as planned	• Be flexible – change the lesson plan if the lesson isn't working as expected. • Respond appropriately when the unexpected occurs – if necessary, stop a lesson, re-teach a concept, or check how the students are feeling. • Where possible, turn surprising or unanticipated events into 'teachable moments' or valuable learning opportunities.
Publicness – many people, often students, witness what teachers do, or learn about a teacher's actions from other witnesses	• Be aware that what you do and say is observed and may be discussed outside the classroom. • Be conscious that students can see how their peers are being treated (for example, Babad, 1995). • Use this as an opportunity to model appropriate or desirable behaviour for students.
History – class groups meet regularly and members become familiar over extended periods of time	• Class groups have accumulated and collective memories. • Memories of previous experiences form the building blocks of subsequent activities. • Routines and norms can be established for future classroom activities.

Source: Adapted from Doyle (1986, pp. 394–5; 2006, pp. 98–9).

2 *Share information.* Spend time learning each other's names and outside interests. Introduce yourself as a teacher and let students know a few of your outside interests and activities. Take time to get to know your students as individuals.
3 *Use positive statements as often as possible.* Because negative behaviours attract more attention, teachers often make more negative than positive comments. Negative statements may not tell students the correct behaviour and may create a negative atmosphere, affecting other students in the classroom too.
4 *Create a feeling of community.* Teach students how to work cooperatively and create opportunities to work together. Conduct class meetings in which routines and procedures can be established, and social skills such as discussion can be practised (Evertson & Emmer, 2009, p. 63).

ESTABLISHING ROUTINES AND PROCEDURES

Effective teachers spend a great deal of time on the careful organisation of instructional tasks by establishing routines and procedures (Evertson, Emmer & Worsham, 2000). In this way, the 'rules' of classroom learning are explained to all students. The most effective teachers do this early in the school

year, a period when they spend more time on organisational tasks than they do on instructional tasks (Cameron, McDonald-Conner & Morrison, 2005). Research shows that classrooms where teachers spent more time explaining and orienting students towards tasks actually showed increased literacy outcomes and task engagement (Bohn, Roehrig & Pressley, 2004), and higher levels of cognitive gains in understanding (Helmke, Schneider & Weinert, 1986). In general, the most effective teachers allow plenty of time for organising instruction early in the school year, resulting in less time wasted later in the year (Cameron, McDonald-Conner & Morrison, 2005).

Routines and procedures are particularly important for creating inclusive classrooms in which *all* students can access learning. Careful explanations and clear instructions for tasks are essential for all students, but may be particularly important for students with learning problems. Students with learning difficulties or conditions such as ADHD often have trouble organising themselves and managing time effectively. Students from different cultural backgrounds may also have difficulty recognising procedures and routines that are different from those experienced within their own culture. When teaching in the Pacific region, including Australia and New Zealand, it is important to remember that many Pacific cultures and Indigenous Australians have a concern for the social group that might conflict with some traditional views of classroom behaviour (Koki, van Broekhuizen & Uehara, 2000). Students from this orientation may be interested in monitoring and looking at each other's work, moving around the classroom to join peers, and perhaps not enjoying individual tasks as much. As you can imagine, some of these behaviours may surprise teachers who adopt a traditional orientation towards classroom management, but it is important not to assume that the student is deliberately disobeying classroom procedures. Rather, it is more important to carefully explain and even modify some classroom procedures to support some of these cultural differences. See Chapter 11 for further discussion of ways in which to cater for students' cultural backgrounds in the classroom.

CLASSROOM RULES

Regardless of which orientation you adopt towards classroom management, there is great commonality among theorists about the most effective classroom rules (Arthur-Kelly, Lyons, Butterfield & Gordon, 2006). The key goal of all rules should be to prevent problems that would normally interfere with learning. In this respect, it is important that rules be focused on realistic and doable behaviours that can be expected of children at different ages. For rules to have the greatest impact, their numbers should be limited – long lists of rules are not easy to remember and tend to detract from the key behaviours that you really want to focus on. It is very important to remember that rules should be stated in positive language, clearly describing the behaviour you want to see. Rules that are expressed with a series of 'Don't' instructions do not actually describe the correct behaviour to students. Rules should also be reasonable – discuss the reasons for rules with students and explain why consequences for rules need to apply. Theorists differ in the extent to which they agree about involving students in setting rules. Evertson and Emmer (2009) suggest that although many effective classroom managers do not allow students choice in the rules, they do engage in extensive discussion and explanation of rules with their students, which allows students to discuss the reasoning behind them. Finally, rules must be applied equitably and consistently. As noted by Doyle (1986, 2006), the ecology of classrooms means they are public places – students can see rules being enforced and will recognise when differential enforcement becomes unfair. These key points are summarised in a general checklist for developing rules in Box 14.2.

Evertson and Emmer (2009, pp. 23–4) suggest four key classroom rules that encompass most classroom behaviours. Note that each of these rules is worded positively and states the expected behaviour. These rules are stated in language most children will understand, but terms such as 'respect' may be a little abstract for younger students and will need to be explained using tangible examples of behaviours that define them.

- *Rule 1: Respect and be polite to all people.* This rule covers all aspects of school life, both inside and outside the classroom; the term 'all people' covers adults and other students. This will need to be discussed with students.
- *Rule 2: Be prompt and be prepared.* This rule is relevant to many different parts of the school day, including the start of the day and when students are getting ready for tasks. The rule is particularly relevant for high school students, for whom punctuality becomes a bigger problem for teachers to manage (Little, 2005).
- *Rule 3: Listen quietly while others are speaking.* This rule addresses many of the problems that can disrupt a carefully organised classroom, such as students calling out. In discussing this rule, you could invite students to tell you the types of behaviours that indicate when someone is listening.
- *Rule 4: Obey all school rules.* Although this is quite general, it allows you the chance to talk to students about rules beyond the classroom, such as rules for the playground.



BOX 14.2 CLASSROOM LINKS

RULES CHECKLIST

Rules should be few in number (six or less) ❑
Rules should be positively stated, using clear language ❑
Reasons should be stated for each rule ❑
Consequences should be stated for breaking each rule ❑
Rules should be displayed in a public place and often referred to ❑
Rules should be taught to students ❑
Rules should be enforced with equity ❑

Source: Adapted from Arthur-Kelly, Lyons, Butterfield and Gordon (2006).

SETTING RELEVANT TASKS

Organising instruction requires careful attention to the tasks we set for students. The relevance of tasks is associated with the level of interest and meaningfulness of the task to students. When students are not interested and engaged in the task, they can easily become distracted and go 'off task'. Arthur-Kelly, Lyons, Butterfield and Gordon (2006) suggest three elements to consider:

1 *Task relevance.* Consider whether the task has been introduced in a way that lets students know its meaning and importance. Remember that younger students have less 'world knowledge' than older students, so tasks have to be meaningful in a way that considers the student's experience and cognitive development.
2 *Achievable tasks.* Tasks need to be set at appropriate levels to ensure learning occurs. If tasks are too difficult, students can become frustrated, which may lead to behavioural outbursts or even avoidance of tasks. If tasks are too simple, then little learning will occur and behavioural problems can arise from boredom or work completed too quickly. Consider whether you have explained the type of effort and skills needed for the task.
3 *Ensuring success.* Achievable tasks ensure that students experience success. Success builds confidence and self-efficacy. Consider whether the tasks you set can be adapted to the learning needs of students with different ability levels – success for one student may not be the same as success for another student. Students also need feedback about success, as it helps them know if they are on the right track and creates a positive atmosphere in the classroom.

The relevance of tasks is particularly important for teaching in diverse school communities. Students from different cultures may have difficulty relating to tasks that only reflect examples from the teacher's

viewpoint, especially if the same cultural background is not shared (Koki, van Broekhuizen & Uehara, 2000). As suggested previously, getting off to a good start with students includes finding out a little about their interests and background – this information can be useful when planning classroom tasks.

SMOOTH TRANSITIONS

As we saw in Doyle's analysis of classroom ecology, the typical classroom is made up of many different events. As each classroom activity changes, the classroom is at a point of transition to a new activity. Transitions also occur when students are entering and leaving the classroom. An astonishing amount of time can be taken up by these transitions, with some research suggesting up to 31 transitions per day in a standard primary school classroom, taking up approximately 15 per cent of all classroom time (Rosenshine, 1980). Unfortunately, inappropriate behaviours are more likely to occur at these times.

Smooth transitions are linked to the effectiveness of classroom routines and procedures. Arends (2004) suggests that beginning teachers need to attend to transitions as a series of steps that they want students to follow. In addition, effective teachers use a series of 'cues' and 'signals' to alert students to a change in pace or type of activity. Consider the following steps that a teacher might undertake to transition students from a teacher-directed activity to an individual student activity at their desks:

- Teacher cue: 'We are now going to do a short activity to try out some of these ideas. I will leave these notes on the whiteboard and I'd like you to use these to complete the activity'.
- Step 1: Put your notebooks away and clear your desks.
- Step 2: You will need one pen or pencil and the worksheet that Darren is handing out now.
- Step 3: Begin your work as soon as you get your worksheet.
- Step 4: Raise your hand if you would like some help from me.
- Teacher cue: 'We have five more minutes to complete this worksheet before we will return to the whole group to discuss our ideas'. (Arends, 2004, p. 190)

Initially, the teacher might need to write these steps on the whiteboard or have them printed on a worksheet, but these instructions become routines as students gradually learn what teachers expect of them. Younger students may need prompts and reminders more often, while students with learning difficulties or ADHD may need special assistance. Transitions can be harder for these students as they may have trouble refocusing attention after periods of 'down time' (Beattie, Jordan & Algozzine, 2006). Transitions that are carefully teacher-directed, with minimal 'down time', are less likely to result in classroom-management problems.

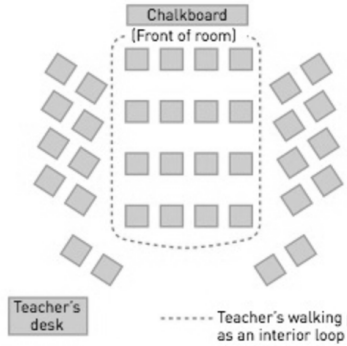
ORGANISING THE PHYSICAL SPACE

Classrooms are also physical spaces, and you can probably remember several ways of organising tables and chairs from your own classroom experiences – straight rows, small groups, horseshoe shapes, a circle of chairs and so on. Classrooms also have other areas and 'zones' that need to be carefully organised – a large sitting area for floor work is common in primary schools, and secondary schools have laboratories and creative spaces; most classrooms have storage areas and a teachers' desk area.

Jones' (1987) ideas about classroom management include a plan for arranging desks to allow the teacher space to move around the classroom. A teacher's walking path should enable them to supervise students through close proximity (1–3 metres) and eye contact. An example of a classroom arranged to provide a walking path for the teacher is set out in Figure 14.2. If you choose to arrange your desks in different formats, you must still consider the walking path and ensure you can access all students at all points of the classroom.

The study of classroom ecology has shown us that the physical design of settings has clear instructional and group-management implications. If you observe the classroom diagram in Figure 14.2, you will notice that it is set up in a traditional row format. Some of the earliest studies of classroom ecology

showed that this type of classroom setting was related to the level of interaction between teacher and students. Adams and Biddle (1970) discovered that the front rows and centre seats were the 'action zone' of the classroom. Students sitting in these seats experienced the highest level of interaction with the teacher. These findings have clear classroom-management implications. Teachers must take care to ensure that interaction with students is spread equitably around the room. We might also consider how the action zone of the classroom could be used to our advantage as teachers. Students who require specialised help or have trouble paying attention might be seated in the action zone or at least in close proximity to the teacher's walking path.



Source: Wolfgang, C. H., *Solving discipline problems: Methods and models for today's teachers*, 3rd ed., Boston: Allyn & Bacon, 1995. Figure 8.4. Reproduced by permission of John Wiley & Sons, New York.

FIGURE 14.2 The teacher's walking path as an interior loop.

Evertson and Emmer (2009) provide four keys to good classroom layout. Each of these keys has clear instructional implications.

1 *Keep high-traffic areas free of congestion.* Just as the teacher needs an easy walking path, students also need clear paths to enter and exit the room or to reach materials. High-traffic areas such as the pencil sharpener or the bin can also be places where students gather, and can become sites of distraction. These high-use areas should be separated from each other so that groups of students do not build up in one area.
2 *Be sure all students can be easily seen from all areas of the classroom.* Effective teachers ensure they can monitor students from all angles of the classroom. Keep a clear line of sight to all work areas and be very careful of the placement of larger pieces of furniture that can block your view of students.
3 *Keep materials and supplies in handy locations.* This is especially relevant in primary school classrooms, where all materials are typically located in one classroom. Time wasting can occur during transitions if students need to walk to different locations to collect commonly used items. Be aware that materials and supplies can also be a source of distraction if they are too handy and visible to students. Use drawers and boxes to keep materials away from distractible students.
4 *Be certain that students can see all presentations and displays from where they are seated.* Fixed pieces of classroom furniture such as the blackboard or whiteboard can limit how you organise your classroom. Try to minimise the number of times students must crane their necks or turn their chairs around to see the main instructional space. Keep this space in an area where the majority of students can easily see the teacher. Presentations and displays can add colour and life to the classroom, but they can also be distracting. Ensure that the main instructional space only includes posters and aides that are the most relevant to that lesson or activity.

In the 'Arranging your own classroom' CourseMate link, you will find an interactive activity that allows you to apply the four keys of good classroom arrangement (Evertson & Emmer, 2009). Your challenge in this activity and in your future classrooms will be to juggle many features of the classroom ecology, as shown in the activity's real classroom example.

CourseMateExpress
Online resources
Try arranging your own classroom with the **Interactive activity** on this text's website.

GROUP MANAGEMENT FOR FACILITATING ENGAGEMENT

In the previous section, we introduced the theory of classroom ecology and some important instructional steps that teachers can take to organise lessons in this environment. In this section, we look more closely at the ideas of ecological theorists, who believe that classrooms comprise complex social groups with special management considerations. Doyle (1986, 2006) suggests that classrooms are organised around a set of activities that vary in terms of how students are involved and how the classroom is managed:

- *Recitation or teacher-led activities.* These frequently involve a whole-class instructional format in which teachers give instruction, ask questions and call on individual students to give answers or recite responses. These types of activities might be used for introducing new materials, reviewing materials covered and checking student understanding.
- *Seatwork activities.* These involve students working independently at their own desks to complete assigned activities. Teachers are free to move around the classroom and monitor activities at this time. These types of activities can be used to give students independent practice and time for individual completion of work.
- *Group activities.* These are associated with students working together in small groups to complete tasks. As discussed in Chapter 6, there is a wide range of cooperative grouping systems, ranging from peer tutoring to reciprocal teaching, and many other cooperative learning strategies.

It is unlikely that teachers would use only one approach to grouping their students. In particular, Brophy (1988) suggests that although most teachers opt for whole-class or teacher-directed strategies, in which they first explain or demonstrate skills, they also use follow-up activities that involve individual seatwork tasks or small cooperative groups. How do teachers manage the groups during these diverse activities?

STRATEGIES OF EFFECTIVE TEACHERS

Each of the different classroom activities requires teachers to be particularly aware of group-management implications. Kounin's (1970) study of effective teachers is now a classic piece of research that has shaped our understanding of the strategies used by the most effective classroom teachers (see Table 14.3).

TABLE 14.3 Strategies of teachers in well-managed classrooms

STRATEGY	TEACHER BEHAVIOURS
With-it-ness	These teachers have 'eyes in the back of their head'; they constantly scan the classroom for potential disruptions, and they seem to see a disruption almost before it starts. Teachers who are 'with it' have low levels of misbehaviour.
Momentum	Effective teachers maintain the flow of the lesson and do not engage in behaviours that slow down the pace of the lesson. In contrast, 'flip flop' teachers can slow down the pace of the lesson by 'flip flopping' from one instruction to another. Teachers can also 'overdwell' on instruction by going over the same points again and again. Misbehaviour increases as the momentum decreases.
Smoothness	Effective teachers maintain a smooth flow of activities. 'Flip flop' teachers cause disruption and 'dangle' teachers might start an activity and then leave it 'dangling' to do something else, or might backtrack to explain an instruction they forgot.
Group alerting	Good teachers use a range of cues and signals to keep the group alert and focused, such as waiting a few seconds for quiet, calling on the group for responses, and asking students to use signals to show they can answer a question.
Accountability	Good teachers also keep the group accountable. Strategies such as questioning keep students accountable to the goals of the lesson. Signals that indicate that students should listen to their peers, or wait their turn to speak, also make students accountable to one another.
Overlappingness	Effective teachers can do more than one thing at a time; for example, using signals such as eye contact to bring a student back to attention, while also continuing with the lesson. 'Flip flop' teachers might disrupt the momentum of a lesson by stopping to correct a student, while more effective teachers use good overlapping skills to continue the lesson.
Challenge arousal and variety	Good teachers keep students enthusiastic and involved in seatwork activities by providing varied tasks and assignments that are targeted at the right level of difficulty.

Source: Adapted from Kounin (1970).

THINK ABOUT

- Which of the effective teaching behaviours in Table 14.3 do you recognise from your experience as a learner?
- Can you recall a teacher who had 'with-it-ness' or was a 'flip-flop' teacher?
- Can you think of a range of cues or signals that an effective teacher might use to manage student behaviour? Remember to include non-verbal cues as well.

Kounin examined the nature of teacher behaviour when students were engaged in typical classroom groupings of teacher-led and seatwork activities. Kounin was trying to understand the most effective use of discipline in classrooms, but he discovered something quite surprising. He found that teachers in both well-managed and poorly managed classrooms used quite similar disciplinary approaches. Therefore, the discipline of individual students did not explain why some classroom teachers were more effective than others were. Rather, he discovered that teachers in the well-managed classrooms had a special talent for managing the *whole* classroom group, preventing misbehaviour from occurring in the first place. Some of the special skills identified in Kounin's research have now become standard descriptions of the most effective teaching strategies. These principles still apply in classrooms today. For example, Kennedy-Lewis (2012) conducted close case studies of teacher practices in specialised community classrooms for students who had been expelled from other schools. Very successful teachers from a range of pedagogical approaches employed consistent use of strategies such as 'with-it-ness' and momentum to build accountability, commitment and rapport with their students. In contrast, teachers who lacked with-it-ness had more harsh disciplinary approaches with students and wasted a lot of class time on disciplinary management of students' off-task behaviours. Kounin's observations have stood the test of time and reflect many of the principles of classroom management discussed so far, including the use of effective management strategies to prevent misbehaviour.

STRATEGIES FOR GROUP MANAGEMENT

Kounin's research, along with many other research studies, has given us a number of strategies for managing groups effectively. Student engagement in each of these group settings must be carefully addressed. As explained in Chapter 8, engagement is characterised by students' on-task behaviours, emotional and cognitive responses, and personal participation in the learning process. As you will see in the following summaries, the engagement of students is closely related to group management and the instructional methods examined in the previous section.

- *Recitation or teacher-led activities.* In these activities, the teacher assumes control of instruction and manages the whole group simultaneously. One criticism of teacher-led approaches relates to the idea that such a high level of teacher control calls for a passive level of student engagement (see Box 14.3). This may have significant implications for engagement in the classroom. For example, learners with ADHD have been shown to experience greater problems staying on-task when they are passively engaged in activities such as sitting and watching the teacher (Vile Junod et al., 2006). As such, teachers must have a high level of *with-it-ness* because



Source: © Monkey Business Images/Shutterstock

FIGURE 14.3 Some classroom activities may be better suited to group work. This classroom arrangement is allowing students to collaborate on an engaging task.

BOX 14.3 RESEARCH LINKS

STUDENT SELF-REGULATION IN TEACHER-LED, SEATWORK AND SMALL-GROUP CONTEXTS

Stright and Supplee (2002) conducted a study to explore student self-regulation in teacher-led, seatwork and small-group instructional contexts. They proposed that different instructional contexts might test students' capacity for self-regulation. The study involved 51 Grade 3 children who were observed in their classrooms over the course of one school year. The students were all completing maths or science lessons during the observations. The researchers recorded the children's capacity to self-regulate in five different areas:

1. *Attention to instructions* – the capacity of the child to listen to instructions and wait for instructions, and their capacity to follow the instructions independently.
2. *Seeking help when needed* – asking for assistance, seeking clarification and asking for additional instructions.
3. *Monitoring progress* – checking work, correcting errors, trying new methods or re-reading instructions.
4. *Organisation* – the level of organisation shown by a child when approaching tasks.
5. *Metacognitive talk* – the child discusses their own thinking strategies with teachers or peers, including sharing problem-solving strategies, explaining why a strategy was used, and verbalising approaches for an academic task.

The results of the study confirmed that instructional groups were related to student's self-regulation. During teacher-directed instruction, students were less likely to attend to instructions, monitor their work or ask for help, but they did show more organisation. During seatwork, students were significantly more likely to monitor their work, attend to instructions and seek help. Small-group activities yielded the highest levels of attentive listening, instructions being carefully read, and metacognitive talk. In contrast, most students did not discuss their thinking strategies during teacher-directed or seatwork activities.

Stright and Supplee concluded that different types of classroom groupings might send different signals to students about expected behaviours. Students may see teacher-directed activities as a passive time in the classroom, and hence self-regulation is reduced. They may wait until seatwork or small-group activities before attending to instructions carefully. Students may feel too intimidated to ask questions and seek help during teacher-directed instruction, or perhaps they receive a signal that this is not the time for asking questions.

ACTIVITIES

1. This study suggests particular advantages of small-group instruction. Draw up three lists and summarise the effects on self-regulation across the three settings.
2. How would you manage your classroom groups to help students develop self-regulation?
3. This study focused on Grade 3 children. Would you expect any difference for older children for whom self-regulatory skills are more developed?

instruction is often located at the front of the room and not close to where problems may arise. The teacher must also maintain a high level of *momentum* and *smoothness* because all learning is assumed to flow from the teacher to the student. Teachers will need clear *routines* and *group-alerting strategies* to manage question-and-answer strategies used during these activities.

- *Seatwork activities.* These activities change the nature of group management considerably. During this time, the management exercise is spread across individual students who are usually more actively engaged in the completion of assigned activities. Kounin's research showed that *variety and*

challenge was the most important factor related to student engagement during seatwork. This is hardly surprising because the focus has shifted from teacher control of instruction to independent completion of tasks, which requires a high level of self-directed focus from students (see Box 14.3 for a discussion of self-regulatory behaviour during seatwork). Because students are working independently, on-task behaviour cannot be assumed during this type of activity. A high level of *with-it-ness* is essential as the teacher must monitor and scan the classroom for potential problems. Teachers will need to be skilled at *overlappingness* as they attend to individual students while remaining aware of events elsewhere in the classroom.

- *Group activities.* These involve small groups of students completing assigned tasks or projects. These groups are in themselves complex ecological systems. Kounin's research was conducted at a time when fewer classrooms used small-group or cooperative learning activities. However, later research has shown that the effective group-management skills identified by Kounin are just as critical in small-group cooperative learning activities in the present day. In a study of 56 cooperative learning lessons, Emmer and Gerwels (2002) found that the most effective teachers were *with-it*, providing high levels of monitoring of group interactions. They made sure that group members were *accountable* for their progress, and they provided hands-on materials and props to be shared by the group, hence providing *challenge arousal and variety.* As discussed in Chapter 7, effective management of small-group work activities requires special attention to social-skill development in the whole group. Specialised social skills involving communication, problem solving and diplomacy can be taught to the whole group as a part of the *routines and procedures* expected during this type of activity.

In summary, there are a variety of approaches to group management in classrooms, and some evidence suggests it may not be wise to stick to a single form of group structure in everyday classrooms. While evidence suggests that primary school teachers are quite adept at using multiple group structures (NICHD ECCRN, 2005), some secondary school teachers who adopt traditional orientations might be more reluctant to move away from traditional teacher-led groupings. As shown in Box 14.3, the structure of groups can affect the self-regulation of students, so a mixture of grouping structures might serve to develop a greater range of developmental processes.

SELF-REGULATION AND SOCIAL SKILLS

One of the most significant changes to occur in the management of classrooms in modern times is the emphasis on social skills and self-regulation. Maintaining control and order remains the hallmark of most approaches to classroom management, but the means to this control has increasingly shifted from teacher to student (Carter & Doyle, 2006). In Chapter 6, we examined self-regulation as a cognitive activity involving the planning, directing and evaluating of one's own thought processes, and in Chapter 8 we explained some theories that link self-regulation with student motivation. As defined in Chapter 4, social skills are specific behaviours that lead to desired relationships and social outcomes for the individual, and these skills may vary across situations and contexts. In combination, self-regulation and social skills are critical tools through which human beings access their world; for students, this includes forming successful social and academic relationships, and controlling the behaviours and impulses that might otherwise undermine these relationships. Many approaches to classroom management now integrate approaches to self-regulation and social skills training. These approaches generally believe that misbehaviour arises from a lack of appropriate social skills or self-regulation.

SELF-REGULATION APPROACHES

Students learn many self-regulatory skills in the everyday classroom in the first days of school – raising one's hand before speaking, waiting your turn to speak, and learning to be patient while standing in queues. Later in school life, self-regulatory learning continues – managing emotions in playground spats, stopping and thinking before answering in class, and increased awareness of the responses and reactions of others. Although many of these skills are learned incidentally or emerge because of typical developmental processes, Rogers (2003) maintains that these skills are in fact critical *academic survival skills*, and suggests that many learners will need quite explicit instruction in mastering them. Teachers can play an important role in teaching these skills by reinforcing expected routines and behaviours, and providing clear guidelines for transitions between activities. Students with learning and attention difficulties may require more explicit instruction where the teacher can provide direct explanation of expected behaviours, written or visual cue cards, and verbal and non-verbal signals as a reminder.

self-monitoring strategies
A self-regulatory strategy in which a student pays attention to their own thinking or behaviour and can take steps to change or correct that behaviour

In terms of more specific approaches, students are typically taught a range of strategies to assist in monitoring and reflecting upon their own behaviours – particularly those behaviours associated with acting out and reacting inappropriately. Many of these approaches have arisen from cognitive-behavioural therapies which explicitly teach self-regulatory skills, with an emphasis on the student's planning, monitoring or awareness of their own behaviour. For example, in evaluating a strategy to assist students with ADHD, Guderjahn, Gold, Stadler and Gawrilow (2013) found that children who had been specifically trained to consider their goals and make plans for their behaviours fared better than students who merely set goals. **Self-monitoring strategies** can also assist some students to recognise and describe their own behaviours by monitoring and recording their own behaviours (Jones & Jones, 2007). This may not be helpful for students with self-awareness and self-reflection difficulties (see Guderjahn, Gold, Stadler & Gawrilow, 2013, for a discussion) and some students may need scaffolds and supports to enable this behaviour. For younger students, desired behaviours can be recorded on pictorial charts, while older students may need a discrete card or a diary entry.

self-talk strategies
A self-regulatory strategy in which students can use internal dialogue in their own mind to send themselves messages about their behaviour or performance

Self-talk strategies can also be used by students who have a reasonable degree of self-awareness. These strategies literally involve students giving themselves verbal cues about how to behave. The main idea with this strategy is to replace negative or absent self-talk with positive and self-reinforcing internal speech. Students can use self-talk to follow instructional steps ('Next, I need to check my answers') or to control negative emotions ('I can finish this if I slow down and relax') (Jones & Jones, 2007). Teachers will need to assist students by providing reinforcement and some strategies to assist in applying self-regulation strategies, and it is important to remember that direct instruction in specific techniques may be essential. As we will see in the following section, many social-skills training programs combine self-regulatory training in a specific instructional model (see Box 14.4).

SOCIAL SKILLS AND PROBLEM-SOLVING APPROACHES

In Chapter 4, social skills were explored as a facet of social competence leading to the development and maintenance of healthy peer relationships. In terms of classroom management, social skills are also linked to academic competence and achievement. This is because many of the same social skills that contribute to social competence also contribute to academic competence. Skills such as paying attention to information, following directions, compliance with teacher (or peer) requests, and making appropriate responses, are just as critical in academic contexts as they are in social contexts

(Carter & Doyle, 2006). Quite simply, the ability of the child to participate in the classroom in a socially acceptable manner influences their access to academic experiences. If students call out or otherwise act disruptively, or cannot share information with peers, they are likely to be corrected or ignored by teachers and peers (Weinstein, 1991, cited in Carter & Doyle, 2006).

As explained in Chapter 4, most social-skills instruction employs direct instruction, in which specific skills are identified and the child is explicitly trained in those skills. However, many of these programs fail because the training is not effectively reinforced in naturalistic settings such as the classroom and playground. Teachers can play a significant role in developing children's social skills in naturalistic, everyday teaching strategies. One particular focus is on the child's capacity to resolve conflict and solve social problems (Elias & Schwab, 2006). Social problem solving involves the capacity of the student to recognise and interpret the cues of social situations accurately, plan and formulate an appropriate response, and exert self-control over their emotions to enact an appropriate response.

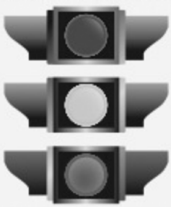
One approach that meets the criteria of being teacher-led and classroom-based was developed in Australia by Linda Peterson (1994). This approach, known as Stop, Think, Do, is a cognitive-behavioural intervention designed to address the needs of children with self-regulation and problem-solving difficulties. These children often have significant problems in interpreting social cues accurately and coming up with appropriate responses (Crick & Dodge, 1994). The Stop, Think, Do approach is widely advocated by Australian educational authorities and used in a large number of schools. Refer to Box 14.4 for an explanation of the approach and strategies.



BOX 14.4 CLASSROOM LINKS

STOP, THINK, DO – THE TRAFFIC LIGHT SYSTEM

Stop, Think, Do is based on the three stages of the traffic light signal:



- **STOP** (red) when faced with a problem and think about how you feel before acting.
- **THINK** (orange) about as many alternatives or strategies for solving the problem as you can, remembering that all solutions have consequences.
- **DO** (green) take the most appropriate course of action. If unintended consequences arise, go back to STOP and THINK again.

The instructional strategy

Stop, Think, Do can be used as a form of social-skills training and as a behaviour-management technique for teachers. The following steps illustrate the instructional strategy for use as a social-skills training tool with students. In this strategy, students are trained to use the traffic light system as an independent self-management strategy, while teachers stand by as a third-party back-up.

The strategy starts with the question 'Who owns the problem?', generating problem ownership by the student.

1 **STOP:** Students are urged not to react but to look and listen to social cues to learn about the problem. Teachers support the student by clarifying the problem and eliciting feeling responses: 'I feel ... because of this problem'.
2 **THINK:** Consider possible solutions with the student; encourage the student to evaluate the various solutions.
3 **DO:** Encourage the student to choose the best solution and act on it. If the solution is not effective, guide them back to the beginning of the process to think again.

Research and evaluation of the program has illustrated its effectiveness across age groups ranging from children in the early years of school to children in high school. In one Australian study, primary school children who were judged to have poor social competence showed significant gains in making friends, being accepted by peers, coping with teasing, and controlling aggressive and shy behaviours (Nimmo, 1993). In another study with young adolescents with mild intellectual disabilities, training in Stop, Think, Do resulted in significant gains in verbalising feelings, controlling anger and learning to respond to teasing in non-aggressive ways (Beck & Horne, 1992). Another intervention was conducted among Year 8 students in a high school in Sheffield in the United Kingdom (Day, Murphy & Cooke, 1999). Teachers were trained to use Stop, Think, Do in regular classrooms, resulting in significant improvement in problem solving among the Year 8 participants. Teachers were particularly impressed by the results for students with emotional and behavioural problems, who actually became more engaged and less disruptive over the course of the program.

Social-skills and self-regulation strategies also appear in specific approaches to the management of problem behaviour and student conflict, and will be examined further in the remaining sections of this chapter.

INTERVENTIONS TO MANAGE CLASSROOM BEHAVIOURS

The teacher asks Suzy to suggest a solution to a problem on the blackboard during a mathematics class, and when Suzy gives a funny reply, all the students laugh. The teacher becomes very angry. After that, whenever that teacher asks Suzy a question, everyone giggles. What can the teacher do to stop this behaviour?

In most classrooms, student behaviour is generally appropriate and does not present a challenge to the teacher. However, there are times when a few children whose behaviour is inappropriate or a nuisance cause disruption to a class. Occasionally, teachers also encounter students whose behaviour is so disturbed or difficult to manage that teachers need to seek additional help from experts, either to develop better strategies for coping with particular students or to find some other solution. It is beyond the scope of this chapter to explain the complexities of the behavioural disorders that affect a small proportion of students. These disorders are complex and best addressed through specialised strategies and remedial programs, and may require the classroom teacher to liaise with other professionals to develop appropriate behaviour support interventions (see Chapter 10). The key focus of this section is to examine interventions that are broadly applicable to the management of student behaviour in everyday classroom contexts – including the range of problem behaviours typically reported by both teachers and students. As you read this section, it is important to reflect upon the need to balance the preventive strategies outlined in the previous sections and the interventions outlined in this section.

WHAT TYPE OF PROBLEMS DO TEACHERS REPORT?

CourseMateExpress

Online resources
Watch a **video** in which children tell us what 'good' teachers do to manage student behaviour.

Many of the behaviour problems reported by teachers concern relatively minor but disruptive behaviours. These behaviours include talking out of turn or hindering other students, behaviours that we might say are relatively trivial in nature (Beaman, Wheldall & Kemp, 2007). Both primary and secondary school teachers report similar types of behavioural concerns, with some variation as children move through the levels of schools (Little, 2005). For example, Little found that talking out of turn was most troublesome in the junior level of high school, while idleness and punctuality became greater concerns in the senior levels of school. There is no doubt that these behaviours might

be considered minor, but it is their frequency that can cause disruption and a great deal of stress to teachers (Infantino & Little, 2005). It is important to bear in mind that these types of behaviours are very different from the perceptions presented in common media sources. Behaviours involving aggression and violence attract media attention, yet these are not the typical troublesome behaviours reported by teachers.

WHAT DO STUDENTS THINK ABOUT PROBLEM BEHAVIOURS?

It is interesting that both students and teachers feel that too much time is taken up with managing relatively minor disruptive behaviours (Infantino & Little, 2005). Students themselves report that talking out of turn, talking back to teachers, being out of seat and eating in class are the most troublesome behaviours (Infantino & Little, 2005). Unfortunately, teachers and students (and their parents) differ in their beliefs about the sources of behavioural problems. Although many teachers blame the student's home life or the child's personal characteristics, students and parents cite unfairness and student vulnerability as major factors in causing reactive discipline problems (Porter, 2007). Teacher behaviours perceived to be unfair include rudeness to students, unfairly blaming students and being inappropriately strict or lenient. These behaviours are sources of reactive feelings from students and parents. Parents and students also recognise that some students are more vulnerable than others in classroom life. These are students who are recognised by their peers as suffering emotional or learning difficulties, and may also have family difficulties (Miller, Ferguson & Byrne, 2000). Babad's (1995) research showed that when teachers responded to these students by giving them the extra attention and support they needed, students actually appreciated this type of differential behaviour. Students saw this differential treatment as appropriate, and feelings of warmth and positivity were greater in these classrooms. However, when teachers denied a vulnerable child this support, students reacted with low morale and felt their classrooms were less supportive.

HOW DO TEACHERS RESPOND TO BEHAVIOURS, AND IS THIS APPROPRIATE?

It may not surprise you to hear that teachers and students sometimes disagree about the most appropriate response to behaviour. In part, this may be associated with the type of responses that teachers use. Johnson, Whitington and Oswald (1994) found that about 70 per cent of Australian secondary school teachers employ a 'traditional' approach to classroom management. This approach is associated with more teacher control, strictness and punishment. Students in Australia report that their teachers use a higher level of punitive and aggressive responses than is reported by students in other countries (Lewis, Romi, Xing & Katz, 2005). Such responses included escalating punishments, shouting at students, deliberately embarrassing students and using sarcasm towards students. Unfortunately, punitive and aggressive management styles are associated with greater disruption to classroom life and negative reactions from students. Lewis, Romi, Xing and Katz (2005) contend that this could create a climate of 'cyclical' hostilities between teacher and student, causing disruption to other members of the class. Lewis and colleagues argue that while it is understandable that teachers react to provocative student behaviours, it is very important that teachers remember that they are the professionals in the classroom, and that they should not allow themselves to be locked into a 'vicious cycle' (Lewis, Romi, Xing & Katz, 2005, p. 14) of reactivity involving teacher and student.

TYPES OF INTERVENTIONS

As we have seen in the preceding sections, much of the teacher's work in managing classrooms concerns preventive approaches to classroom management. The establishment of warm and supportive relationships, along with clearly organised instructional and group-management strategies, are critical to preventing the emergence of classroom-management problems. In addition to these preventive strategies, teachers must also develop a clear, well-thought-out plan that provides a framework for maintaining and responding to student behaviours. At the beginning of this chapter, we learnt that teachers might hold different beliefs about learning and classroom management. In the final section of this chapter, we will examine these approaches using Wolfgang's (1995) classification of 'interventionist', 'interactionalist' and 'non-interventionist' approaches. Each approach may provide guidelines for coping with some forms of disruptive behaviour, but it is important to remember that very few teachers ever adopt one single approach or orientation, because classroom management is far more complex than that.

Interventionist approaches

Interventionist approaches are guided by a belief that young people *need* adults to exercise control over them. In other words, they are incapable of controlling themselves. These approaches are based on the idea that external forces (such as discipline from teachers and other adults) shape and guide the behaviour of the young person. In this way, many of these approaches are strongly influenced by the principles of behaviourism and applied behaviour analysis (see Chapter 5), and are also consistent with the 'traditionalist' approach adopted by many secondary school teachers.

assertive discipline
A high level of teacher control, with firm limit setting and supportive feedback

classroom discipline plan
A planned approach to responding to behaviour, which avoids overly hasty and emotional responses and leads to consistent reactions

Lee and Marlene Canter (1992) adopted an interventionist approach known as **assertive discipline**. They strongly believe that firm teacher control is essential for successful classrooms, but they also believe that teachers should be fair and positive in their relationships with students. This control is attained through a **classroom discipline plan**, which should contain the elements of:

- establishment of rules
- supportive feedback – 'Catch them being good'
- corrective procedures.

Establishment of rules

According to the Canters, teachers must set rules by clearly establishing how they want students to behave. These are expressed as observable, doable rules, and should be limited to a maximum of five general rules. They must be observed at all times throughout the day, and the teacher must be consistent in responding to all rule violations in the same manner. Therefore, the consequences of rules also need to be clearly thought through and explained to students.

Supportive feedback

The Canters suggest that teachers must 'Catch them being good'. This is based on the assumption that positive behaviours will be reinforced by sincere and meaningful feedback from teachers. Supportive feedback is based on the concept of praise. Praise in this model is simple, direct and specific about the behaviour that is being praised. The Canters advocate the use of rewards such as certificates, notes sent home and special privileges. The Canters also advocate the use of praise as an incentive to other students who are not behaving appropriately.

Corrective procedures

Under the model of assertive discipline, students must be left in no doubt that breaking the rules will be met with negative consequences. However, the Canters are very clear that negative consequences or

punishments should not be harmful – they should not embarrass or humiliate the student. Unfortunately, this may conflict with a key idea about tracking student behaviour. When tracking misbehaviour, a number of systems are recommended in which the teacher writes the student's name on a board at the first sign of misbehaviour (Canter & Canter, 1981). For subsequent misbehaviour, a tick is placed next to the name, until a maximum of five ticks is reached. Each tick represents an escalating set of consequences, which become more severe as the number of ticks increase. Clearly, such a public method of naming and punishing students may cause humiliation or even reactive resentment in students, thus Canter (1996) later recommended that teachers might like to use a clipboard or notebook to keep their tracking private.

Corrective procedures also involve assertive verbal demands in which the teacher repeats the desired behaviour several times, commencing with a hint and escalating to a demand:

- Teacher: It is time to put that phone away now Susan. (hint)
- Susan: I haven't finished this message yet.
- Teacher: Susan, I would like you to switch your phone off and put it in your bag.
- Susan: Just wait a minute!
- Teacher: Put that phone away now! (demand)

When students do not comply with a demand, negative consequences must follow. A range of negative consequences have been suggested, including the well-known strategy of the 'time out', in which a student is isolated for a period of time, or the withdrawal of privileges and detentions. The teacher may decide to withdraw a favourite activity from Susan or contact her parents. Parent support is an essential component of the Canters' model. Parents are informed about the disciplinary approach and their support is expected by attending parent–teacher meetings and backing up the teacher by enforcing expectations regarding homework.

Strengths and limitations of interventionist approaches

The Canterian model of assertive discipline is widely applied in Australian schools but is not without its critics. To be fair, the notion of assertive discipline is underpinned by the idea that good discipline shows care and concern for all students. However, it is also underpinned by a strong notion of the teacher's right to control their classroom. As noted by Porter (2007, pp. 42–3), assertive discipline strongly asserts the right of the teacher to 'manage *your* classroom' (Canter & Canter, 2001, p. 33) and set '*your* classroom rules' (Canter & Canter, 2001, p. 66). Such strong methods of teacher control and use of reinforcement raise questions about the long-term effects on children's social and emotional skills, and on their capacity for self-regulation.

Some commentators have raised a concern that there is a lack of empirical evidence about the effectiveness of assertive discipline. As stated by Brophy (2006), the Canters have not published empirical research about their program. Earlier reports presented conflicting and equivocal evidence about the assertive discipline method (Render, Padilla & Krank, 1989), and some reviewers have noted that the assertive discipline approach does not consider other sources or reasons for student misbehaviour, such as poor quality teaching (Crockenberg, 1982; Curwin & Mendler, 1989). Of greater concern are the effects of punishment on students. As outlined by Burden (1995), punishment is largely ineffective in changing students' behaviour because it does not teach behaviours that are more appropriate. Punishment promotes aggression in some students and causes others to withdraw or become less engaged in learning. Finally, assertive discipline is a reactive strategy and, as with any behaviour-management approach, it must be embedded within a wider system of comprehensive classroom management focused on preventing misbehaviour from occurring in the first place. At the following CourseMate link, you can look more closely into a behaviourist strategy known as 'positive

CourseMateExpress
Online resources
Go further: Learn more about positive behaviour systems.

behaviour support' (Simonsen & Sugai, 2009), which contains a specific plan for addressing student behaviour at a school-wide or 'system' level.

Interactionalist approaches

Interactionalist approaches view children's development as a product of interaction between internal and external factors. Rudolf Dreikurs (1968), Thomas Gordon (1974) and Maurice Balson (1992) exemplify the theorists who emphasised the role of the school in preparing students to live in a democratic society through the sharing of power between teachers and students.

Dreikurs' ideas about democratic teaching emerged during the movement towards humanism and reflected a child-centred view of discipline (see Box 14.5). In keeping with Wolfgang's classification of the theory as interactionalist, the approach does retain some elements of teacher control in redirecting the child's misbehaviour.

Dreikurs' ideas of classroom discipline are based on the main assumption that all human beings have a desire to belong and be part of a social group. Therefore, all *mis*behaviour represents a mistaken or misplaced attempt to reach the goal of achieving belonging and control in one's life (Dreikurs, 1968).

As such, the role of the teacher is threefold. First, teachers must *identify the sources of misbehaviour* by understanding the child's goal. Second, they must *break away from their typical reaction* to the child's behaviour, as the motive of misbehaviour may be to seek this reaction. Third, they must *plan a response* that reflects care and concern, and assists the child in identifying their goal and making choices about their behaviour by emphasising the logical consequences of misbehaviour.

The sources of misbehaviour

According to Dreikurs and other interactionalist theorists, children's misbehaviour is generally motivated by four possible goals (Balson, 1992; Dreikurs, Grunwald & Pepper, 1982, 1998). These goals represent different levels of the child's discouragement with the state of their life – they no longer feel a sense of belonging or significance and believe the only way to regain a sense of belonging is through misbehaviour.

BOX 14.5 ABOUT RUDOLF DREIKURS

Rudolf Dreikurs (1897–1972) spent his early years in Vienna, Austria. He graduated in Medicine from the University of Vienna and worked for a time with Alfred Adler.

Dreikurs emigrated to the USA in 1937, where he obtained a position as director of the Alfred Adler Institute in Chicago (Edwards, 1997). His primary interest was in child and family counselling, and this work led to an interest in classroom management. Influenced by Adler's ideas about children's behaviour, Dreikurs argued that behaviour is always purposeful and directed towards social goals such as gaining status, attracting attention and achieving a sense of belonging through membership of a social group. These ideas are set out in Dreikurs' key publications *Psychology in the classroom: A manual for teachers* (Dreikurs, 1968), *A new approach to discipline: Logical consequences* (Dreikurs & Grey, 1968) and *Discipline without tears* (Dreikurs & Cassel, 1990). In Australia and New Zealand, Dreikurs' ideas are evident in Maurice Balson's work (1992).


Source: National Library of Medicine

FIGURE 14.4 Dreikurs believed that in order to live in a democracy, children need to learn that freedom implies order and responsibility.

These misplaced goals reflect a hierarchical order, with goals further down the list representing the most discouraged state of the child (Dreikurs, Grunwald & Pepper, 1982). These goals are:

1 *attention* – to gain attention by any means, both active and passive, and constructive and destructive
2 *power* – to overcome feelings of inferiority, real or imagined, by exercising power and control; this could be achieved by becoming the centre of attention or striving to win a perceived battle with a teacher
3 *revenge* – to revenge their loss of status by getting even; this could include lashing out at others, destroying property, or insulting the teacher
4 *inadequacy* – to achieve a sense of care and belonging by displaying helplessness, or to avoid feeling inadequate by avoiding participation and leaving the group.

A teacher's response to misbehaviour should be to observe the student carefully in order to identify the underlying goal motivating the behaviour. Conclusions can be verified by further observation and by questioning the student.

Breaking the typical teacher reaction

Teachers should examine their own reactions to the student's behaviour as well as to the student's responses to correction. For example, when a child seeks attention, teachers may feel annoyance, but they typically respond or react to the child. As such, typical teacher reactions may reinforce the child's misplaced idea that misbehaviour gains attention, and fulfil the child's need to belong. Other examples of typical teacher reactions are outlined in Table 14.4.

TABLE 14.4 Teacher reactions to student misbehaviour

STUDENT'S GOALS	TEACHER'S FEELINGS	STUDENT'S REACTION TO CORRECTION
Seeking attention	Feels minor annoyance but responds with a comment or correction	Temporarily stops behaviour but will likely use the behaviour again to gain attention
Seeking power	Feels upset or personally challenged and fights back or gives in to the child	Behaviour persists, and if teacher overpowers child and 'wins' the battle, then further aggression may occur
Seeking revenge	Feels deeply hurt or threatened and retaliates	Behaviour intensifies or may be modified to a new form of revenge. The teacher's retaliation may be used by the child to justify theirs
Displaying inadequacy	Frustration or gives up on the child	Gives up and does not attempt to change their behaviour

Source: Adapted from Balson (1992, p. 31); Arthur-Kelly, Lyons, Butterfield and Gordon (2006, p. 157).

Plan a response

Dreikurs believed that encouragement was fundamental to achieving a change in student behaviour. This notion of encouragement is fundamentally different from the concept of praise practised by interventionist teachers. Encouragement focuses on effort rather than achievement and removes a value-based judgement about the student. In contrast, praise often arises after the child has completed a task and makes a direct link to the value of the person because they acted in a praiseworthy way. An example of the difference between praise and encouragement can be seen in the contrast between the following two statements (Arthur-Kelly, Lyons, Butterfield & Gordon, 2006, p. 155):

- Praise – 'Good girl Amy, your story was lovely'. The connotation here is that Amy is a good person because she pleased the teacher by writing a 'lovely' story.
- Encouragement – 'I enjoyed your story Amy. I bet you had fun writing it'. This statement also conveys the teacher's pleasure, but it is a personal reaction and not linked to a value judgement about Amy as a person. Rather, the intrinsic nature or goal of the child's effort is reinforced – to have an enjoyable experience of creative writing.

Teachers can also develop better relationships with their students by discussing important matters with them as soon as possible after they occur (***dealing in the present***). Communication with the student should be conducted respectfully. The teacher should talk directly to the student rather than making universal comments about their behaviour to the class. They should speak courteously, making eye contact, and be aware of non-verbal messages. Teachers can also use **I-messages** to address concerns (Gordon, 1974). These messages focus on the feelings and needs of the speaker rather than the listener. The example of encouragement to Amy is a good example of an I-message. The teacher used the personal pronoun 'I' when talking about the feeling the teacher experienced (enjoyment) and the effect of the student's behaviour (story writing) on the teacher. These statements can be used in an assertive way to discuss a problem behaviour; for example, 'When you interrupt me, I get distracted and can't help other students' (Arthur-Kelly, Lyons, Butterfield & Gordon, 2006; Jones & Jones, 1998).

I-messages
Using the personal pronoun 'I' to focus on the feelings and needs of the speaker rather than the listener

Teachers' responses to the different motives that underlie student behaviour should include the use of natural or logical consequences that follow the behaviour. **Natural consequences** are outcomes that occur without intervention, while **logical consequences** are contrived to influence behaviour. In each case, the focus is on allowing students to experience the consequences of their actions.

natural consequences
Outcomes that occur without interference

logical consequences
Outcomes contrived to influence behaviour

Balson (1992) gives examples of a natural consequence; these are:

- students who do not put their equipment away in the correct place and cannot find it the next time they need it
- students who do not study for a test and then get poor marks on the test.

Examples of a logical consequence include:

- students who forget to bring required materials to a class and as a result miss out on an activity
- students who draw on a wall and then have to clean their marks off the wall.

Logical consequences differ from punishment because they do not place the power into the hands of the punisher. Rather, the child is faced with a logical consequence of their behaviour that reveals the cause and effect of their actions. Dreikurs asserts that teachers should make a clear connection between a student's choice over their own actions and facing logical consequences. Democratic discussion in class should be used to establish expected rules and consequences, as this allows the child to understand the connection between actions and logical consequences.

Strengths and limitations of interactionalist approaches

One of the main strengths of the approach described by Dreikurs (1968) and Balson (1992) is its focus on students' understanding of why they behave as they do and the consequences of their behaviour. The interactionalist approach tends to encourage a high degree of student autonomy, as well as respect between teachers and students (Edwards, 1997). One of the main weaknesses of this approach is that teachers often have difficulty recognising the motives that underlie student behaviour. Moreover, it is probably too simplistic to explain student behaviour in terms of four basic goals, and teachers may have difficulty in identifying logical consequences for inappropriate behaviour. As argued by Kohn (1996), teachers may find it comforting to believe that logical consequences are not a form of punishment, but it probably makes little difference to the child, who may still see the consequence as a punishment. As shown in Figure 14.5, there is always the chance that planned or unplanned consequences may not change behaviour in the intended way.

Non-interventionist approaches

Non-interventionist teachers allow the process of learning to occur naturally. The work of William Glasser (1992) and William ('Bill') Rogers (1989, 1998, 2003) represents a model of classroom management in which power is shared more equally between teacher and students than in the interventionist and interactive approaches just discussed, with greater weight on students' roles and responsibilities.



Source: Martin (1987, p. 159). Used by permission.

FIGURE 14.5 In some situations, natural consequences may not be the best option.

Bill Rogers (1998) sees discipline as arising from the type of learning environment established by the teacher. He views discipline as a teacher-directed activity that seeks to 'lead, guide, direct, manage, or confront a student about behaviour that disrupts the rights of others, be they teachers or students' (Rogers, 1998, p. 11). Here, the focus is on causes of behaviour difficulties and the teacher's responsibility to guide students towards enhanced self-control, self-esteem and personal accountability for their own behaviour.

Glasser and Rogers have both argued that students misbehave because schools fail to fulfil their basic needs. These needs clearly reflect elements of Maslow's hierarchy of needs (see Chapter 7), and include:

- *safety* – feeling safe in the classroom environment
- *belonging* – feeling loved, a sense of comfort and group membership
- *power* – importance, status and being respected
- *freedom* – being free from the control of others, being able to choose, being self-directed and having responsibility for one's own actions
- *fun* – having satisfying and enjoyable experiences.

The key principle of Glasser's choice theory is the idea that *only we can control our own behaviour*. Thus, the teacher's role is to focus on their behaviour, their relationship with children, and their ability to support children in achieving a sense of control in their own lives. In Roger's approach, teachers can assist students in achieving a sense of control and belonging by helping children to meet these basic needs. They can show care for children to promote a feeling of safety in the classroom. They should promote belonging by helping children develop friendships, by giving them tasks that enhance their status in the group, and by allowing choices that encourage self-direction and responsibility. At the same time, learning should be fun (Rogers, 1998). Glasser particularly recommends cooperative learning as a strategy that can assist with many of these tasks. In particular, he asserts that cooperative groups enable students to feel a sense of belonging and a sense of power as they learn to assist less-able group members, and that they provide a means of gaining self-understanding as students evaluate their own actions in groups (Glasser, 1981, as cited in Edwards & Watts, 2008).

BOX 14.6 ABOUT WILLIAM GLASSER

A CASE STUDY OF A CHANGING PHILOSOPHY

The story of William Glasser's ideas about classroom management is an interesting case study of the importance of examining and, if necessary, changing one's personal approach to classroom management.

Glasser (1925–2013) was a psychiatrist who worked in a punitive institution for delinquent teenage girls in California. This experience led him to develop a number of approaches that particularly appealed to many school leaders and teachers around the world. Concepts such as 'time out' and 'levels' for behaviour management can be attributed to Glasser's ideas. His theory of 'reality therapy' adopted a humanist and behaviourist approach, suggesting that teachers should help children become responsible for their own behaviours. The popular take-up of Glasser's ideas led to closer involvement with schools, and in 1996, Glasser travelled to Australia to speak about his approach. However, in talking to teachers, Glasser found a very discomforting use of his methods. He found that teachers were particularly concerned with using his methods for coercive disciplinary approaches, rather than establishing better-quality classroom environments. These teachers were overly focused on the behaviourist principles of coercion and manipulative reinforcement techniques. These experiences led Glasser to revise and change his theory of classroom management.

In 1998, Glasser removed ideas of behavioural intervention and replaced these with 'choice theory' (Glasser, 1998). The central belief of choice theory is that only the individual can control their own behaviour. Glasser stated that it is not children who are the problem, but the learning environment itself. In particular, the learning environment must make it possible for children to feel a sense of belonging, power to make decisions, freedom to choose an individual learning pathway, and a sense of fun and engagement during interesting classroom activities. Glasser supported his ideas by conducting interviews with students in different countries, including Australia. He concluded that students become disillusioned by the controlling strategies of teachers, and for students with behaviour problems, this just causes their behaviour to deteriorate (Arthur-Kelly, Lyons, Butterfield & Gordon, 2006).

Other research has supported Glasser's choice theory, showing particular effectiveness for individual students with chronic behaviour problems. Most studies have reported reduced absenteeism, lower rates of return to delinquent behaviour, fewer disputes with peers, and more 'on-task' time in classrooms (Porter, 2007).

As such, this case study highlights the importance of revisiting and examining the impact of one's personal theory of classroom management.



Source: William Glasser Institute

FIGURE 14.6
Glasser's ideas have significantly influenced ideas about classroom management and discipline in Australia and New Zealand.

Teachers as leaders

Glasser (1992) argues that teachers need to become 'lead-managers', not 'boss-managers'. To show this leadership, teachers should facilitate learning by encouraging children to think deeply about the nature of learning, and to help children reach rational decisions to solve conflicts. The way in which curriculum material is presented should emphasise quality school work, with skills developed rather than facts learned, and achievement tests replaced by student self-evaluation. When disruptive behaviour occurs, Glasser proposes that teachers try to stop the misbehaviour through the use of reality therapy (see Box 14.7). Reality therapy is a cognitive-behavioural approach in which the teacher or therapist works with the student to build problem-solving skills. This approach is based on the belief that teachers can help students gain a sense of control in their lives by encouraging self-evaluation, self-regulation and choice. One of the critical points about reality therapy is that the teacher or therapist always focuses on the present behaviour, as this is the context in which change can occur.



BOX 14.7 CLASSROOM LINKS

REALITY THERAPY TECHNIQUES

Edwards and Watts (2008) provide the following steps for conducting a reality therapy interview:

1 Ask: 'What do you want to achieve in this situation?'
2 Ask: 'What are you currently doing or what have you tried to do to achieve this?'
3 Assist the student to evaluate what is working.
4 Assist the student to explore other options that may be available.
5 Plan to act, noting how, when, where and who will act.

Reality therapy is not an overnight behavioural-change technique. Like other social-skills or problem-solving approaches, behavioural change can take a long time to occur. The focus is on moving the child away from negative thoughts and towards more productive strategies for solving problems and the gaining of control in their own lives.

CourseMateExpress

Online resources
Go further: Read more about Glasser-based school management and discipline on this text's website.

Rules, rights and responsibilities

A major focus of Rogers' ideas is on the fundamental place of rules, rights and responsibilities in the operation of classroom communities. Although the curriculum is a critical element in classroom management and discipline, a teacher's primary goal is to develop self-control and self-discipline in students through the establishment of fair rules, coupled with an understanding of personal rights and responsibilities within the framework of these rules. Early in a school year, teachers need to discuss with students the fundamental rights that all people in the school should expect:

- the right to feel safe
- the right to be treated with dignity and respect
- the right to learn and teach.

Rules are the other side of rights, and function to safeguard rights. Individual responsibility for actions at school and in the classroom ensures that rules are followed and rights are respected. When misbehaviour occurs, Rogers (1998) suggests that teachers use strategies that move from least to most intrusive, depending on the seriousness of the disruption and the degree to which others' basic rights are being infringed.

Strengths and limitations of non-interventionist approaches

The strength of the non-interventionist position presented by Glasser (1992) and Rogers (1998) is in the degree of autonomy and responsibility it gives to students, allowing them to see the consequences of their behaviour and to determine possible solutions (Gordon, Arthur & Butterfield, 1996). Weaknesses concern the difficulties teachers may have in giving students increased autonomy and responsibility without, at the same time, feeling threatened by loss of control. It can be difficult, too, for teachers to help students who do not wish to cooperate in this approach. Training students through reality therapy may also require particular skills on the part of the teacher, who may not feel equipped to adopt the stance of therapist. It is worth remembering, however, that the problem-solving techniques of reality therapy are quite similar to those in approaches such as Stop, Think, Do, and teachers have found success in using such approaches in the everyday classroom.

This section has introduced three approaches that reflect the orientations of interventionist, interactionalist and non-interventionist teachers. Each of these approaches is widely used in Australian schooling and no doubt across the Pacific region. The critique of each approach suggested points that teachers should think about before adopting any single approach to classroom management. Box 14.8 lists some points about each approach that educators need to consider when planning classroom-management strategies.



BOX 14.8 IMPLICATIONS FOR EDUCATORS

MODELS OF CLASSROOM MANAGEMENT IN STRATEGY PLANNING

When planning classroom-management strategies, educators need to be aware of the following:

- In an interventionist model, effective classroom-management strategies include firm teacher control, insistence that rules be followed, and abundant use of praise along with clear punishment strategies. Teachers are responsible for developing and enforcing rules and consequences. Concerns have been raised about the capacity of students to develop personal control and self-regulation strategies.
- In an interactionalist model, students need to understand the consequences of their behaviour and also have a high degree of autonomy and responsibility. Teachers are responsible for understanding the sources of student behaviour and must use abundant encouragement before enforcing logical consequences.
- In a non-interventionist model, students need opportunities to make choices. This model encourages self-direction and responsibility in students, and includes students' recognition of class rules and their own rights and responsibilities. Teachers are responsible for guiding students and making them aware of their rights and responsibilities towards themselves and others.



THINK ABOUT

- Towards the start of this chapter, you were asked to consider which of these management styles you would prefer to adopt as a teacher. After studying specific approaches for each of these management styles, have your ideas changed? If so, how?
- Similarly, we suggested earlier that few 'real people' ever adopt only one type of approach to classroom management. Which features of these approaches would you most like to adopt?
- Do you think any features of the approaches are incompatible with one another?

SCHOOL-WIDE ISSUES AND APPROACHES

Throughout this chapter, we have largely considered classroom management from the perspective of teachers and students in classrooms. However, the responsibility for creating safe and positive educational experiences also lies with the entire school community.

CREATING SAFE SCHOOLS

In 2013, the Standing Council on School Education and Early Childhood (SCSEEC) produced an updated national framework for ensuring safe and supportive school environments, stating:

> In a safe and supportive school, the risk from all types of harm is minimised, diversity is valued and all members of the school community feel respected and included and can be confident that they will receive support in the face of any threats to their safety or wellbeing.

Source: SCSEEC (2013, p. 2). © Education Services Australia (ESA) (2013).

The principles of the framework outline the right of all members of the school community to safety and support, firmly stating that schools are responsible for developing policies and programs that support and engage all students, foster the skills necessary for developing positive relationships, and protect all children from harm and abuse. The responsibilities of school leaders and teachers are clear – they must make themselves aware of relevant policies and procedures, research and information, to help them make the best decisions, and they must engage in training and ongoing education to facilitate this process. Table 14.5 outlines the key elements and strategies of the framework.

TABLE 14.5 Elements and strategies of the *National safe schools framework*

ELEMENT	STRATEGIES AND APPROACHES
Leadership commitment to a safe school	• Leadership is being committed to an inclusive school environment with appropriate programs and strategies to foster positive school culture • Engage in evaluation, review and data collection about harassment, violence and bullying
A supportive and connected school culture	• Student connectedness to school; teacher modelling of explicit prosocial values and behaviours, positive and respectful teacher–student–peer relationships • Monitoring and responsiveness to child protection • Cultural sensitivity and recognition of specific needs of different groups in the school community (for example, Indigenous, refugee and immigrant groups)
Policies and procedures	• Develop policies, programs and procedures in collaboration with the whole school community. Ensure there are relevant policies to address and manage bullying, violence and child protection, and procedures for risk assessment and minimisation
Professional learning	• Ensure all school staff have access to appropriate professional learning that assists in development of understanding and ability to respond to bullying, violence, harassment and child-protection issues
Positive behaviour management	• Selection of an evidence-informed positive behaviour management approach with clear promotion and recognition of positive behaviour, and consistency in implementation by all staff across the school • Risk-prevention plans for use of technology, for playground activities and off-campus and out-of-school-hours activities
Engagement, skill development and a safe school curriculum	• Enhancing student engagement; extensive use of cooperative learning and relational teaching strategies • Teaching skills to promote cybersafety, social and emotional skills in all subjects, across all year levels
Focus on student wellbeing and ownership	• Enhancing student wellbeing with defined processes and strategies; a strengths-based approach • Multiple opportunities for ownership, decision making, student voice, sense of meaning and purpose
Early intervention and targeted student support	• Effective processes to identify students and families in need of support • Early intervention and follow-up support for skill development
Partnerships with families and community	• Working collaboratively with parents, community organisations and the justice system on all issues of student wellbeing, safety, child maltreatment, aggression, violence and cybersafety

Source: © Education Services Australia (ESA) (2013) ESA is the legal entity for the Standing Council on School Education and Early Childhood (SCSEEC). This extract has been used with permission from ESA. Apart from any uses permitted under the Copyright Act 1968 (Cth), and use for non-commercial education purposes where the source is acknowledged, this text may not be sold or used for any commercial purpose. Other than as permitted above, no part of the may be reproduced, stored, published, performed, communicated or adapted by any means without the prior written permission of the copyright owner.

MANAGING CONFLICT AND BULLYING

It is now well accepted that bullying is another unacceptable form of violence, and that schools have a responsibility to prevent and respond to this behaviour (Rigby, 2007). It is also acknowledged that bullying and acts of aggression in the school context sometimes go unnoticed or are neglected by teachers and school staff. As claimed by Randall (1996), 'schools do not create bullying; at best they merely import it from the communities they serve, at worst they allow it to flourish by not giving it the constant attention it deserves'. Although Randall acknowledges that the neglect of bullying can allow it

to flourish, some researchers would not agree that schools merely import bullying from the communities they serve. Rather, they would assert that school cultures and practices *within* the school community can indeed foster bullying, violence and conflicted relationships between students.

Saltmarsh (2005) carefully documented the institutional practices of a private boy's school in which older students perpetrated acts of extreme sexual violence against younger students. Institutional practices included a cultural history that allowed older boys to discipline younger boys, and there was more recent neglect of the warnings and concerns of parents. There appeared to be a history of denying reports of abuse and a concern for protecting the image and status of the school. In Saltmarsh's analysis, classroom-management practices and individual teachers were also implicated in this violence. The abusers developed their tools of abuse in school woodworking classes, and perpetrated their acts of violence in the clear absence of appropriate supervision. In this case, child protection was neglected, risk management was overlooked, and 'duty of care' towards students was breached.

Supporting students: 'duty of care'

One of the critical responsibilities of teachers, administrators and others involved in the education of children is to be aware of our **duty of care**. Duty of care is a special responsibility of teachers. It involves

duty of care
The obligation to protect a child of immature age against injury

> the need of a child of immature age for protection against the conduct of others, or indeed of himself, which may cause him injury, coupled with the fact that, during school hours the child is beyond the control and protection of his parent and is placed under the control of the schoolmaster who is in a position to exercise authority over him and afford him, in the exercise of reasonable care, protection from injury.
>
> Source: Warren v Haines (1986). Australian Torts reports 80-014: Richards v State of Victoria (1969) VR 136 (FC), cited by Watson (2003, p. 19).

As stated by Watson (2003), the teacher has a special duty to take reasonable steps to ensure the safety of students. Teachers cannot always ensure against injury, but they should provide adequate supervision inside and outside the classroom. Duty of care also extends to duty on all school premises during school hours, and can extend outside school hours and outside the property (Watson, 2003, p. 19). This is particularly important in any discussion of classroom management and the management of student behaviour.

Duty of care requires careful attention to the relevant laws, statutes and school procedures. Teachers should be aware that the States and Territories of Australia have a variety of legislative and mandatory procedures for reporting suspected cases of child abuse. These child-protection and notification guidelines vary from State to State and change from time to time. The National Safe Schools documentation provides a comprehensive breakdown of responsibilities across the States and Territories of Australia (see the reference to this documentation in the websites listed at the end of this chapter).

Other situations where a variety of laws or statutes are applicable include the student's right to privacy (including rights in relation to bag and locker searching and drug testing), freedom of information, and freedom from sexual or racial discrimination. Schools are also expected to develop appropriate procedures and documentation for practices related to student health, including the administration of medication and health-care procedures.

When schools or school staff do not uphold a duty of care, the school may be liable to legal action or claims of compensation. However, quite apart from these legal concerns, the harm a student experiences at school may involve long-term emotional or psychological harm, resulting in damage that may be more serious and long-lasting than any physical injury. Other consequences that may not immediately be apparent include loss of educational opportunities and reduced employability and career prospects (Watson, 2003).

Claims of negligence and legal action result from allegations that a student was owed a duty of care, that this duty of care was infringed, and that the student was harmed as a result of this neglect. Particularly important is the protection of students from aggression, harassment, bullying and vilification, since these actions are ongoing, intentional, and directly relate to the duty of care relationship between students, their teachers and the school. This is evident in the case law example of Oyston v St Patrick's College (No 2) [2013] NSWCA 310, in which the NSW Court of Appeal ruled in favour of a young women who had been bullied at school. Specifically, the judgement examined if the school was negligent because the year coordinator did not take reasonable steps to respond to the bullying incidents. It was noted that the school failed to have an operating bullying policy and psychological injury would not have resulted if the school had upheld its duty of care.

It is particularly important for teachers and administrators to be aware that many alleged assaults have occurred in school toilets or other sites that cannot easily be supervised. Procedures need to be developed to allow for adequate supervision, including supervision of all school areas. Similarly, the National Safe Schools Framework clearly states that cyber-safety should be a key concern of teachers and schools, and it is important to recognise that risks may arise from covert and unseen actions of students; however, this does not absolve teachers or schools from their legal obligation to be vigilant, conduct education and follow up suspicious use of technologies that affect students, whether occurring in or out of school time. Furthermore, many assaults and incidents of bullying go unreported to teachers. It is particularly concerning that students can be unwilling to report assaults and bullying because they perceive that their teachers do not care, will not act, and do not understand bullying (Bauman & Del Rio, 2006). This has direct implications for the care and support of students.

Approaches to managing bullying and conflict

whole-school approach
An approach that recognises that commitment and cooperation is needed from all members of the school community – teachers, students and parents – to prevent and address bullying

As described in Chapter 4, bullying and aggression are pervasive behaviours that affect many aspects of school culture and include multiple levels of student involvement. Teachers and schools may also be unaware of or underestimate the extent and prevalence of bullying and harassment. For all of these reasons, the **whole-school approach** to bullying is considered essential in the prevention and management of this behaviour. A whole-school approach is a comprehensive strategy for considering the interaction of many features of the individual student, school community and wider community outside the school. Whole school approaches encourage all members of the school community to take responsibility for the prevention of bullying (See Figure 14.7).

Table 14.6 outlines the key components of a whole-school policy (McGrath & Noble, 2006; Rigby, 1996).

TABLE 14.6 A whole-school policy to address bullying

POLICY	PROCEDURE FOR IMPLEMENTING POLICY
1 The school's stand in relation to bullying	A clear statement that bullying, harassment and violence is unacceptable. Use unambiguous, strong language and avoid being 'prim and proper' (Rigby, 1996)
2 A succinct definition of bullying ... with examples	A clear statement that bullying is an abuse of power. Defines the different types of bullying, with clear examples, and outlines the roles of the bullying student and the target of bullying. Avoid terms such as 'the victim' as this may suggest weakness; terms such as 'the bully' may also be demoralising (McGrath & Stanley, 2006)
3 Children's rights in respect to bullying	Clearly asserts the rights of all students to a safe environment and the right to be left alone and not harassed
4 The responsibilities of child witnesses to bullying	Defines the steps students can take if they witness bullying; encourages a sense of moral responsibility but provides safe and discrete mechanisms for students to report bullying
5 What the school will do to counter bullying	Defines the roles of teachers and school staff, and describes the actions teachers will take if they become aware of a bullying situation. This would include reference to the specific methods and approaches adopted by the school
6 Undertake to evaluate the effectiveness of the policy	Evaluate and report on the effectiveness of the school policy. Outline the strategies that will be used to evaluate effectiveness and identify the school staff responsible for managing this process



Source: Syda Productions/Shutterstock

FIGURE 14.7 A whole-school approach encourages peer support strategies.

Interventions to prevent bullying

As with approaches to classroom management, the first line of intervention deals with the prevention of bullying and violence in schools. The classroom-management strategies identified earlier are a critical component of preventive strategies. Supportive teacher–student relationships, a sense of belonging and connectedness to school, and non-punitive classroom-management practices are significantly associated with reductions in school violence and improvements in students' mental health and wellbeing (McNeely, Nonnemaker & Blum, 2002; Resnick et al., 1997). In addition to these classroom-management approaches, Rigby (2006, p. 153) outlines the three preventive strategies most commonly used in everyday school contexts:

1 *School surveillance.* Playgrounds and places where bullying is known to occur should be closely monitored. Strategies might include careful playground supervision and identification of bullying 'hotspots' such as the school toilets and corridors during transitional times. Surveillance need not be a system of adult control; students can also be trained to assist in supervision and prevention.
2 *Providing and identifying safe places.* Children who may be vulnerable to bullying have a right to places where they feel safe. However, they can also be helped to develop safe strategies (see Box 14.9 for an example). Lunchtime clubs and activities, such as a Chess Club, can be meaningful ways for children to engage with peers doing activities they enjoy.
3 *Providing activities during break times.* The introduction of structured and supervised recess or lunchtime activities can reduce the chance of bullying occurring due to boredom. However, be careful not to rigidly enforce participation in these activities as students have a right to free play and engagement with peers.



BOX 14.9 CLASSROOM LINKS

HELPING A CHILD DEVELOP SAFE STRATEGIES

Andrew Fuller, a psychologist and family therapist, developed a resilience-based approach to helping students who had been bullied and their families. The full treatment protocol is described in Fuller (2006) and is a strategy suitable for school counsellors and welfare coordinators. A number of the strategies suggested aim to assist the student to develop safer strategies and resilience. These include:

- *identifying and mapping safe and unsafe places* – help the student to draw a map of their school and mark unsafe places with a cross and safe places with a tick. Although the aim is not to make students avoid the problem of bullying, simple ideas such as changing routines, including the time they catch transport to school, or using lockers and particular corridors, can help
- *invisibility training* – use the map to identify strategies for the student to remove themselves from dangerous places and move around the school safely
- *cognitive reframing of beliefs* – ask questions and discuss beliefs about bullying. Question whether the child believes the insults and if they remember the friends they do have
- *deconstructing and deflecting insults* – the student and counsellor practise insults and respond with strategies of ignoring, changing the topic and coming up with humorous responses or deconstructing terms such as 'smart arse' (Does that actually mean my bottom is smart?)
- *reducing the 'smell of fear'* – discuss with the student the importance of not being ashamed, of standing tall, speaking firmly and making eye contact. Making humorous comebacks, even inside the student's own mind, is quite empowering.

Conflict-resolution and peer-mediation approaches are considered here as preventive approaches for important reasons, as outlined in each example. **Conflict-resolution strategies** are, in effect, problem-solving strategies (as discussed earlier in this chapter) in which children are taught skills for working through problem situations in a range of contexts. Conflict-resolution procedures used in schools include peer conferencing or peer mediation (Johnson & Johnson, 1996; O'Toole & Burton, 2005; Theberge & Karan, 2004; Van der Kley & Burn, 1993). It is important to recognise that not all student conflicts are bullying. As defined in Chapter 4, bullying is a particular term used to denote ongoing and repeated forms of abuse. As such, conflict-resolution skills are included here as a preventive strategy in keeping with the idea that the development of these skills may prevent a conflict escalating into an ongoing bullying problem.

conflict-resolution strategy
A strategy aimed at preventing or resolving conflict by working through a series of steps or processes

As outlined in Chapter 4, the capacity of children to understand and resolve social problems is linked to other developmental processes such as cognitive development, emotional understanding and perspective-taking ability. Thus, school-based strategies must take into account the different capacities of children to engage in conflict- and problem-solving approaches. Scenario-based approaches (as shown in Box 14.10) can include strategies and problems for children of different ages.



BOX 14.10 CLASSROOM LINKS

IMPLEMENTING A CONFLICT-RESOLUTION STRATEGY

Two conflict scenarios have been selected which illustrate the different steps suggested for older and younger students. These conflict scenarios have been developed for training purposes and can be used by teachers in the classroom using a small-group instructional setting. Working in small groups, students use the conflict-resolution steps described below to decide on the best solution to the scenario they have been given. Once a solution has been found, each group can role-play their resolution of the conflict. Time should also be allowed for students to talk about similar situations that they have experienced.

Sample scenarios

Ages 5–7:

- Jeff is sitting on a seat under a tree eating his lunch. Ethan runs past the spot where Jeff is sitting. As he does, he knocks Jeff's drink to the ground. Jeff is upset. What should the boys do?
- Rebecca and Alyssa are playing in the sandpit together. Aimee and Sjaan would also like to play in the sand. All the spades and buckets are being used. What should the girls do?

Steps:

1 What is the problem? How do you feel?
2 How can we fix the problem?
3 Brainstorm ways to fix the problem.
4 Choose the best option.
5 Agree on a final solution.

Ages 11+:

- A is having problems with an English project. B is very good at English, so A asks B for some help. B refuses. A is annoyed, because he has helped B with his maths homework a number of times.
- A is told by B and a group of her 'friends' that 'you cannot sit with us anymore because you are too fat'.

Steps:

1 Stop and cool off.
2 Define the problem (use 'I' statements). Tell the other person what has happened and how you feel.
3 Brainstorm solutions.
4 Chose a solution that is fair to you both (compromise is the key).
5 Make a plan. Decide how you will put it in action.
6 Agree to the plan (a handshake is a good way to show that you agree).

Source: Adapted from *Conflict Resolution* series, Balcatta, WA, R.I.C. Publications, 2003, www.ricpublications.com.au

ACTIVITIES

1 How do the conflict-resolution strategies vary for younger versus older students?
2 Can you identify the particular development skills required for the additional steps in the older students' problem-solving strategy (for example, perspective taking)?

In peer-mediation programs, students are left to settle their disagreements between themselves, assisted by peer mediators who arrange for the disputing parties to meet and who help in drawing up agreements or contracts to resolve the dispute. **Peer mediation** is discussed here as a preventive strategy and should be used cautiously in cases of bullying. As suggested by Rigby (2007), mediation is most likely to be successful when each party trying to resolve the conflict is of equal power and status, and therefore equally enabled to suggest solutions to the problem. This is unlikely to occur in bullying situations because there is an imbalance of power between the bully and the victim. The mediation process is also a voluntary agreement to solve the problem, and bullies may not be willing to accept a mediated solution when their behaviour is actually to their advantage. As such, peer mediators must be carefully trained to identify situations appropriate for mediation, and participants must be capable of negotiating an agreed solution. Strategies for strengthening peer mediation programs are suggested in Box 14.11.

peer mediation
A conflict-resolution strategy in which a third party (for example, a peer) helps the conflicting parties to resolve their differences and agree on a solution



BOX 14.11 IMPLICATIONS FOR EDUCATORS

STRATEGIES FOR STRENGTHENING IN-SCHOOL PEER-MEDIATION PROGRAMS

1. All members of the school community, including teachers, counsellors and administrators, should model mediation and conflict-resolution skills in their interactions with students, parents and each other.
2. School administrators should provide leadership and financial support for mediation programs.
3. Conflict-resolution and mediation skills need to be taught throughout the curriculum from the primary grades, with peer mediators trained in Year 4 or Year 5.
4. Strategies to solve overcrowding and break large schools down into smaller communities contribute to the effectiveness of peer-mediation programs.
5. Mediation should be easily accessible to students and should be confidential and clearly differentiated from punishment.

Source: Adapted from Theberge and Karan (2004, p. 107).

Porter (2007) suggests that these approaches may be particularly suited to adolescents who generally prefer teachers to stay out of their disagreements with peers. The NSW Department of Education and Training specifically recommends peer mediation as an approach to solving conflict between students, but it clearly specifies that this approach should not be used for all conflict situations. In particular, peer mediation is not to be used for any behaviours relating to statutory or mandatory reporting obligations – these include sexual assault, violence involving a weapon, illegal substance use and any other compulsory-notification behaviours (NSW Department of Education and Training, online).

Interventions to address bullying

As stated by Rigby (2006), the distinction between 'dealing with bullying' and 'preventing bullying' is a little arbitrary (p. 153). If approaches to dealing with bullying are effective, then they should be a means to preventing bullying as well. Before we continue, it is worth mentioning that approaches to bullying differ along the philosophical lines described earlier in the discussion of orientations to classroom management. Just as orientations to classroom management vary from punitive interventionist approaches to humanist non-interventionist approaches, so too do approaches to bullying.

Punitive approaches

punitive approaches
Based on ideas of 'crime and punishment' in which the bully must be punished, and this punishment will stop them from bullying again

Punitive approaches are associated with a traditional 'crime and punishment' approach in which sanctions and consequences are applied to breaking 'no bullying' rules. Many people instinctively favour these approaches because bullying is seen as repugnant and we believe that violence must be punished, but as with other punitive classroom-management strategies, they raise significant concerns. First, schools report that punitive strategies are less effective when bullying is subtle and covert, such as in relational bullying (McGrath & Stanley, 2006). It can be hard to identify and match the appropriate punishment to all forms of behaviour and one 'rule' often does not cover all the ways in which one person can bully another person (McGrath & Stanley, 2006). Second, students who are punished can react with more subtle forms of aggression, and punishment can lead to resentment and hostility. Researchers from a wide range of countries report only moderate levels of success using punitive approaches (McGrath & Stanley, 2006). In particular, **zero tolerance**, expulsion and suspension strategies have been extensively critiqued and are widely regarded as ineffective (Skiba & Rausch, 2006). Students in schools that apply zero tolerance strategies actually feel less safe than students in schools that adopt moderate policies (McNeely, Nonnemaker & Blum, 2002).

zero tolerance
An extreme intolerance for antisocial behaviours of any kind, allowing no compromise and usually resulting in strict punishment such as school expulsion

Non-punitive approaches

Non-punitive approaches are more similar to the interactionalist approaches to classroom management and have the humanistic qualities of some non-interventionist approaches. However, they are certainly reactive strategies in which bullying is directly addressed. In these approaches, students involved in bullying are not blamed or punished but are asked to engage in problem solving and discussion of the problem (McGrath & Stanley, 2006). Two of the most commonly used models in Australian schools are the 'support group approach' (previously known as the 'no blame approach') (Maines & Robinson, 1992; Young, 1998) and the 'method of shared concern' (Pikas, 2002).

support group approach
An approach to bullying that believes blame is unproductive and instead encourages group responsibility, empathy and behavioural change on the part of the bully

The **support group approach** is based on the idea that it is more important to solve the problem than to blame or punish students. Blame only causes students to feel resentful and they may not participate in a solution to the problem. The title of the approach was changed to the 'support group approach' by Young (1998) because 'no blame' does not sound acceptable to everyone in the current climate of concern about bullying and violence (McGrath & Stanley, 2006). The key steps and features of this approach are outlined in Figure 14.8.

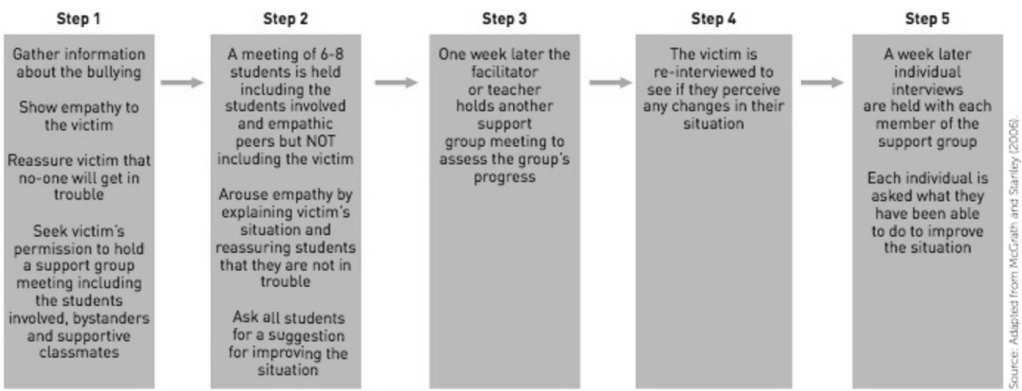


FIGURE 14.8 The steps of the support group approach.

In general, the approach is described as successful by secondary and primary schools employing it (Smith & Madson, 1997). Young (1998) found that in the majority of cases, the approach could be described as successful due to the fact that bullying completely stopped or the victim felt they no longer needed the support.

The **method of shared concern** is based on the assumption that bullying is often a group process (Pikas, 2002), and that children who bully can be taught to understand that they have caused harm and can be encouraged to act responsibly. In this approach, the emphasis is on group bullying situations and on reconstructing the individual's mindset about their involvement in bullying and their capacity to bring about a change.

method of shared concern
A method for dealing with group bullying in which bullies are approached as individuals and helped to understand their actions, and how the whole group can change their behaviours

In many ways, this approach is similar to the support group approach. But in this strategy, the victim and other bullying parties participate in a series of interviews. These interviews are initially held with each individual, who is asked what they could do about the situation. The interviews are held again after one week, and each individual is asked to describe what they have done to improve the situation, then positive feedback is given. The procedure is repeated a few weeks later with the whole group (minus the victim) to discuss and celebrate the progress made towards solving the problem. Eventually, if the victim wishes to participate, a whole-group meeting can occur in which everyone is given positive feedback about improvement in the situation. The emphasis in this approach is not so much to suggest that victims are equally responsible for bringing about change, but the interview is designed to elicit whether or not the victim has done anything to contribute to bullying, such as being a provocative victim (Rigby, 2006). The interviewer could discuss strategies for the victim to change this behaviour.



THINK ABOUT

- Have you observed or been affected by bullying at school? How was the bullying managed? Do you feel the result was satisfactory?
- Discuss your experiences and observations with others in your group.

Other approaches

There are many other approaches to dealing with bullying when it arises in school. Some of these approaches are not so easily classified as the punitive or non-punitive strategies, and teachers should review them carefully to determine the implications for both bullies and victims. One that has gained popularity in recent years is based on the idea of restorative justice (Armstrong & Thorsborne, 2006). This idea arose from similarly titled legal approaches in which the offender and victim are brought together through conferences. In these meetings, the victim is asked to express their hurt and the perpetrator is asked to express regret, realise the harm caused by their actions, and compensate the victim in some way. A strong emphasis is placed upon the offender feeling a sense of shame and accepting responsibility for their actions (Morrison, 2002), leading some commentators to suggest that these elements are more in keeping with punitive approaches (McGrath & Stanley, 2006). The 'More examples of anti-bullying programs' CourseMate link contains more information about anti-bullying programs, including approaches to manage bystander behaviours.

CourseMateExpress
Online resources
Go further: See more examples of anti-bullying programs on this text's website.

Strengths and limitations of approaches to bullying

Each of the approaches and interventions described here has received extensive research support and has also been extensively critiqued. As stated in relation to classroom-management strategies, it is unlikely that any single approach to bullying will be satisfactory for all cases of bullying, or for all contexts in which bullying, harassment and violence might occur. Although many believe the punitive and non-punitive approaches to bullying are incompatible, Rigby (2006) reports that there are schools that manage to combine both approaches. In these instances, non-punitive approaches are used with less

serious cases, while punitive approaches are used for serious cases and when cases cannot be solved with non-blaming approaches. Smith (2001) cautions that not all approaches match the situation and circumstance of every bullying incident, and that teachers should match the approach with the context of the bullying situation. The failure of non-blaming approaches to solve all bullying problems is one of their perceived weaknesses. For example, some research has suggested that bullies who are low in empathy and perspective-taking abilities may not be able to participate in approaches such as the method of shared concern (Olweus, 1993). Indeed, many teachers do not believe that students will respond to strategies in a constructive and responsible manner, and some teachers have thought that bullies 'knew well enough what harm they were doing' (Rigby & Barrington Thomas, 2002, p. 55). It remains a concern, however, that punitive strategies may simply serve to make aggressive students even more hostile, or push them to bully students in more subtle or covert ways.

Training in skills such as peer mediation and conflict resolution appears to be critical in determining the success of these approaches. Some evidence suggests that students can go 'off plan' and start modifying the peer-mediation strategies to suit themselves, as reported by one concerned school in the research of Rigby and Barrington Thomas (2002, p. 47): "The peacekeepers … were turning into little Hitlers, for instance yelling "Get out of there – you know you shouldn't be there". They have blue shirts. Parents think it's wonderful but teachers think it's legitimised bullying'. This school reported that the 'peacekeepers', who were trained not to intervene, started to take on the role of 'mini teachers' who used their bumbag of stickers to coerce children: 'You want a sticker – you'll have to do what I say' (Rigby & Barrington Thomas, 2002, p. 47).

As Rigby and Barrington Thomas (2002) concluded, the importance of training and monitoring all students cannot be understated.

SUMMARY

As with teachers' approaches to classroom management, it is unlikely that many schools would find one approach suitable for addressing all problems of bullying, harassment or violence. As such, the National Safe Schools Framework advocates a comprehensive approach in which students, teachers and parents are informed and educated, and all members of the school community have rights and responsibilities to prevent bullying, harassment and violence. One aspect of managing a safe school is the creation of appropriate policies, procedures and strategies for dealing with incidents of bullying, harassment or violence. A whole-school policy is advocated, which encompasses preventive and reactive strategies. Teachers have a key responsibility known as a 'duty of care' to protect students from harm, and this relates to the way in which we respond to both bullies and victims. As Rigby (2007) concludes, schools are best placed to manage these behaviours if they have clear and well-informed policies.

CONCLUDING COMMENTS

As suggested by ecological theory, classrooms and schools are complex environments. Within this context, the learning process needs to be carefully planned and managed in order for it to be meaningful and to meet the needs of a diverse range of students. As a teacher, your task is to find a philosophical approach to classroom management and organisation that is congruent with your personal values and beliefs, and that will support the development and learning of students from different cultural and socioeconomic backgrounds, as well as that of students with different attitudes, motivations and life experiences. The challenge of learning how to manage student behaviour and provide a safe and effective learning environment is one that even experienced teachers can find daunting. When the challenge is met successfully, learning becomes a satisfying and enjoyable experience. Then, the classroom has an atmosphere of cooperation, balance and mutual trust, and teachers are positive and enthusiastic about their teaching.

CHAPTER REVIEW

- Classroom management is best approached with a comprehensive model which includes the development of supportive teacher–student relationships, the careful organisation of instruction, attention to group management, the development of self-regulation and social skills in students, and the use of appropriate interventions to manage behaviour problems.
- Classroom teachers need to identify their own set of beliefs about how children learn and how classrooms should be managed.
- Philosophies that teachers can follow include the interventionist, interactionalist and non-interventionist model of teaching. Each involves a different balance in the relative power of teachers and students over what happens in a classroom.
- Most of the discipline difficulties teachers encounter in their classrooms involve minor disruptions such as talking out of turn, being out of seat or hindering other children. Serious behaviours, such as physical violence, are rarer.
- Procedures for managing behaviour vary according to different orientations and teacher philosophies, and include traditional approaches in which the teacher exercises strict control through the use of praise and punishment, as well as a focus on developing student control and choice as advocated in more recent theories.
- Teachers have a duty of care for their students that should not be infringed.
- Schools must implement the appropriate strategies to prevent and manage bullying, harassment and violence.
- Strategies used to combat bullying include punitive and non-punitive approaches such as sanctions and punishments, discussion and counselling, social-skills training, conflict resolution and peer mediation.

ONLINE STUDY RESOURCES

CourseMateExpress

COURSEMATE EXPRESS

Visit http://login.cengagebrain.com and use the access code that comes with this book for 12 months' access to the student resources for this text.

The CourseMate Express website contains a range of resources and study tools for this chapter, including:

- a **self-check quiz**
- **crosswords**, **flashcards** and a **glossary** to help you revise the key terms from this chapter
- the **Go further** materials and **interactive activity** mentioned in the chapter.



SEARCH ME! EDUCATION

Explore Search me! education for articles relevant to this chapter. Fast and convenient, Search me! education is updated daily and provides you with 24-hour access to full-text articles from hundreds of scholarly and popular journals, ebooks and newspapers, including *The Australian* and *The New York Times*. Log in to Search me! through http://login.cengagebrain.com and use the search terms listed in the 'Education databases' section (page 581) as a starting point.

QUESTIONS AND ACTIVITIES FOR SELF-ASSESSMENT AND DISCUSSION

1 Identify some of the characteristics of classroom ecology that influence teaching and learning. What can teachers do to control the effects of these factors on classroom activities?
2 Set up a debate with your tutorial group on the topic: 'Disruptive and inappropriate behaviour at school is the product of a child's home background'.
3 Identify some of the main philosophies of classroom management. What are the key factors that distinguish these different models? In what ways are the models different?
4 Ask some teachers to identify the type of strategies they use to manage their classroom. Can you identify the type of management philosophy each teacher is using? To what extent are these philosophies eclectic?
5 Outline a whole-school approach to preventing and managing bullying, harassment and violence in schools.

KEY TERMS

assertive discipline
classroom discipline plan
classroom management
conflict-resolution strategy
differential teacher–student interactions
duty of care
ecological perspective
I-messages
interactionalist philosophy
interventionist philosophy
logical consequences
method of shared concern
natural consequences
non-interventionist philosophy
pedagogy
peer mediation
punitive approaches
self-monitoring strategies
self-talk strategies
stage–environment fit
support group approach
whole-school approach
zero tolerance

PUTTING IT TOGETHER

MAKING LINKS BETWEEN 'MANAGING CLASSROOMS FOR EFFECTIVELY WORKING WITH STUDENTS' AND MATERIAL IN OTHER CHAPTERS

- Fit the models of classroom management presented in this chapter to the different views of learning and development described in modules I and II.
- Identify your own beliefs and preferences about learning, development and styles of classroom management.

FURTHER RESEARCH

RECOMMENDED READING

Evertson, C. M. & Emmer, E. T. (2009). *Classroom management for elementary teachers.* Upper Saddle River, NJ: Pearson.

Evertson, C. M. & Weinstein, C. S. (Eds). (2006). *Handbook of classroom management: Research, practice, and contemporary issues.* Hillsdale, NJ: Erlbaum.

Lyons, G., Ford, M. & Arthur-Kelly, M. (2011). *Classroom management: Creating positive learning environments* (3rd ed.). Melbourne: Cengage Learning.

Porter, L. (2007). *Student behaviour: Theory and practice for teachers.* St Leonards, NSW: Allen & Unwin.

Rigby, K. (2002). *A meta-evaluation of methods and approaches to reducing bullying in pre-schools and early primary schools in Australia.* Barton, ACT: National Crime Authority.

Rigby, K. (2007). *Bullying in schools: And what to do about it.* Melbourne: ACER.

Rogers, B. (2002). *Classroom behaviour: A practical guide to effective teaching, behaviour management and colleague support.* Thousand Oaks, CA: Corwin.

RECOMMENDED WEBSITES

Cybersmart: www.cybersmart.gov.au
Bullying. No Way!: www.bullyingnoway.com.au
Kia Kaha: A whole-school approach to bullying: www.police.govt.nz/advice/personal-and-community-advice/school-portal/resources/successful-relationships/kia-kaha
Kids Helpline Australia on bullying: www.kidshelp.com.au/kids/information/stories/bullying
National Safe Schools Framework: www.safeschoolshub.edu.au/documents/nationalsafeschoolsframework.pdf
New Zealand Ministry of Education: www.minedu.govt.nz
YouthLaw Tino Rangatiratanga Taitamariki: www.youthlaw.co.nz

EDUCATION DATABASES

Search databases such as ERIC, PsycINFO and the Australian Education Index, using terms such as:

- behavior management
- behaviour management
- bullying
- classroom management
- discipline
- disruptive behavior
- disruptive behaviour
- harassment.

Combining these terms with words such as 'schools', 'students', 'learners' and 'classrooms' (as in 'assessment and schools') will limit your search to material related to schools and young students.

You can also use these terms as a starting point for exploring the **Search me! education** database mentioned above.

PUTTING IT TOGETHER: MODULE IV

EDUCATIONAL PSYCHOLOGY IN CONTEMPORARY CLASSROOMS

Module IV has identified key issues relating to ICT, assessment and reporting, and classroom management in schools, discussing these issues with reference to relevant research in

	ICT IN LEARNING AND TEACHING
Main focus of this chapter	How an understanding of educational psychology can guide the use of ICT in the classroom.
Key issues and concepts	Shifts in roles of learners and teachers in classrooms, through technology Variation across individuals and groups in access and use of Internet for different purposes, and employing different tools Need for digital information skills, ICT literacy skills, and application of critical thinking and metacognitive skills to be taught in order to ensure students' technology use is effective Influence of technology use on students' cognitive processing (positively and negatively) New ways of learning through technology New literacies to be learnt Changing modes of assessment Changing dynamics of classrooms Emergence of cyberbullying and cybersafety Potential of technology to address particular learning needs, and provide assistance for learning
Questions to consider as you develop your philosophy	What learning approach underpins the technology I employ, and how does it support students' learning? How will I ensure use of technology enhances learning? How can I best combine my knowledge of pedagogy and content with my knowledge of ICT? How will I manage use of technology to maximise student engagement? What responsibilities do I have to keep students safe online? How will I do this? How will I employ technology to differentiate learning and teaching?



educational psychology. These topics are ones in which you will be called on to develop your own philosophy and approach. As you review the summary table below, consider the research that underpins various theories and approaches, and how you will make use of it to guide your decisions in these important areas of your learning and teaching practice.

	ASSESSMENT AND REPORTING	EFFECTIVE CLASSROOM MANAGEMENT
	The critical role of assessment in the learning and teaching cycle.	The effective management of classrooms for optimal learning and teaching outcomes.
	The purpose of assessment guides the choice of assessment tools Movement towards assessment based on determining what students need to learn / where they are going next, rather than judging how much they have learnt of what was taught All students can progress in their learning; assessment can show where and how Assessment can also involve learning A range of sources and types of assessment provides a fuller picture of student learning Testing can have positive effects on learning, although high-stakes tests can also have negative effects Quality assessment needs to minimise threats to its reliability and validity Alignment, moderation and transparency of judgements with reference to an agreed set of standards contribute to quality evaluation Reporting involves considering the needs of families and students, and can allow them to be partners in the learning process Reporting may also be done for teachers, school, system and government for purposes of accountability	The purpose of classroom management is effectively working with students and maximising their learning This involves the creation of an environment that supports learners and their learning Teacher–student relationships vary, are affected by teacher attitudes to particular students, and can affect students' social standing with their peers School belonging is important for student engagement. It tends to drop in the transition to secondary school Classrooms are complex places with at least the features of multidimensionality, simultaneity, immediacy, unpredictability, publicness and history to be navigated Managing the whole classroom group well is the key to well-managed classrooms Student self-regulation and social skills are important and may need to be explicitly taught Students' ability to participate in a socially acceptable way influences their access to learning The responsibility to ensure safe and supportive schools includes addressing conflict and bullying
	What is assessment for? How will I balance assessment for, assessment of, and assessment as learning? What principles of assessment will guide my practice? What combination of tools will provide me with the best information about a student's learning in a particular domain? How will I maximise reliability and validity of assessment to ensure I gather accurate information about my students' learning? What measures will I put in place to guide my evaluation of assessment data? What role will students, their peers and their families have in the assessment process? What will students' progress be measured against (other students / a set of criteria / their own previous progress)? Who will the assessment information be reported to? For what purpose? How will I ensure feedback enhances students' learning? How will my reports to parents involve them and the students in the learning process?	What will be the roles of the teacher and the students in my classroom? How is my philosophy of classroom management similar to what I have experienced? How is it different? Why? How do I define 'good relationships' with students? What theoretical/research basis does this definition have? How will I organise instruction? What theoretical approach does this link to? How will I support students and their learning through the routines, procedures and rules of my classroom? Under what principles will the space be organised? How will I respond to student behaviour problems? What principles underpin this approach? How will what I do influence students' ability to regulate their own behaviour? What will my approach to addressing bullying be?

GLOSSARY

Aboriginal English
A dialect distinct from Standard Australian English, and having many variants in different Aboriginal communities
acceleration
Allowing students to move faster through the education system
accommodation
Using fresh information to form a new mental model or scheme
achievement motivation
The need to strive for success
action research
Professionals evaluating their own practice with the goal of improving it
active listening
Attending purposefully to the meaning and intention of what another person is saying
adaptation
The process of adjusting to new situations and experiences through the modification of existing schemes (assimilation) or the creation of new schemes (accommodation)
adolescence
The period between childhood and adulthood
affect
A psychological term used to describe emotional states such as feelings and moods
alternative schools
Usually small in size, student-centred and non-traditional, with high staff–student ratio, more individualised instruction, less structured organisation and a more personal and caring environment
anecdotal record
Objective description of behaviour at a particular time and place, recorded as soon as possible after the behaviour has occurred
animism
The tendency to attribute human characteristics to inanimate objects
antecedent
An event that precedes a behaviour
antecedent–behaviour–consequence (A–B–C)
Behaviour represented as an ongoing chain of activity involving events that immediately precede the behaviour and that follow it
anxiety
Feelings of tension, uneasiness and apprehension
applied behaviour analysis (ABA)
The use of behavioural principles to change behaviour
approach success
A stable motivational tendency to strive for success by tackling moderately difficult tasks with a high expectation of success
approaches to learning
Learner motivational approaches to learning
arousal
Alertness and attentiveness
assertive discipline
A high level of teacher control, with firm limit setting and supportive feedback
assessment
The purposeful gathering and analysing of information about student achievement
assessment as learning
Assessment with the goal of helping students to become more conscious of their own thinking and learning processes
assessment for learning
Assessment with the goal of improving learning
assessment of learning
Assessment with the goal of judging what students know and can do at a particular point in time
assimilation
Adjusting an existing mental model or scheme to fit a new experience
associationism
An explanation of learning as the formation of connections between stimuli and responses
attachment
The strong emotional bond established between infant and caregiver
attention
allocation of resources to process information
attribution theories
Theories concerned with the way in which an individual's explanations of success and failure influence subsequent motivation and behaviour
authentic assessment
A mode of assessment that uses tasks similar to those performed in the real world
autonomous morality
Moral reasoning that appreciates the perspectives of others and the motives behind their words and actions
autonomy-supportive
Teacher behaviours that foster students' intrinsic motivational resources
avatar
A fictional and usually graphical representation of a computer user for use in online environments such as games
aversive
A contingently applied stimulus that the recipient finds aversive and reduces the behaviour it follows
avoid failure
A stable motivational tendency to avoid tasks because of a fear of failure and an expectancy for failure on tasks
axon
The long 'arm' of a neuron that carries messages to other cells by means of electrical impulses
baseline
Level of a specific behaviour prior to intervention
basic emotions
The emotions that babies are born with, such as happiness, sadness, anger and fear
basic needs
Lower-level or 'deficit' needs, such as the need for food, safety, love and respect
behaviour
Actions that are observable and measurable
behaviourism
Explanations of learning concerned with the effect of external events on behaviour
being needs (B-needs)
Growth needs that motivate individuals to achieve personal fulfilment and self-actualisation
brain plasticity
The capacity of the brain to change and develop new neural connections throughout the lifespan
bullying
Repeated verbal and/or non-verbal aggression by individuals or groups and directed towards particular victims who find it difficult to defend themselves
central executive
Controls the processes and flow of information in the information-processing system
centration
Concentrating attention on one aspect of a stimulus while ignoring other features
cerebral cortex
The outer layer of the brain, which is responsible for human intelligence
chaining
When one action functions both as a reinforcer for the previous action and as a stimulus for the next
checklist
A set of descriptions of specific behaviours that an observer records as present or not present
child-directed speech
A type of speech directed to young children and characterised by high pitch, short and well-spaced sentences, simple vocabulary and exaggerated intonation
chronosystem
Changes in environments and processes over time that influence development
class inclusion
Understanding that a number of small collections can be combined in different ways to form a larger collection
classical conditioning
The association of an automatic response with a new stimulus

classification
The ability to mentally group objects in terms of similar characteristics; for example, pansies, daffodils and roses are all 'flowers'

classroom discipline plan
A planned approach to responding to behaviour, which avoids overly hasty and emotional responses and leads to consistent reactions

classroom management
The actions of teachers to create a planned and organised classroom environment that supports student learning and socioemotional needs

closeness of the match
The distance between what is already known and new learning

cognition
The mental processes involved in perceiving, attending to, understanding and recalling information

cognitive apprenticeships
Relationships within communities, in which children learn adult ways of thinking, through both explicit teaching and more indirect observation and listening to adult talk

cognitive learning theories
Concerned with internal mental processes and how learners manipulate information during learning

cognitive load
The total demands made on working memory at any one time

cognitive style
The way an individual tends to perceive and process information

collaborative learning
Students learning together, drawing on one another's knowledge and skills

collectivistic culture
Typically group-centred, viewing individuals in terms of their relationships, roles and responsibilities in the community

compensation
The ability to see that an increase in one dimension (such as height) is compensated for by a decrease in another dimension (such as width)

computer-assisted instruction (CAI)
A computer and its software are used as a tutor; also known as 'computer-based instruction' (CBI) or 'computer-assisted learning' (CAL)

concrete-operations stage
Piaget's third stage, in which a child is able to mentally manipulate and think logically about objects that are present

conditioned response (CR)
A response evoked by a conditioned stimulus

conditioned stimulus (CS)
A previously neutral stimulus that elicits a conditioned response after pairing with an unconditioned stimulus

conditioning
The establishment of a new association between a stimulus and a response

conflict-resolution strategy
A strategy aimed at preventing or resolving conflict by working through a series of steps or processes

connectionist model
Views the brain as a complex network of interconnected units of information, with information stored in patterns of connectivity

consequence
An event that follows a behaviour

consequential validity
Intended and unintended consequences of assessment interpretation and use

conservation
The ability to see that certain characteristics (size, height, length, amount) of an object do not change with changes in the object's physical appearance

construct validity
A measure of the link between a test and underlying knowledge, attitudes and skills

constructivism
An explanation of learning that views it as a self-regulated process that builds on learners' existing knowledge, and in which learners are active participants

content validity
A measure of the link between a test and relevant curriculum objectives

contiguity
The association of two events that are always closely paired, or that repeatedly occur at about the same time

contingency
Reinforcement that is only given when the target behaviour is produced

contingency contract
Students sign a contract to indicate that they understand and agree with an intervention plan

conventional morality
Being a good member of society and helping those close to you is a priority

cooperative learning
Students working together to gain rewards for themselves and their group

creativity
The ability to think in novel ways to produce innovative and valuable ideas

criteria
The particular indicators that are being assessed to indicate knowledge or understanding

criterion-referenced assessment
Where achievement is compared against a specified criterion or standard

critical reflection
Analysing what we are thinking and learning by questioning assumptions, perspectives and values related to our thoughts or to new information

crystallised intelligence
Culturally based, fact-oriented knowledge gained through experience

cueing
Using a specific stimulus to elicit a desired response

culture
Systems of knowledge, beliefs, values and behaviour shared by a group of people

culture-sensitive or culture-fair test
A test that does not require culturally based knowledge

curriculum differentiation
Modification of instruction, materials and assessment procedures to match learner needs

curriculum-based assessment
Assessment that compares individual students' performance with curriculum goals

cyberbullying
The use of ICTs and other electronic devices to bully someone

cyberpsychology
The study of psychology and behaviour associated with the use of ICTs and other technologies

deductive reasoning
Using rules or general principles to find general solutions to specific problems

defensive pessimism
A defensive or protective cognitive strategy to lower expectations and hence protect the sense of self when faced with negative outcomes

deferred imitation
Actions copied from models no longer present, the actions having previously been observed and remembered

deficit needs (D-needs)
Basic needs that motivate individuals to action in order to reduce or eliminate the need

dendrites
Branch-like protrusions from a neuron that receive messages from other cells

deviation IQ
An IQ score that compares an individual's performance on a test with the expected average performance of someone in the same age group

diagnostic assessment
Assessment to determine what a student knows and can do, and why a student might be making particular errors

differential teacher–student interactions
Qualities of the interaction between a teacher and student that lead to different types of relationships

digital natives
A term used to describe someone who has grown up in the era of digital technologies

direct assessment
Criterion-referenced or mastery tests that assess specific content from a clearly defined curriculum

direct observation
Purposeful and focused looking and listening

discovery learning
The learner actively manipulates materials or ideas in the learning environment and discovers connections between them
discrimination
Learning that it is appropriate to respond to some stimuli but not to others
disequilibrium
Cognitive imbalance resulting from inconsistency between what is known and expected, and something strange and unexpected
distributed cognition
The notion that cognition is shared by individuals who make up communities and who share cultural tools
distributed learning (computer-mediated instruction, or CMI)
Teachers, students and learning resources can be in different locations so that learning and teaching occur independently of time and place
duty of care
The obligation to protect a child of immature age against injury
dyadic
Characterised by two elements, or two people, as in the case of friendship
dynamic assessment
A form of interactive assessment that identifies potential for learning and interventions to help achieve this potential
ecological perspective
A view of the classroom as an environment with unique purposes, dimensions, features and processes that have consequences for the behaviour of people in that environment
educational psychology
A branch of psychology concerned with studying how people learn and the implications for teaching
egocentrism
An individual's belief that everyone sees the world in exactly the same way as that individual
elaboration
Process of linking new information with what is stored in long-term memory
emergent literacy
Understandings about and attitudes towards reading and writing, which are the precursors of acquiring those skills
emotion
A mental or physiological state associated with thoughts, feelings and behaviours
emotional competence
The skills needed to negotiate the demands of the immediate social context
emotional intelligence
The ability to recognise and understand emotions, and to use emotional information to enhance thought
emotional self-regulation
Awareness of and ability to control or alter our emotional state as necessary
encoding
Process of storing information in the long-term memory
engagement
The energy that connects and shows our participation in an activity; it consists of behavioural, cognitive and emotional components
entity theory
A belief that intelligence and ability are fixed traits, and not malleable or easily changed
episodic memory
Memory for life experiences
equilibration
Achieving cognitive balance between what is familiar and known, and what is new or unfamiliar, through the processes of assimilation and accommodation
ethnicity
Membership of a group according to race, nationality or religious background
evaluation
The process of making judgements about the quality of something
executive control
Higher-level functions that help with the control of processes and flow of information
exosystem
Settings in which the child is not involved, but which nonetheless influence the child's development
expansion
Parents' tendency to respond to young children's utterances by restating them in a more elaborate form
externalising behaviours
Acting out behaviours such as displays of aggressiveness, impulsiveness or non-compliance
extinction
Reduction and cessation of a response following the withdrawal of reinforcement
extrinsic motivation
Motivation arising from the use of external rewards such as food or praise
face validity
The degree to which a test appears to measure what it is intended to measure
fading
The gradual removal of prompts or reinforcers
field dependence
A cognitive style related to perceiving items, events or information as an integral part of a broader context (or 'field')
field independence
The tendency to perceive individual items, events or pieces of information analytically, and as distinct from the broader context (or 'field')
fine motor skills
Movement skills using small muscle groups
fluid intelligence
Non-verbal abilities associated with manipulation of information, seeing complex relationships and solving problems
formal-operations stage
Piaget's fourth stage, in which the individual is now able to think abstractly and logically, to form hypotheses and to solve problems systematically
formative assessment
Information gathered while students are learning, to give information about their progress; see also 'assessment for learning'
frequency distribution
The number of times each score occurs in a range of possible scores
friendship
A close relationship between two people who mutually agree on the importance of this relationship
functionalist perspective
An approach that views emotions as shaping and organising thoughts and behaviours
gender
Those aspects of an individual that relate to the individual's sex; they are biologically and culturally determined
gender schema theory
A theory proposing that children's schemas or understandings about gender influence the way in which they process information and their choices
general mental ability (*g*)
Basic intellectual capacity
generalisation
Learning to respond to stimuli that are similar to but not the same as those that previously triggered a response
gifted
Significantly superior potential to achieve in one or more domains
goal-directed or intentional action
A sequence of acts produced intentionally to achieve a desired outcome
gross motor skills
Movement skills using large muscle groups
group
An exchange involving several interacting individuals who have formed a relationship and who have some degree of reciprocal influence over one another
growth needs
Higher-level or 'being' needs, such as the need for self-actualisation
guided participation
Support provided to enable students to participate in expert activities in increasingly expert ways
heteronomous morality
Moral decisions based on the rules of authority figures such as parents
hidden curriculum
Understandings, values and attitudes that are implicit in school structures and in the way material is taught
home schooling
The education of children at home by parents or other adults who take primary responsibility for this education

horizontal decalage
Gradual development within a cognitive stage, as demonstrated in the gradual attainment of the different aspects of conservation within the concrete-operations stage

human agency
The capacity of a person to act on and shape their world

humanism
An orientation or philosophy that recognises the uniqueness of human beings and the qualities of life that contribute to our humanity

hypermedia
A system that links pieces of information such as text, sound, visual images, animation and video in electronic environments

I-messages
Using the personal pronoun 'I' to focus on the feelings and needs of the speaker rather than the listener

ICT literacy
The capacity for purposeful and effective use of ICTs in one's own setting

identity
An internal self-structure in which we organise our beliefs, abilities, needs and self-perceptions

identity achievement
Occurs when adolescents explore several identity roles, but resolve conflicts and feel comfortable with who they are and who they hope to be

identity diffusion
Occurs when young people have little direction, their life and career goals are unclear, and they do not know who they are or who they want to be

identity foreclosure
Describes adolescents who typically form their identity by adopting the occupational and ideological goals of significant others, often their parents

impulsivity
Having a cognitive preference for rapid problem solving

inclusive education
The programs and services provided in most education systems to address the needs of all students in regular schools, regardless of ability or disability

incremental theory
A belief that intelligence and ability are changeable states that are able to grow and develop

Individual Education Program (IEP)
A planned program of instruction for an individual student, based on assessed needs, strengths and interests

individualistic culture
Focuses on the self as an autonomous individual; successful pursuit of individual goals is valued

inductive reasoning
Inducing general rules or principles from observation of specific examples

information and communication technology (ICT)
Any technology used to access, gather, manipulate and present or communicate information, such as electronic hardware, software and network connectivity

information literacy
The ability to locate, evaluate and use information; it extends beyond technical skills

information-processing model
Likens the human mind to a computer that interprets, stores and retrieves information

informed consent
Agreement given by a parent or student for the collection and/or dissemination of information not directly relevant to the student's school program

inquiry learning
Students learn content and discipline-specific thinking and practical skills by collaboratively investigating and solving a problem

intelligence
A general aptitude and capacity for understanding and learning

intelligence quotient (IQ)
A score on an intelligence test that permits an individual's performance to be compared with the average performance on the test

interaction
A first-order (or superficial) social exchange between two or more individuals, with little emotional commitment

interactionalist philosophy
A belief that children's learning and behaviour results from an interaction between internal and external factors

interest
A cognitive and affective state associated with a heightened state of arousal, leading to increased attention, concentration and persistence

internalisation
The transformation of external processes into internal processes that guide action and thought

internalising behaviours
Inhibited and withdrawn types of behaviours that could be seen as loneliness, depression or anxiety

interval schedule
When a reward is given after a set period of time

interventionist philosophy
A belief that children's learning and behaviour is an outcome of external factors

intrinsic motivation
Motivation arising from internal sources, such as an individual's feelings of curiosity, excitement and satisfaction

involuntary minority group
A group of people who have at some point been brought into a society against their will

ipsative assessment
Assessment that compares an individual's current achievement with previous achievement

jigsaw
A form of cooperative learning in which each group member works individually on components of the one task

joint attention
When carer and child together attend to a stimulus, such as when reading books or playing peekaboo games

lateralisation
The specialisation of functions in the two hemispheres of the cerebral cortex

law of effect
Responses that have a satisfying outcome are likely to be strengthened and repeated

law of exercise
Connections between actions and new consequences are strengthened the more they are repeated

LBOTE
Language background other than English

learning
Permanent or relatively permanent changes in individuals that result from instruction or experience

learning style
Learner preferences for types of learning and teaching activities

least restrictive environment (LRE)
The setting that is as close as possible to that experienced by children who do not have disabilities

levels of processing model
A process-oriented approach that attaches most importance to the type and depth of processing taking place

literacy
Engaging with various kinds of texts, and using and modifying language for use in a variety of contexts

locus of control
A tendency to attribute success or failure to internal (controllable) or external (uncontrollable) factors

logical consequences
Outcomes contrived to influence behaviour

loneliness
A cognitive and affective state of feeling disconnected and lacking in supportive relationships

long-term memory
A permanent storage facility for information

macrosystem
Societal and cultural influences on development

mainstream
The normal or typical school placement for a schoolchild in a regular school

mainstreaming
The process of educating children with special needs in regular classrooms rather than in segregated classes or schools

maintenance
The continued performance of a learnt action after instruction has ceased
mastery goal
A personal objective to achieve mastery of a task or skill
mental age
The chronological age that typically corresponds with a particular performance level on an intelligence test
mentor
An expert practitioner inducting a novice into their profession
mesosystem
Connections between settings involving the child
metacognition
Higher-order thinking which involves knowledge of and control over our own cognitive processes
metalinguistic awareness
Awareness of and understandings about language
method of shared concern
A method for dealing with group bullying in which bullies are approached as individuals and helped to understand their actions, and how the whole group can change their behaviours
microsystem
Interactions and activities in the child's immediate environment
mobile learning (or mlearning)
Use of mobile devices for learning at any time or place
modelling
A form of prompting that involves demonstrating a desired response for someone to imitate
moderation
The process of teachers comparing and discussing judgements with each other in order to improve consistency of judgement
moral dilemma
A moral problem requiring individual judgements and moral reasoning
morality
The fundamental questions of right and wrong, justice, fairness and basic human rights
moratorium
Refers to the state of adolescents who postpone making a definitive commitment to a single identity or set of values
morphology
The combination of units of meaning in words; for example, listen + ed = past tense of 'listen'
motivation
An internal process that energises, directs and maintains behaviour over time
multiliteracies
The variety of types of language we need to master to be literate in our society
multiple intelligences (MI)
Eight or more domains of intellectual functioning
multistore model
Depicts how information is processed and stored in memory
myelination
The process by which axons are insulated with a sheath of fatty cells, which improves the speed and efficiency of message transmission
natural consequences
Outcomes that occur without interference
nature–nurture debate
Controversy over the relative influence that inherent characteristics and environmental factors have on development
negative reinforcement
Increasing the likelihood of a behaviour being repeated by contingently removing an aversive object or activity
net generation
A term used to describe someone who has grown up in the era of Internet connectivity
neuron
A nerve cell
neurotransmitter
A chemical substance that carries messages across the synapse between neurons
neutral stimulus (NS)
An event or happening that has no effect on an organism
new literacies
The skills, strategies and dispositions for using and adapting to rapidly changing ICTs
non-directive teaching
Teaching in which the teacher is a facilitator, guiding students and nurturing their learning
non-interventionist philosophy
A belief that allows for children's learning and behaviour to occur naturally
norm
The mean or average performance of a group of people
norm-referenced assessment
Used to compare the performance of individuals or groups with the performance of a comparable group on the same task
normal distribution (bell-shaped curve)
A representation of test scores, showing their natural tendency to cluster around the middle (mean) of the distribution and taper off at either side
normalisation
Giving people with disabilities access to the daily experiences and activities available to those in the community who do not have a disability
numeracy
The ability to use mathematics effectively and with confidence in a range of contexts
object permanence
Piagetian term used to refer to children's understanding that objects continue to exist even when they are out of sight
open education
A model of learning and teaching that provides a warm, caring environment, and that builds on children's interests and experiences and actively involves them in the learning process
operant conditioning
The use of positive and negative consequences to strengthen or weaken voluntary behaviour
operants
Voluntary actions, usually goal-directed
operations
Actions that are governed by rules and logic, and are performed mentally rather than physically
organisation
Process associated with storage and retrieval of information in long-term memory
otitis media
A disease of the middle ear that affects hearing
outcomes approach
Students work towards the achievement of outcomes located sequentially along a learning continuum
overextension
Inappropriate use of a word for a class of things rather than for one particular thing
overlapping waves model
Siegler's model of strategy use, which states that people have a set of strategies they choose from, and that over time, less efficient strategies are replaced with more efficient ones
over-regularisation
Application of a grammatical rule, ignoring its exceptions
pedagogy
The art and science of teaching and instruction
peer acceptance
The likeability and acceptance of a person by their peer group
peer mediation
A conflict-resolution strategy in which a third party (for example, a peer) helps the conflicting parties to resolve their differences and agree on a solution
peer tutoring
Students are paired in roles of tutor or learner and follow specified learning strategies
peer-assisted learning
Encourages social interaction, as peers help each other to learn
perception
Allocation of meaning to experienced sensation
performance assessment
A mode of assessment that requires a student to engage in a complex task
performance goal
A personal objective to perform well in an area of achievement
performance-approach goal
A personal objective to perform well by demonstrating competence over others and outperforming classmates

performance-avoid goal
A personal objective to complete academic work in order to avoid appearing incompetent
person first language
The practice of referring to the person or individual before you refer to the label of their condition
perspective taking
The ability to imagine the self in another's position and to understand others' feelings
phonology
The sound system of language
portfolio
A collection of samples of student work used to demonstrate achievement
positive education
Applies the principles of positive psychology to education
positive reinforcement
Increasing the likelihood of a behaviour occurring by contingent presentation of a reward immediately following it
postconventional morality
Individuals move beyond the conventional rules of their community to focus more broadly on what is best for society at large, and on ways of promoting justice in society
pragmatics
Rules for the appropriate use of language in social contexts
preconventional morality
Morality is seen as a set of rules handed down by adults
prejudice
A preconceived, uninformed opinion or feeling
Premack principle (Grandma's rule)
Any behaviour that is enjoyed and that occurs often can be used to reinforce behaviours that are not enjoyed and that do not occur often
preoperational stage
Piaget's second stage, in which a child is not yet able to 'operate' or carry out logical physical actions mentally, but is reliant on manipulating real materials
primary reinforcer
An unconditioned (unlearnt) stimulus that is innately rewarding
private speech
Speech used to guide own thinking and actions; it can be both internal (silent) and external (audible)
problem-based learning (PBL)
Students learn content, strategies and learning skills through collaboratively solving problems
procedural memory
Memory about steps or procedures for performing a skill
profile
An ordered sequence or continuum of learning descriptors that can be used to chart progress
progressive education
A child-centred approach to education based on a commitment to democratic ideals
prompting
Providing an additional stimulus to elicit a desired response
prosocial behaviour
Positive social behaviours, such as helpfulness, intended to benefit others
psychoanalytic approach
A theoretical stance proposing that personality develops when children move through a series of stages that present conflicts that have to be resolved
psychological constructivism
Focuses on individual learners and how they construct their own knowledge, beliefs and identity
psychosocial crisis
A 'turning point', where individuals experience a temporary state of conflict and disequilibrium
psychosocial development
Psychological development in a social context
punishment
Weakening or reducing behaviour through contingent use of aversive objects or events
punitive approaches
Based on ideas of 'crime and punishment' in which the bully must be punished, and this punishment will stop them from bullying again
puberty
The biological changes associated with sexual maturity
racism
Discrimination based on race or ethnicity
rating scale
A procedure for recording the degree to which a specific behaviour or characteristic is present
ratio schedule
When a reward is given in a predetermined ratio to the number of responses
readiness
Having the prior experiences and knowledge needed for learning
recasting
Parents' tendency to respond to children's utterances by restating them in the correct grammatical form
reciprocal determinism
The interactive, complementary system formed by people and environments
reciprocal teaching
A teaching approach in which a teacher guides a group of students to ask questions that guide learning
reflectivity
Having a cognitive preference for taking time to solve problems and to analyse oneself and the context
Reggio Emilia
A system of education for the early childhood years, with a particular focus on children expressing their ideas in many different language modes
rehearsal
Repeating items as a memory strategy
reinforcement
Increasing or strengthening the likelihood of a behaviour recurring through use of contingent feedback
reinforcement schedule
The frequency with which reinforcement is delivered
reinforcer
Any event that strengthens the behaviour it follows
relationship
An exchange between two or more people, resulting from several interactions and taking on emotional significance
reliability
The extent to which a test or measurement device obtains the same result when used on successive occasions
respondents
Elicited or reflex reactions to a specific stimulus
response (R)
An observable reaction to a known (or unknown) stimulus
response cost
Removal of privileges or something pleasant as a punishment
retrieval
Process of bringing information stored in long-term memory back to be manipulated in working memory
reversibility
The ability to mentally reverse thought, such as adding back something that has been taken away or remoulding something to its original shape
risk factor
A factor associated with negative outcomes
rubric
A tool for marking and giving feedback about student work against particular criteria and standards
satiation
A stimulus that originally functioned as a reinforcer no longer functions as a reinforcer
scaffolding
The support provided to learners to enable a task to be done successfully and more independently by adjusting the assistance to fit the learner's current level of performance
schema
A mental image or cluster of related ideas used to organise existing knowledge and to make sense of new experiences
secondary reinforcer
A conditioned (learnt) stimulus that functions as a reward
self
Who we are, what makes us unique and who we believe ourselves to be

self-actualisation
The achievement of one's full potential
self-concept
A collection of information, ideas, attitudes and beliefs we have about ourselves
self-conscious emotions
Higher-order emotions (such as pride and shame) that require advanced cognitive processes and a capacity to understand how the self might be harmed or enhanced
self-determination theory
People have a basic psychological need for autonomy, a sense of competence and relatedness to other people
self-efficacy
An individual's sense of being able to manage a task effectively and successfully in a particular domain
self-esteem
The level of satisfaction and pride that individuals have in the self
self-handicapping
Actions or choices an individual makes to prevent or hinder performance or achievement
self-monitoring
A metacognitive activity that involves monitoring how well we are understanding and remembering
self-monitoring strategies
A self-regulatory strategy in which a student pays attention to their own thinking or behaviour and can take steps to change or correct that behaviour
self-regulation
A metacognitive activity that involves planning, directing and evaluating one's cognitive processes
self-talk
Private speech uttered aloud
self-talk strategies
A self-regulatory strategy in which a student can use internal dialogue in their own mind to send himself or herself messages about their behaviour or performance
semantic memory
Memory about information and knowledge in the world around us
semantics
The system of meanings associated with language
sensation
Information taken in from the environment through the five senses
sensorimotor stage
The earliest of Piaget's developmental stages, characterised by object permanence, intentional or goal-directed behaviour and deferred imitation
sensory memory
Stores new information, which enters via the sensory register through the five senses, for between one and three seconds
seriation
The ability to mentally arrange objects or elements in terms of a dimension such as length, weight or volume
shaping
Reinforcement of gradual approximations of the target behaviour
short-term memory
A temporary storage place with a limited capacity to store approximately seven items
simulation
A model of a real system or phenomenon
social cognition
A cognitive capacity to think about and process social information
social constructivism
Emphasises the role of social and cultural factors in shaping learning
social constructivist perspective
An approach that emphasises the role of the social context in shaping the development of emotional understanding
social development
The development of skills and understanding necessary for forming relationships and participating in the social context
social interaction (social transmission)
The interactions with others (parents, peers, teachers and so on) that contribute to children's learning experiences
social referencing
Taking cues from another person's emotional reaction to interpret a situation
socialisation
The passing of cultural beliefs, knowledge, values and behaviour among members of a group
sociocognitive conflict
Conflict within the child's thinking resulting from social interaction
sociocultural factors
Factors contributing to individual difference, which have a basis in society and culture
socioeconomic status (SES)
A measure of social and economic position in society; typically a combination of education, occupation and income
sociolinguistic features of language
Cultural conventions directing the use of language
sociometric assessment
The measurement of social networks and connections between people by assessing people's ratings of one another
special education
The system of programs and services provided in most education systems for children who have difficulties in school for a variety of reasons and who need additional support
specific mental abilities (*s*)
A collection of distinct intellectual abilities
stage–environment fit
The extent to which the school matches the needs of the developing adolescent
Standard Australian English (SAE)
The language of mainstream Australia, and 'standard' in the sense that it does not vary significantly across communities
standard deviation (SD)
A measure of how much test scores vary from the mean of the sample
standardised test
A test designed in accordance with set rules, administered under uniform conditions, and scored and interpreted in terms of identified norms
standards
Detailed descriptions of student achievement used to measure progress within a set of sequentially ordered learning outcomes
state
A temporary condition or feeling
stimulus (S)
An environmental condition or event that activates the senses
summative assessment
Information gathered to give information about students' achievements at a particular time; see also 'assessment of learning'
support group approach
An approach to bullying that believes blame is unproductive and instead encourages group responsibility, empathy and behavioural change on the part of the bully
symbolic thought
The ability to represent objects and events mentally
synapse
The gap between the axon and dendrites of two neurons
syntax
The grammatical system that orders the construction of sentences
talent
Significantly superior performance in one or more domains
task analysis
Breaking a task into a series of manageable steps so as to assist learning
telegraphic speech
Communication using two-word sentences, leaving out smaller words
test anxiety
Fear of performing poorly in tests
test bias
Where particular groups are disadvantaged by factors associated with a test's content and the interpretation of results
three-way reporting
Reporting that involves student, teacher and parent input
token economy
Behavioural system using tokens to reward desirable behaviour
trait
An enduring characteristic
trial-and-error learning
An explanation of learning that states that when an individual is placed in a problem-solving

situation, the correct response will be learnt through being reinforced

triarchic model of successful intelligence
Intelligence defined as thinking (analytic), responding to new experiences (creative) and coping with everyday situations (practical)

unconditioned response (UR)
An action triggered spontaneously by a stimulus

unconditioned stimulus (US)
An object, event or happening in the physical environment that causes spontaneous activity in an organism

underextension
Inappropriate use of a word for one thing rather than for a class of things

Universal Design for Learning (UDL)
A set of principles for curriculum planning that allows all students an equal opportunity to learn in that curriculum by planning tasks in which all students can participate

validity
The extent to which a test or measurement device measures what it purports to measure

vertical decalage
Unevenness in cognitive development, as demonstrated by advanced development in one area compared with development in other areas

voluntary minority group
A group of people who have at some point chosen to move to a new society in search of a better life

whole-school approach
An approach that recognises that commitment and cooperation is needed from all members of the school community – teachers, students and parents – to prevent and address bullying

working memory
A working space for short-term storage and manipulation of small amounts of information; contains your conscious thought

zero tolerance
An extreme intolerance for antisocial behaviours of any kind, allowing no compromise and usually resulting in strict punishment such as school expulsion

zone of proximal development
The distance between children's current level of competence on a task and the level they can achieve with support or guidance

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