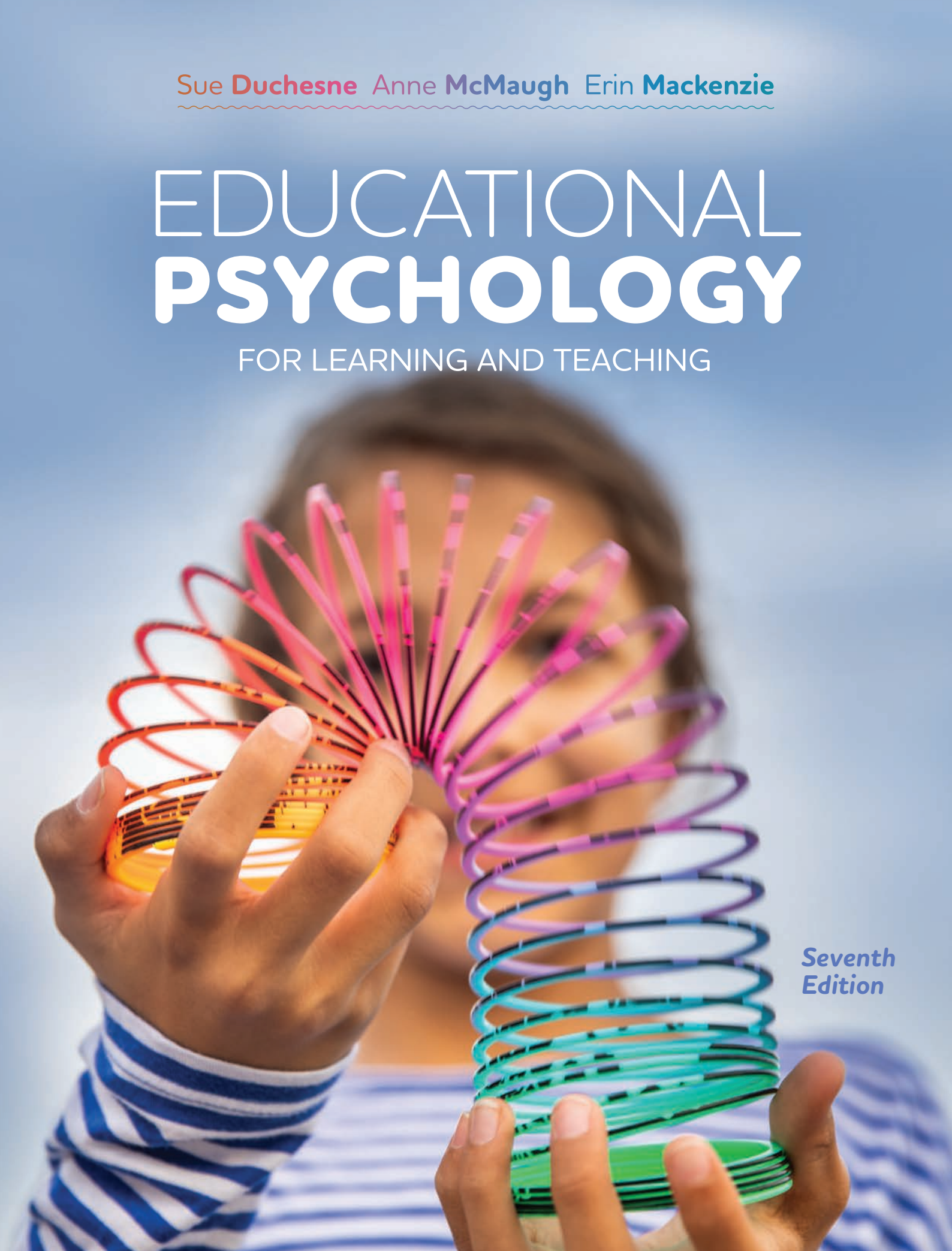
Sue Duchesne Anne McMaugh Erin Mackenzie

EDUCATIONAL PSYCHOLOGY

FOR LEARNING AND TEACHING



Seventh Edition

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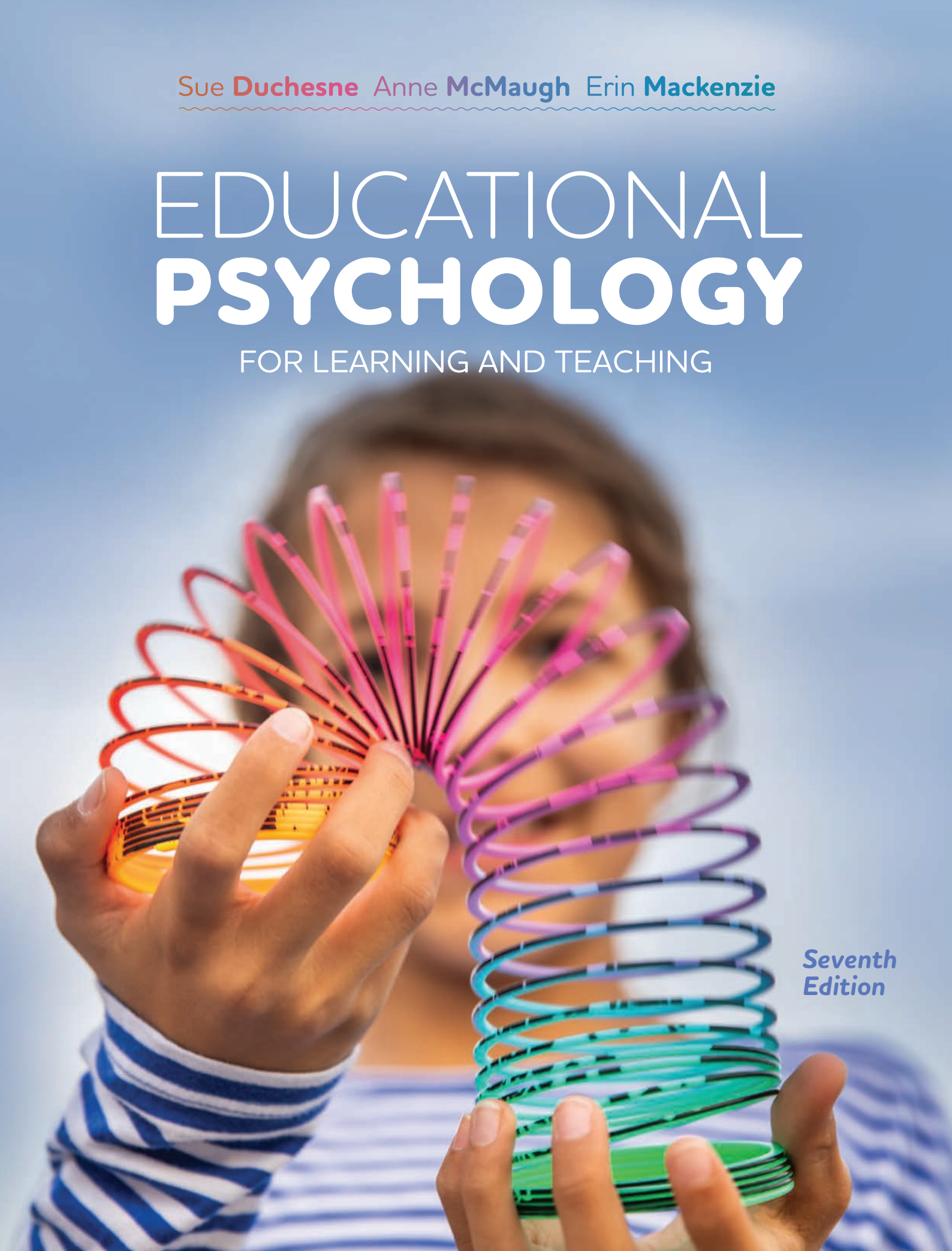

Seventh Edition

Educational Psychology for Learning and Teaching
7th Edition
Sue Duchesne
Anne McMaugh
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Portfolio lead/Product manager: Fiona Hammond
Content developer: Eleanor Yeoell
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Proofreader: Anne Mulvaney
Permissions/Photo researcher: Liz McShane
Text designer: Dannielle Maccarone
Cover designer: Linda Davidson
Cover: iStock.com/vitapix
KnowledgeWorks Global Ltd.

Any URLs contained in this publication were checked for currency during the production process. Note, however, that the publisher cannot vouch for the ongoing currency of URLs.

6th edition Published in 2019

Acknowledgements

AITSL deep link:
© 2011 Education Services Australia as the legal entity for the Education Council. Publication (as a pdf) : Australian Institute for Teaching and School Leadership 2011, Australian Professional Standards for Teachers, AITSL, Melbourne. ISBN 978-1 -925192-64-3 First published 2011 Revised 2018

Module opener images:
Module 1, 2, 3 and 4: iStock.com/nadia_bormotova

Module/Chapter opener background image:
Pattern of slinky - iStock.com/Aleksandra Sokolovskaja

National Library of Australia Cataloguing-in-Publication Data
Creator: Duchesne, Sue; McMaugh, Anne; Mackenzie, Erin (author).
Title: Educational Psychology for Learning and Teaching / Sue Duchesne, Anne McMaugh, Erin Mackenzie (author).
Edition: 7th
ISBN: 9780170449274 (paperback)
Notes: Includes index.
Other Creators/Contributors: Sue Duchesne, Anne McMaugh, Erin Mackenzie (author).

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South Melbourne, Victoria Australia 3205

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Printed in China by 1010 Printing International Limited.
1 2 3 4 5 6 7 25 24 23 22 21

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Acknowledgements

This book is the result of the combined efforts, energies and encouragement of many of our colleagues, students, friends and family. We thank the team at Cengage Learning Australia who have supported us in the development of this seventh edition. Fiona Hammond, Eleanor Yeoell and Sutha Surenddar have all been involved in our discussions about text design, photographs and text support materials.

Our colleagues and students in teacher education at the University of Wollongong, Western Sydney University and at Macquarie University have contributed to our understanding of the field and have continual input into our thinking about educational psychology and how it can be taught.

We have consulted various classroom teacher colleagues, whose practical classroom experience has made an important contribution to our text. In particular, we would like to thank the following teachers who have provided ideas and content for the text and its supplements:

- Chrisanthi McManus – Mumbulla School for Steiner Education
- Gabbie Stroud
- Tracey Hughes-Butters – Lumen Christi Catholic College
- Ann-Louise Clark – Sapphire Coast Anglican College
- Alyson Whiteoak – Jervis Bay Public School
- Rachael Seal – Loftus Public School
- Ursula Brown
- Anne Warburton
- Cheryl Russell.

Our thanks go to the children who have contributed ideas, images and content to the text: Natalie, Jake, Jesse, Etienne, Odette, Katie, Kirsty, Jed, Tully, Nicole, Hannah, Hannah, Kai, Henry and Pete. A special thank you to our families who have provided constant support, good humour and encouragement along the way.

Sue Duchesne
Anne McMaugh
Erin Mackenzie

Cengage Learning and the authors would like to thank the following reviewers for their incisive and helpful feedback:

- Cindy Smith – Curtin University
- Gemma Scarparolo – The University of Western Australia
- A. Prof. Joseph Zajda – Australian Catholic University
- Dr Lesley-Anne Ey – University of South Australia
- Elizabeth Preston – University of Newcastle
- Loraine McKay – Griffith University
- Slava Kalyuga – University of New South Wales
- Natasha Ziebell – University of Melbourne
- Tracey-Ann Palmer – University of Technology Sydney
- Dr Donella Cobb – The University of Waikato
- Elly Kalenjuk – Melbourne Polytechnic
- Katherine Main – Griffith University

We would also like to extend our thanks to the reviewers and contributors for providing their expertise and feedback on all previous editions of this text.

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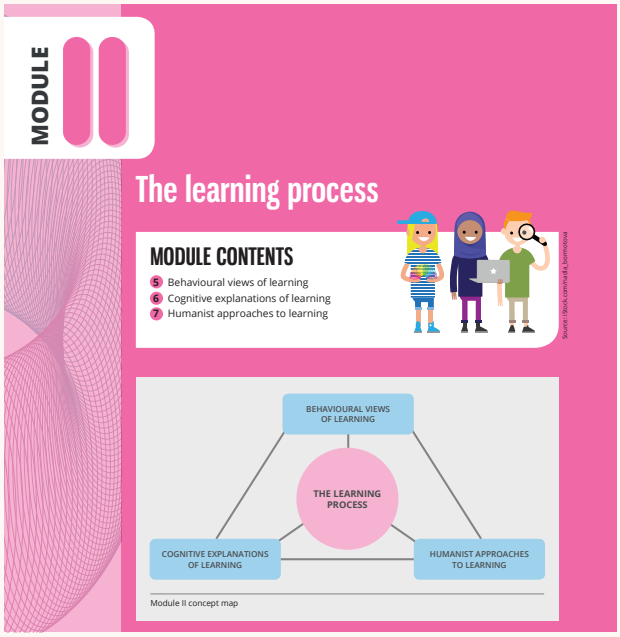
Guide to the text

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 the theory is applied in the real world.

MODULE OPENING FEATURES

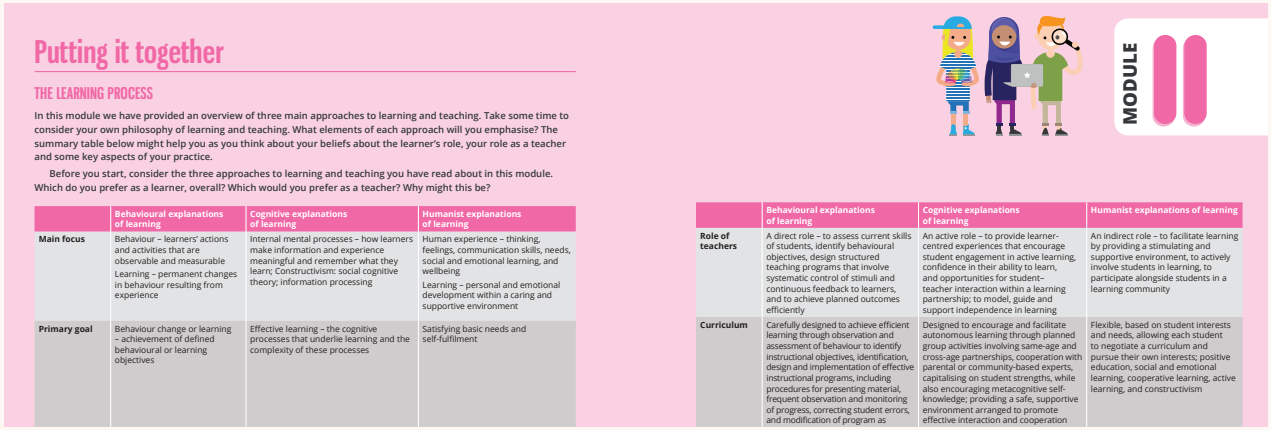
Understand how key concepts are connected across all chapters in the module by viewing the **Concept map**.



Core questions introduce key themes in the module and give an overview of how the chapters in the module relate to each other.

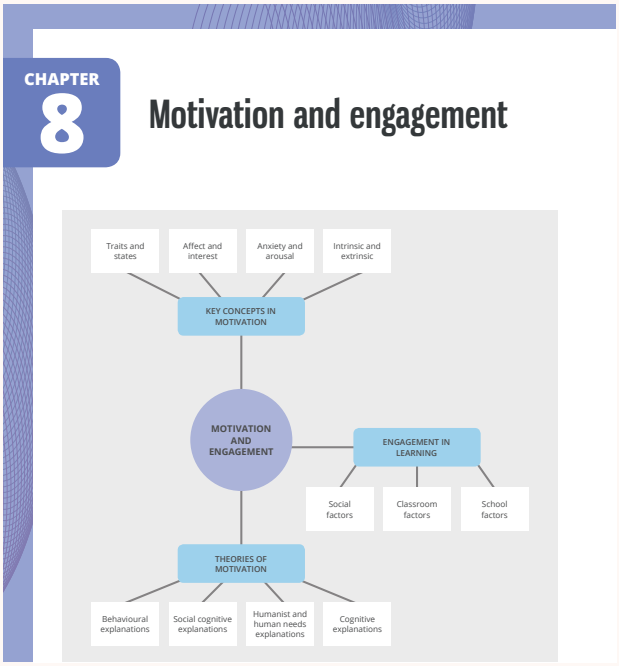
END-OF-MODULE FEATURES

At the end of each module, you will find the **Putting it together** section that demonstrates how the key theories in the module answer the Core question through a **Summary** and **Module table**.

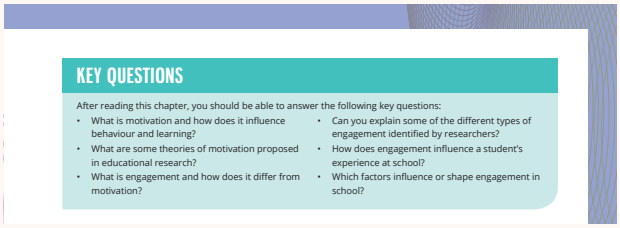


CHAPTER OPENING FEATURES

Understand how key concepts in the chapter relate to each other by viewing the chapter **Concept maps**.



Identify the key concepts you will engage with through the **Key questions** at the start of each chapter.

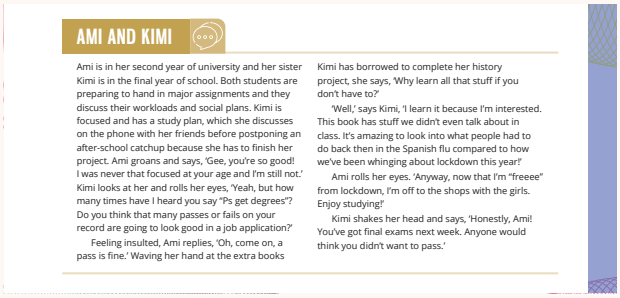


KEY QUESTIONS

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

- What is motivation and how does it influence behaviour and learning?
- What are some theories 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?

Gain an insight into how educational psychology theories relate to the real world through the **Scenario** at the beginning of each chapter.



AMI AND KIMI

Ami is in her second year of university and her sister Kimi is in the final year of school. Both students are preparing to hand in major assignments and they discuss their workloads and social plans. Kimi is focused and has a study plan, which she discusses on the phone with her friends before postponing an after-school catchup because she has to finish her project. Ami groans and says, 'Gee, you're so good! I was never that focused at your age and I'm still not.' Kimi looks at her and rolls her eyes, 'Yeah, but how many times have I heard you say "Ps get degrees"? Do you think that many passes or fails on your record are going to look good in a job application?'

Feeling insulted, Ami replies, 'Oh, come on, a pass is fine.' Waving her hand at the extra books Kimi has borrowed to complete her history project, she says, 'Why learn all that stuff if you don't have to?'

'Well,' says Kimi, 'I learn it because I'm interested. This book has stuff we didn't even talk about in class. It's amazing to look into what people had to do back then in the Spanish flu compared to how we've been whinging about lockdown this year!'

Ami rolls her eyes. 'Anyway, now that I'm "freeee" from lockdown, I'm off to the shops with the girls. Enjoy studying!'

Kimi shakes her head and says, 'Honestly, Ami! You've got final exams next week. Anyone would think you didn't want to pass.'

FEATURES WITHIN CHAPTERS

RESEARCH LINKS 8.1

A growth mindset intervention: 'directly telling' versus 'explaining to others'

Mindset researchers David Yeager and colleagues (2016) were interested in the types of lessons and messages conveyed in mindset interventions. One of the things they wanted to test was whether *directly* telling students the research findings about the developing brain was more effective than if students had to explain and tell these research findings to other students (*indirectly* learning the concepts). They compared these different types of interventions in a classic A/B experimental design where condition A is compared to condition B. They tested these research problems among a very large sample of Year 9 students (N = 3005).

The research question

Is it more effective to deliver growth mindset information directly or indirectly to students?

'Students often do a great job explaining ideas to their peers because they see the world in similar ways. On the following pages, you will read some scientific findings about the human brain ... We would like your help to explain this information in more personal ways that students will be able to understand. We'll use what we learn to help us improve the way we talk about these ideas with students in the future.'

The results

The researchers found that directly telling students about the scientific findings (Group A) led to smaller changes in mindsets compared to the 'explaining to others' intervention (Group B). This means that directly

Examine important and current research in teaching and learning in specific studies highlighted in the **Research Links** boxes.

CASE STUDY 7.1

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 that 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. Although the teacher plays 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

Analyse in-depth **Case studies** that present issues in context, encouraging you to integrate the concepts discussed in the chapter and apply them within Australian and New Zealand classroom settings.

FEATURES WITHIN CHAPTERS

Consider the implications of theory on classroom practitioners with learning and teaching examples in the **Implications for Educators** boxes.

IMPLICATIONS FOR EDUCATORS 7.5

Humanism in the classroom

The key elements of humanist education in classroom practice

- concern for student *wellbeing* alongside content and cognitive needs
- 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**)
- support for student *autonomy* through student-directed learning (see also **CHAPTER 6**)
- development of *social and emotional learning*
- 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

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* – 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 (Johnson & Johnson, 2017)
- *individual accountability and personal responsibility* – 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 et al., 1994, p. 31) – with each member of the group contributing a 'fair share' to the task
- *interpersonal and small-group skills* – 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,

Connect theory to practice via examples of research or applications of theory in classroom settings in the **Classroom links** boxes.

CLASSROOM LINKS 8.1

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 than other children of their age or other learners at their level.
- Their anxiety stops them participating in normal learning or social activities at school or in other social contexts.
- These anxious feelings are consistently very intense.
- They may persist for some time after the event has passed.

At school, teachers can look out for the following signs of anxiety in their students:

- Students show perfectionistic tendencies, such as wanting their work to be perfect, and are dissatisfied with work to the extent that they may become anxious.
- The student is reluctant to ask for help, may avoid.
- They have problems joining in with other students or joining in class work.

How can teachers help?

Teachers are not expected to diagnose a mental health issue – this is not your role – but you may be able to notice the symptoms and behaviours and seek help and support the young person. The following principles can guide your approach to helping children with anxiety disorders:

- Social and emotional learning programs (see **CHAPTER 4**) can help all children develop coping strategies and support capacity to be resilient.
- Assist children to develop 'emotional language (see **CHAPTER 4**) so they can describe their thoughts and feelings.
- Help students learn to recognise their own internal cues or warning signs that they may be becoming anxious.
- Make changes and transitions in the classroom explicit with warning ahead of time.
- Make learning goals achievable by breaking tasks down into smaller steps; set small goals first, especially for tasks like presenting or speaking in public (see more in **CHAPTER 4**).
- Encourage the student to have a go and try new things.

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

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:

Reinforcement

- 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 the 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'?

Important **Key terms** are marked in bold in the text and **defined in the margin** when they are used for the first time.

1.1 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

Go Further icons in the chapters indicate that extra resources are available. Ask your instructor for the Go Further resources and deepen your understanding of the topic.

GO FURTHER
Appendix 1.1
Research report

NEW

END-OF-CHAPTER FEATURES

At the end of each chapter you will find several tools to help you to review, practise and extend your knowledge of the key learning objectives.

STUDY TOOLS

Chapter review

1.1 What is educational psychology?

- *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, of your students, and of the learning and teaching processes themselves.
- Understanding learners and the learning process contributes to effective learning and teaching.
- Effective teaching is linked to making effective choices, and educational psychology can help to guide teachers in both making and evaluating their choices.

1.2 Introducing reflective teaching

- Educational psychology informs and deepens reflection on teaching practice.

1.3 Reflecting on your 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.

1.4 Using research as a reflective teacher

- Using existing research can inform practice, provide new ideas for teaching, evaluate choices and make sense of experiences.

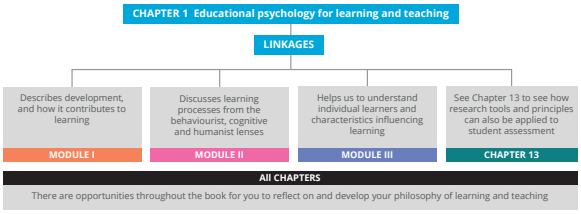
1.5 Conducting research as a reflective teacher

- Conducting research involves asking questions and seeking answers to those questions. Methods include experiment, interview, questionnaire, observation, document analysis and case study.
- Research quality is determined by validity and reliability, as well as ethical considerations, such as confidentiality, informed consent and voluntary participation.
- Action research links reflection about teaching to research. It involves a cycle of reflection, planning and action.

Review your understanding of the key chapter topics with the **Chapter review**.

Putting it together

Making links between 'educational psychology for learning and teaching' and material in other chapters.



The visual **Putting it together** section illustrates the ways that material in the chapter is related to other chapters.

Questions and activities for self-assessment and discussion

1. Draw a concept map to show how understanding learners and learning processes can contribute to effective learning and teaching. You could add to this as you read further chapters.
2. List some ways in which educational psychology can guide teacher reflection.
3. Identify strategies teachers can employ to reflect on their teaching and students' learning.
4. Name some research methods teachers can use in their work. What benefits could this have for students' learning and for your teaching?
5. What makes for quality research? What issues should be considered?
6. 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?

Test your knowledge and consolidate your learning through the **Questions and activities for self-assessment and discussion**.

Guide to the online resources

FOR THE INSTRUCTOR

Cengage is pleased to provide you with a selection of resources that will help you prepare your lectures and assessments. These teaching tools are accessible via au.cengage.com/instructor/account for Australia or nz.cengage.com/instructor/account for New Zealand.

MINDTAP

Premium online teaching and learning tools are available on the MindTap platform – the personalised eLearning solution.

MindTap is a flexible and easy-to-use platform that helps build student confidence and gives you a clear picture of their progress. We partner with you to ease the transition to digital – we're with you every step of the way.

The *Cengage Mobile App* puts your course directly into students' hands with course materials available on their smartphone or tablet. Students can read on the go, complete practice quizzes or participate in interactive real-time activities.

MindTap for Duchesne's Educational Psychology is full of innovative resources to support critical thinking, and help your students move from memorisation to mastery! Includes:

- Educational Psychology 7th edition eBook
- Classroom videos
- Professional learning scenario activities, Go Further and Develop Your Philosophy activity sheets

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INSTRUCTOR'S GUIDE

The **Instructor's guide** includes:

- Learning objectives
- Chapter overview and key topics
- Additional video discussion questions
- Useful websites, and more.

COGNERO® TEST BANK

A **bank of questions** has been developed in conjunction with the text for creating quizzes, tests and exams for your students. Create multiple test versions in an instant and deliver tests from your LMS, your classroom, or wherever you want using **Cognero**. Cognero test generator is a flexible online system that allows you to import, edit, and manipulate content from the text's test bank or elsewhere, including your own favourite test questions.

POWERPOINT™ PRESENTATIONS

Use the chapter-by-chapter **PowerPoint slides** to enhance your lecture presentations and handouts by reinforcing the key principles of your subject.

CLASSROOM VIDEOS

This series of **Classroom videos** provides relevant and engaging visual teaching demonstrations for instructors to illustrate in class the concepts covered in Educational Psychology. These visual resources are available to instructors prescribing the text.

ARTWORK FROM THE TEXT

Add the **digital files** of graphs, tables, pictures and flow charts into your learning management system, use them in student handouts, or copy them into your lecture presentations.

FOR THE STUDENT

MINDTAP

MindTap is the next-level online learning tool that helps you get better grades!

MindTap gives you the resources you need to study – all in one place and available when you need them. In the *MindTap Reader*, you can make notes, highlight text and even find a definition directly from the page.

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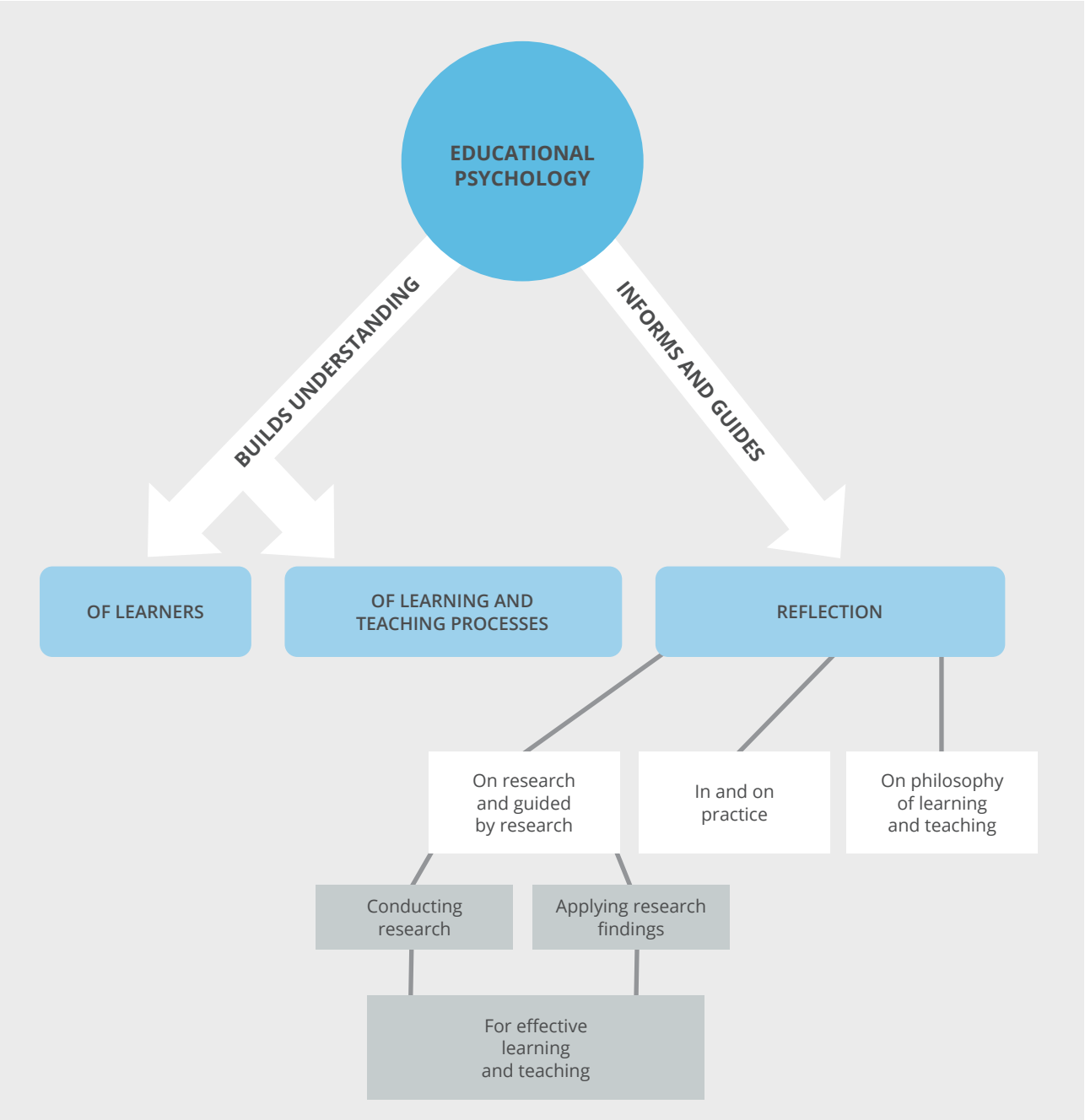
CHAPTER 1

Educational psychology for learning and teaching



Chapter 1 concept map

KEY QUESTIONS

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

- What is the purpose of educational psychology?
- How can educational psychology help me to understand and improve learning (my own and others')?
- How can educational psychology contribute to my development as a teacher?
- What role does research play in reflection and teaching?
- 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?

SOPHIE, TED AND KIRSTY

Sophie, Ted and Kirsty have finished their final school exams and are talking about their plans for university in the coming year. Ted says, 'Have you looked at your subjects? I've got one called "educational psychology" – I'm looking forward to the practical teaching subjects, not so sure how I feel about studying psychology though.'

'Oh, I think my Mum did that in her teaching degree', offered Kirsty. 'She said it was all about teaching really, and understanding kids helped her to teach them.'

'I'm doing a subject like that too in my psychology degree', said Sophie. 'I'm hoping it will help me work with kids as a psychologist.'

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.

In this chapter, we explore the broad topic of educational psychology, and why it is of use to teachers.

1.1 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 (e.g. 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 these 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.

Interactions between learning and teaching

Teaching is visible. Learning itself is largely invisible, although its outcomes – in students' work, their questions and answers – are seen and may be measured by teachers as an indication of learning. Nonetheless, if learning does not occur, then teaching cannot be said to have occurred either; the two are tightly bound components of the work of a teacher and their partners – the learners. Consider this in your own experience: you may have sat in a lecture in which the lecturer was explaining some complex idea (perhaps it was learning!). If you were thinking about something else, did not understand them, or already knew about what they were talking about, then you probably walked out of the lecture having learnt nothing, although the person alongside you may have outwardly behaved similarly to you, and yet learnt a great deal. Did the lecturer

teach you anything during that hour? Teaching involves much more than simply delivering information; what was happening within you, the learner, was just as important as what the lecturer was doing. Understanding learning then, and the various processes that occur within learners, is important for both learners and teachers. Educational psychology provides us with research findings and theories that are built from that research and can help us to develop that understanding for ourselves as learners and teachers.

Understanding learners

As we saw in the previous example, learning happens within learners – it involves change. Rather than learning being something that simply happens to learners, they are actively involved in the process. You may read or hear about 'passive learning' to describe reading, observing or listening, in contrast to 'active learning' in which students discuss or create, but in fact this is a misnomer. The internal cognitive processes that occur in learning are active, including thinking, making connections between new and old information in memory, making sense of new experience and constructing new understandings (see **CHAPTER 6** for more on these processes). Emotional processes also occur, each of which influence learning; for example, interest, boredom, frustration or excitement. Therefore, 'passive' or 'active' in regard to learning is referring to the behaviours that prompt that thinking rather than to the learning itself. In **CHAPTER 2** we will see that current theories of development recognise the individual as active in their development as well as their learning. It is therefore important to understand the individual learners we teach and how their prior experience, skills, knowledge and attitudes influence their learning.

Each individual learner brings a unique set of experiences to their learning, and these experiences may differ for each new learning situation they encounter (see **FIGURE 1.1**). Pre-existing knowledge interacts with new material learnt to support or interfere with learning. Work on information processing (**CHAPTER 6**) suggests teachers can activate this prior knowledge, prepare for misconceptions held and organise new information in helpful ways to connect with what is already known. Similarly, pre-existing attitudes arising from previous experiences affect learning behaviour. Work on motivation and engagement (**CHAPTER 8**) can help us to recognise, understand and prevent or respond to these attitudes in ways that support learning. And pre-existing skills – cognitive, social and emotional (**CHAPTER 7**) – may be drawn on in the learning situation. In each case, what the learner brings to the learning interacts with what is being taught. We need to understand individual learners to effectively teach them and support their learning.

Educational psychology can help us in this endeavour. For example, you may think that praising a learner's ability would help to motivate them to keep going with a difficult task. However, educational psychology research shows that when learners are praised for their ability, they make *less* effort in learning; whereas praising a learner for the effort they have made promotes greater effort in the current task, prompts them to persist when faced with difficulty, and helps them to develop a 'growth mindset' – believing their ability is not fixed but changeable (for a summary of this research, see Haimovitz & Dweck, 2017). You can read more about motivating students in **CHAPTER 8**.

Many more examples of educational psychology's contribution to learning and teaching are found throughout this book. Module I describes the

FIGURE 1.1 Each learner brings a set of prior experiences, knowledge, attitudes and skills that influence learning. Educational psychology can assist you to work with these to support your students' learning

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development of individuals, and can assist you to support that development as it influences and interacts with learning. Module III explores individual differences that influence learning in various ways, and may help you to support the varied learners in your classrooms.

Understanding learning processes

We referred above to cognitive, emotional and social processes that are involved in learning. Understanding these processes can assist teachers in working with students to maximise their learning. Learners' awareness of their learning processes is a form of metacognition (thinking about thinking – explained further in **CHAPTERS 3** and **6**), which contributes to learning itself (Donker et al., 2014). Learners can set, monitor and evaluate goals for their learning; and teachers can provide feedback related to the learning process that provides learners with knowledge and strategies to help them to move forward in their learning.

Emotional processes

Emotional processes involved in learning relate to motivation and engagement, discussed in **CHAPTER 8**. For example, research has shown that learners' expectancy of success (an aspect of self-concept) and the value they have for a task or subject, including their interest, work together to multiply the effect of either one on learning and on decisions to study a particular subject (Guo et al., 2015).

Social processes

Social processes include both relationships between teachers and learners as they work together to achieve learning goals; and relationships between peers, which themselves can influence learning directly by peers teaching one another, and indirectly by observing and being influenced by peer behaviours and attitudes. Researchers in educational psychology have found both positive and negative effects of peers on learning (Mentzel & Ramani, 2017). Awareness of these influences and how they operate can assist learners and teachers in choosing effective approaches to learning.

Additional theoretical approaches

Further examples of the application of theory and research to learning and teaching are found in Module II, which explores learning processes from the viewpoint of three different theoretical approaches: the behavioural, cognitive and humanist approaches to learning. Each has a different focus, and thus provides understanding of a different piece of the learning puzzle. The 'putting it together' summary table at the end of **CHAPTER 7** provides an overview of how the three approaches differ and each contribute to our understanding of the learning process.

THINK ABOUT

- What are the implications for teaching in this information about learners and learning?

Changes in the education landscape

In the past decade, 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 third phase in 2018. 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 Standards for the Teaching Profession, Ngā Paerewa
Chapter 1	**6 Engage in professional learning** *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	**Professional learning:** *Use inquiry, collaborative problem-solving and professional learning to improve professional capability to impact on the learning and achievement of all learners* Inquire into and reflect on the effectiveness of practice in an ongoing way, using evidence from a range of sources
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	**Design for learning:** *Design learning based on curriculum and pedagogical knowledge, assessment information and an understanding of each learner's strengths, interests, needs, identities, languages and cultures* Select teaching approaches, resources, and learning and assessment activities based on a thorough knowledge of curriculum content, pedagogy, progressions in learning and the learners
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 **3 Plan for and implement effective teaching and learning** *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	**Design for learning:** *Design learning based on curriculum and pedagogical knowledge, assessment information and an understanding of each learner's strengths, interests, needs, identities, languages and cultures* Select teaching approaches, resources, and learning and assessment activities based on a thorough knowledge of curriculum content, pedagogy, progressions in learning and the learners **Teaching:** *Teach and respond to learners in a knowledgeable and adaptive way to progress their learning at an appropriate depth and pace* Use an increasing repertoire of teaching strategies, approaches, learning activities, technologies and assessment for learning strategies and modify these in response to the needs of individuals and groups of learners Provide opportunities and support for learners to engage with, practise and apply learning to different contexts and make connections with prior learning Teach in ways that enable learners to learn from one another, to collaborate, to self-regulate and to develop agency over their learning
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	**Learning-focused culture:** *Develop a culture that is focused on learning, and is characterised by respect, inclusion, empathy, collaboration and safety*

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Chapter	Elements from the Australian professional standards for teachers	Elements from Standards for the Teaching Profession, Ngā Paerewa
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 *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	**Learning-focused culture:** *Develop a culture that is focused on learning, and is characterised by respect, inclusion, empathy, collaboration and safety* Demonstrate high expectations for the learning outcomes of all learners, including for those learners with disabilities or learning support needs Manage the learning setting to ensure access to learning for all and to maximise learners' physical, social, cultural and emotional safety Create an environment where learners can be confident in their identities, languages, cultures and abilities Develop an environment where the diversity and uniqueness of all learners are accepted and valued
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	**Design for learning:** *Design learning based on curriculum and pedagogical knowledge, assessment information and an understanding of each learner's strengths, interests, needs, identities, languages and cultures* Design and plan culturally responsive, evidence-based approaches that reflect the local community and Te Tiriti o Waitangi partnership in New Zealand Harness the rich capital that learners bring by providing culturally responsive and engaging contexts for learners **Te Tiriti o Waitangi partnership:** *Demonstrate commitment to tangata whenuatanga and Te Tiriti o Waitangi partnership in Aotearoa New Zealand* **Learning focused culture:** *Create an environment where learners can be confident in their identities, languages, cultures and abilities* Develop an environment where the diversity and uniqueness of all learners are accepted and valued
Module IV: Chapter 12	*2.6 Information and communication technology (ICT)* Implement teaching strategies for using ICT to expand curriculum learning opportunities for students *3.4 Select and use resources* Demonstrate knowledge of a range of resources, including ICT, that engage students in their learning *4.5 Use ICT 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	**Teaching:** *Teach and respond to learners in a knowledgeable and adaptive way to progress their learning at an appropriate depth and pace* Use an increasing repertoire of teaching strategies, approaches, learning activities, technologies and assessment for learning strategies and modify these in response to the needs of individuals and groups of learners

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Chapter	Elements from the Australian professional standards for teachers	Elements from Standards for the Teaching Profession, Ngā Paerewa
Module IV: Chapter 13	**5 Assess, provide feedback and report on student learning** *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	**Professional relationships:** *Establish and maintain professional relationships and behaviours focused on the learning and wellbeing of each learner* Communicate clear and accurate assessment for learning and achievement information **Teaching:** *Teach and respond to learners in a knowledgeable and adaptive way to progress their learning at an appropriate depth and pace* Ensure learners receive ongoing feedback and assessment information and support them to use this information to guide further learning **Design for learning:** *Design learning based on curriculum and pedagogical knowledge, assessment information and an understanding of each learner's strengths, interests, needs, identities, languages and cultures* Gather, analyse and use appropriate assessment information, identifying progress and needs of learners to design clear next steps in learning and to identify additional supports or adaptations that may be required
Module IV: Chapter 14	**4 Create and maintain supportive and safe learning environments** *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	**Learning-focused culture:** *Develop a culture that is focused on learning, and is characterised by respect, inclusion, empathy, collaboration and safety* Develop learning-focused relationships with learners, enabling them to be active participants in the process of learning, sharing ownership and responsibility for learning Foster trust, respect and cooperation with and among learners so that they experience an environment in which it is safe to take risks Manage the learning setting to ensure access to learning for all and to maximise learners' physical, social, cultural and emotional safety

1.2 Introducing reflective teaching

Students sometimes enter teacher education courses with the aim of discovering 'the best way to teach'. In fact, 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, 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. Teachers are constantly reflecting and revising what they do, making new choices in response to their students' learning needs and behaviours. How do teachers evaluate whether their choices were good ones? Educational psychology can help.

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.

Teaching as a reflective practice and process

For some years now, 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**).

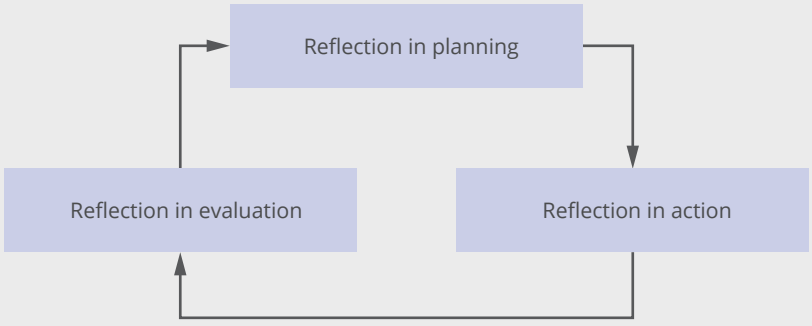


FIGURE 1.2 The cyclical nature of the reflective teaching process

Levels of reflection

A number of researchers have developed typologies of reflection on teaching, distinguishing between several levels of reflection (e.g. Lane et al., 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. **TABLE 1.2** combines aspects from a number of the typologies to summarise the levels in broad terms.

TABLE 1.2 Levels of reflection

Level	Explanation	Example
1 Description	At the most basic level, there is a *description* of what happened in the situation and its context (in Dewey's [1933] terms, this is not yet reflection)	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 Evaluation	The next level adds some *evaluation* to the description	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 Analysis	At a higher level, teachers *analyse* what happened in the situation	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 Integration and reframing	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	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.

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.

1.3 Reflecting on your teaching practice

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.

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

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. **CASE STUDY 1.1** gives an example of one teacher's reflective journal, while **FIGURE 1.3** provides you with some questions to guide your reflection on your teaching.

CASE STUDY 1.1

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.

Questions to guide your reflection on your teaching

1. What are my goals for this class/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?

Questions that focus reflection on students' learning

1. What learning is happening in the lesson? By whom?
2. What evidence of it is visible?
3. What did the teacher, the student, the task or others do for the learning to eventuate?
4. What is blocking learning for another student or students?
5. At what points in the lesson did most learning happen?
6. When in the lesson did I see the least learning?
7. What could be changed to maximise learning in this class?

FIGURE 1.3 Questions to guide your reflection on your learning and focus reflection on students' learning

Mentors, critical friends and colleagues

Mentors, critical friends and colleagues play quite different roles in relation to your reflection and development as a teacher. 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. Helping novices to reflect on their practice is the central aim of mentoring; this can be supplemented by pointing them in the right direction to seek help, modelling practice, and working collaboratively to solve problems and answer mutual questions (Education Council New Zealand, 2017).

mentor
An expert practitioner inducting a novice into their profession

Mentor programs may be formal or informal, but mentors do more than simply providing tips for teaching, or collegial support. Rather, they provide support for reflection on teaching.

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.

Considering a mentor

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. You will need to think about someone who communicates well with you, is reflective, whom you trust, and who has expertise (in mentoring as well as teaching), 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 you will 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? In your conversations about your teaching, are you mainly listening to them give advice? Do you feel that they listen to you and help you to think about your practice?

Critical friends and colleagues

Critical friends and colleagues can also provide emotional and professional support for your teaching. Consider how you can work with them to deepen reflection on your teaching as well, through team teaching and professional conversations focused on observations of one another's classes. Colleagues provide an important source of assistance and input for reflection, as is discussed further below in the section on observation.

Observation

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 and colleagues (2014) reviewed a number of studies showing that observing and annotating videos facilitated reflection and increased depth of thinking, particularly when the process involved interaction with others.

Observing and reflecting together with a mentor or colleagues can deepen reflection in, and on, teaching (Camburn & Han, 2017). Professional learning communities can participate in this process together by observing, describing and analysing – but importantly, not evaluating – one another's teaching, in 'instructional rounds' (Elmore, 2007). An example in NSW applied the NSW Quality Teaching Framework in 'Quality teaching rounds', and was found to improve teacher quality and morale (Gore et al., 2017).

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 and 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 record sheet is given in Figure 1.7.

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. One way your implicit theories and assumptions might be revealed, for example, is when your actions as a teacher do not align with your philosophy – how you think you *should* be as a teacher. 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 of learning and teaching:

- 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?

Having drafted your philosophy of learning and teaching, the next step is to consider how you will enact it in practice; what will these principles look like in the classroom? The 'Putting it together' table in Module II of this text provides some examples of how answers to these questions link with what teachers do, and the choices they make.

1.4 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 (2009; Hattie & Zierer, 2019) conducted a number of **meta-analyses**, combining the results of thousands of studies to compare the effects of various factors on student achievement. Hattie and Zierer (2019) reported that there are many influences on student learning and that they interact with one another. The school, the classroom, the home, the student, the teacher and what the teacher does, and the curriculum and how the teacher implements it, all work together to contribute to learning (see **FIGURE 1.4**). However, combining all that the teacher contributes directly: the teacher, teaching and learning strategies and implementation approach, they have the largest influence on students' learning, as well as influencing other domains. (Of course, teachers are also influenced themselves by those other domains.) Hence it is important for teachers to think about how they evaluate what they do, to ensure that it is effective.

meta-analysis
A statistical approach to combining data from a number of studies, to identify the strength of a particular effect

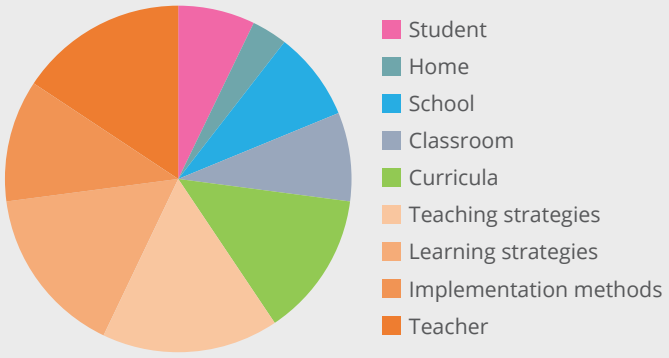


FIGURE 1.4 Percentage of achievement variance according to Hattie's research

Source: Hattie, J. & Zeirer, K. (2019). Visible learning insights. Routledge

Hattie's (2009) research showed that almost all teacher interventions made some difference to student learning. This is in part because of the process of reflection that teachers go through in preparing, conducting and evaluating the program. This is a strong argument for research as a tool for reflection. Hattie (2009) argued that because the average effect size was 0.4, we should look for effects above this figure to identify truly effective interventions. Some of Hattie and Zierer's 2019 results are summarised in **TABLE 1.3**. You can explore many of the influences in the chapters of this book, as indicated in the table.

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?

TABLE 1.3 What makes a difference to students' achievement? Comparison of effect sizes

Factor, source	Effect size	Chapter	Factor, source	Effect size	Chapter
Student			**Teacher**		
Self-concept	0.92	4	Teacher–student relations	0.52	14
Working memory	0.64	3	Teacher expectations	0.43	9
Concentration, Persistence, Engagement	0.56	8	**Teaching strategies**		
Self-efficacy	0.41	4	Classroom discussion	0.82	6
Gender	0.08	11	Feedback	0.70	13
Boredom	–0.49	8	Mastery learning	0.57	5
Home			Questioning	0.48	6
Socioeconomic status	0.52	11	**Implementation methods**		
Home environment	0.52	11	Scaffolding	0.82	3
Parental involvement	0.50	11	Interventions for students with learning needs	0.77	10
School			Reciprocal teaching	0.74	3
Principals	0.32		Direct instruction	0.6	5
School climate	0.32	14	Technology with students with learning support needs	0.57	10, 12
Summer holidays	–.02		Cooperative v competitive learning	0.53	7
Classroom			Inquiry-based teaching	0.4	6
Acceleration	0.68	9	Mobile phones	0.35	12
Classroom behaviour	0.62	14	Teaching creative thinking	0.34	9
Peer influences	0.53	4	Collaborative learning	0.34	6
Cognitive behavioural programs	0.29	5	**Learning strategies**		
Class size	0.21		Rehearsal and memorisation	0.73	3
Ability grouping	0.12		Metacognitive strategies	0.58	6
Open v traditional	0.01	7	Student-centred teaching	0.36	7

Hattie, J. & Zeirer, K. (2019). Visible learning insights. Routledge.

- 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.

1.5 Conducting research as a reflective teacher

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, thus deepening reflection. It also helps teachers to integrate their experience with theory and previous research. In order for research to be helpful, and to ensure it meets its purposes, it needs to be carefully designed and conducted. In this section we discuss some of the questions, options and principles to be considered in conducting research.

The research process

The research process involves asking questions that are themselves 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 1.5 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.

FIGURE 1.5 The research process

Research methods

In learning and teaching, there are a number of research methods that can be useful for helping teachers to reflect on their practice. These include, for example, experimental approaches, interviews and observations. You will see examples of these and other research methods in research projects that are described throughout this book.

Experiment

independent variable
The variable that is controlled or manipulated in an experiment, to determine its effect

dependent variable
The variable that is measured in an experiment, to determine whether the independent variable had any effect

An experiment is a particular research technique involving the manipulation of one or more **independent variables** so that you can observe the result in a **dependent variable**. Experiments generally test a hypothesis about the effect of one variable on another.

For example, Jen, a primary teacher, has been introduced to an online application (app) to support her Year 3 students' learning of fractions. Although the students love using the class tablets for educational games, she is not sure whether this app would be as helpful for their learning as the hands-on activities she currently uses. Jen decides to design an experiment to determine the relative effectiveness of the two strategies.

In this situation, the dependent variable would be students' score on a fractions test following a week of using the activity. The independent variable would be the learning activity (use of the app, or participation in a hands-on activity). Students would be assigned to two conditions: one in which they used the fractions app, and another in which they did a hands-on activity relating to fractions. In order to be sure that it was the learning activity that was creating any difference found, Jen would need to be careful to match the type of activity in the two conditions, ensuring that they are both addressing the same content and level of learning about fractions. She would also need to ensure that the two groups of students were equivalent in ability level. For this reason, sometimes students are not randomly assigned to experimental groups, but matched, with equal numbers of high-achieving and low-achieving students in each group.

Quasi-experimental designs compare outcomes (dependent variables) in two groups that already exist, such as two classrooms. There is less control, and therefore less certainty about the result, but this method is more realistic, and so results are more likely to 'fit' the real world of the classroom.

Interviews and focus groups

validity
The extent to which a test or measurement device measures what it purports to measure

reliability
The extent to which a test or measurement device obtains the same result when used on successive occasions

Interviews and focus groups directly ask participants for their views or experiences. They are thus high in **validity** (are likely to tell you what the participants think). However, you may not be sure that the participant would give you the same answer if you asked them at a different time, or in a different way – **reliability** may be compromised.

An interview might be used, for example, to discover students' attitudes towards a particular teaching approach (e.g. use of the fractions app, compared with hands-on activities). If the students were interviewed following a lesson in which they received some negative feedback on a task, however, their response might be different than if interviewed following another lesson.

Some guidelines for collecting data through interviews are included in **IMPLICATIONS FOR EDUCATORS 1.1**. Interviews are generally held with individuals, but can also be held in focus groups that combine groups of people with common experiences or attributes. An ideal size for a focus group is between four and six individuals, as this allows all members opportunity to speak. Focus groups can be helpful in generating discussion, as participants spark one another's ideas. Care needs to be taken, however, that one or two members do not dominate the discussion or skew it in a particular direction.

Questionnaires

Questionnaires allow participants to report their own attitudes, beliefs, perceptions and ideas, without the researcher needing to be present. This means that larger numbers of participants can be surveyed than with interviews. However, care needs to be taken in the construction of

IMPLICATIONS FOR EDUCATORS 1.1

Guidelines for collecting data through interviews

Using background reading to develop questions

Do plenty of background reading so that you can ask appropriate questions. If necessary, tailor your reading and literature review to suit the subjects of your study. For example, 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 ensure they feel comfortable. This is also an opportunity to establish rapport with the interviewee. 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, with the participant's permission. 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 do not need to attend to it during the interview.

Ideas for eliciting information

In order to promote discussion during the interview, you might ask participants to first write down their ideas and let them think about them before they elaborate and tell you more.

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.

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 ...?'

Keeping track of the interview

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

In verbatim transcripts, do not include 'ums' and 'aahs', but 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 use pseudonyms. It is vital to maintain confidentiality throughout the report.

the questionnaire to ensure that questions are clear and easy to understand, yet do not lead the participants' answers. Questions can be open-ended (requiring a written response) or closed (typically requiring respondents to choose a particular response from a list of options), and questionnaires may be analysed qualitatively or quantitatively. As with interviews, the design of questions in questionnaires is guided by the broader research question. **FIGURE 1.6** gives some examples of types of questions that can be used.

Observation

Observation has been discussed thus far as a strategy for reflective teaching. It can also be a research tool. When observing in this context, it is useful to have a clear operationalisation of the variables you want to observe: What will they look like? How could they be measured? This is particularly important for abstract constructs, such as 'student engagement'. It is also helpful to have a systematic way of collecting the data, as described in **TABLE 1.4**.

An example is given in **FIGURE 1.7**. 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

1 What is your favourite way of learning about fractions? Why?				
2 In the questions below, circle the response that is closest to your view. When learning about fractions:				
I learn best with hands-on activities	Strongly disagree	Disagree	Agree	Strongly agree
I learn best with online activities	Strongly disagree	Disagree	Agree	Strongly agree
I learn best with a worksheet	Strongly disagree	Disagree	Agree	Strongly agree
I learn best with the teacher explaining to me	Strongly disagree	Disagree	Agree	Strongly agree
3 Put the activities in order of your preferred way of learning about fractions, by numbering them from 1 to 4:				

☐ Hands-on activities ☐ Worksheets

☐ Online activities ☐ Teacher explaining

FIGURE 1.6 Questionnaire items can be open-ended and qualitatively analysed as in the first question, or closed and quantitatively analysed as in the second and third questions. Which do you think will give you more accurate information about students' views?

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 1.7 Observation record sheet

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 1.7** focuses on 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 can act as a check of the reliability of the data.

Document analysis

Documents surround us and can help provide a picture of the context in which we teach and students learn. Authored documents can reveal our students' thinking as well as our own. Examples of documents that could be analysed include syllabus, policy or school documents, student work samples, and posts to online websites or social media. Themes may be identified in the document that are linked to the research question. For example, if a teacher–researcher was interested in her students' concerns about the environment, she might analyse student work samples to identify particular environment-related themes in their writing. Documents should be de-identified, so that individuals' and schools' names are not discernible.

Case study

Case studies look in depth at a particular situation, group or person. They typically combine a number of methods, such as interview, observation, questionnaire and document analysis (described previously), to compose a total picture of the case. This combination of methods allows the researcher to 'triangulate' the data, to ensure that a consistent and accurate picture of the case is being drawn. Cases are carefully chosen as an example of a broader group to allow for the findings to be meaningful beyond the specific case.

Researchers are careful to choose the appropriate method that fits the purpose of their research and helps answer their research questions. **TABLE 1.4** links various methods to relevant questions and purposes you might have as a classroom teacher-researcher.

Quality considerations in research

If it's worth doing, it's worth doing well! In particular, researchers need to ensure that the information they collect can be trusted and will answer the research 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 reliability and validity.

Reliability

The principle of reliability 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.

Validity

Validity refers to 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 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.

TABLE 1.4 Research methods are determined by research purpose and research question

Research purpose	Example question	Relevant methods
Evaluation	How effective is collaborative learning for students' learning of science concepts?	**Experiment.** 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 you to test whether any treatment effect was found or whether it would have occurred anyway
Description	What patterns exist in students' answering of questions in this class?	**Observation.** When observing for research, it is useful to have a systematic way of collecting 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 1.7**
	What changes are evident in students' self-concept during their transition to secondary school?	**Case study.** In-depth, detailed study of an individual, situation or context. It will typically use a number of sources of data, including interview and observation, for example
	What are students' attitudes towards NAPLAN?	**Questionnaire.** This allows the researcher to gain responses from a larger number of participants, and to examine the data statistically, allowing correlations and comparisons to be made across groups. Questionnaires need to be carefully designed to maximise clarity and to ensure validity and reliability of the data collected
Explanation	How do students' day-to-day experiences on social media influence them in their peer interactions at school?	**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. However, if you are the interviewer, they may simply tell you what they think will please you. Some guidelines for collecting data through interviews are included in **IMPLICATIONS FOR EDUCATORS 1.1**
	How does *x* influence *y*?	**Experiment.** An experiment is a particular research technique involving the manipulation of one or more variables so that you can observe the result. An experiment may test a hypothesis about a relationship between two variables
Exploration	When are my students most engaged in learning? What classroom factors influence this?	**Observation.** Observation can be broad with 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. 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?'
		Interviews and focus groups. Interview data can also answer this exploration question. Using a combination of methods can strengthen the reliability of findings
	What kinds of errors are typical in students' free writing?	**Content or text analysis.** The text of a document is analysed in systematic ways
Prediction	Is group work more effective with particular groups of students? (more/less capable or mixed)	**Experiment.** Experiments can be used to test predictions or hypotheses. Care needs to be taken to set up treatment and control groups to ensure that explanations other than the one being tested can be excluded

Adapted from Jackson, 2006.

Action research

Action research is a particular type of research that can utilise any of the research methods described above. It 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. **RESEARCH LINKS 1.1** discusses a research project that found long-term benefits to teachers' work from being involved in action research. The process of conducting action research involves five steps, as shown in **FIGURE 1.8**:

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 and implement your strategy.
4 *Observation* – collect data as evidence about the outcomes of your strategy. You might do this through observation of students or their work, interview or survey. Share the results with your students and colleagues. Action research is a collaborative process. Evaluate the evidence about the outcomes of your strategy.
5 *Reflection* – revise your plans based on your evaluation. This restarts the cycle.

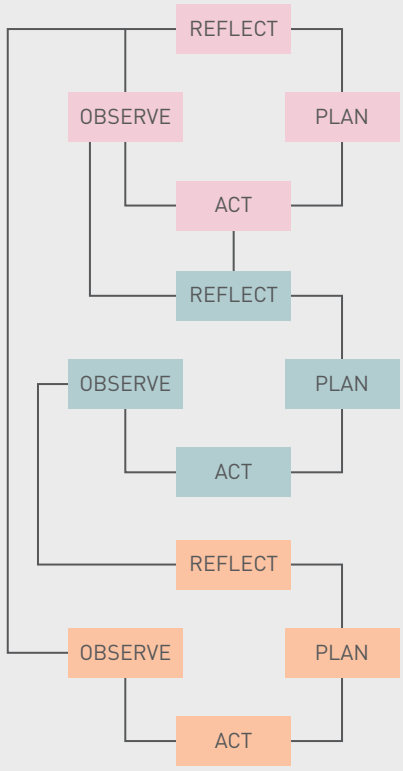


FIGURE 1.8 The action research cycle

Strengths and limitations of research methods

When selecting a research method to help you answer a particular question, it is also important to recognise the strengths and limitations of each method. **TABLE 1.5** summarises the strengths and limitations of the research methods we have introduced in this chapter.

RESEARCH LINKS 1.1

Action research as professional development

Edwards & Burns (2016) found that action research built teachers' confidence, connection to students, research engagement and recognition by colleagues. Increased connection with students resulted from greater consideration of student needs and perspectives as a result of their research, and strategies involving student focus groups and interviews, that the teachers continued to use to evaluate their teaching: 'AR definitely opened the roads of communication with my students and allowed me to adjust my teaching accordingly. (LP, survey)' (Edwards & Burns, 2016, p. 10).

Impacts of action research were sustained, according to the teachers, by their own motivation and interest in research, as well as by the emotional and practical support they received from managers in their schools.

ACTIVITIES

1 Read the full paper: Edwards, E., & Burns, A. (2016). Language teacher action research: Achieving sustainability. *ELT Journal*, *70*(1), 6–15.
2 Develop a brief survey, to be given to your students after one of your lessons, that draws out your students' perspectives on your teaching and on their learning. How could you build this into your regular teaching practice?
3 Consider how you could embed the plan–act–observe–reflect action research cycle into your everyday work as a teacher. What would this look like in planning a lesson? How would it look when deciding on how to respond to a student experiencing difficulty in engaging or in learning in your classroom?

TABLE 1.5 Summary of research methods

Research method	Strengths	Limitations
Experiment	Allows for control of variables so that conclusions can confidently be drawn about what has affected the result	As variables are controlled in an experiment, validity is compromised; results may not reflect the true (messy) world of an actual classroom
Interview	Provides rich and deep data, including in-depth insight into participants' views	Interviewer and interview questions can bias responses. This can be minimised by carefully constructing the interview schedule and training the interviewer
Focus group	Interaction between participants can result in greater reflection and richer responses as participants' thinking is sparked by others' responses	Interaction between participants can result in bias, for example if one student dominates the group and others respond to please him or her
Questionnaire	Allows for sampling of large numbers of people Can provide quantitative data that can be analysed statistically	Requires a reasonable level of literacy, which may limit its usefulness with young children Relies on self-report of information, which may be influenced by participant's bias, level of self-awareness, and/or social desirability
Observation	Data is collected in real time and authentic context Contextual information can be gathered to provide a richer picture of the situation	Potential bias from observer. This can be minimised by having more than one observer and reporting inter-rater reliability An observer (or camera or microphone) being present may influence the result; people may not behave as they would normally
Document analysis	Authentic data that has been produced for a purpose other than the research	There is the potential for researcher bias in what is picked out of the data for analysis, as well as how it is interpreted. Having clear guidelines for doing this can improve reliability in this respect
Case study	Focus on one or a few cases allows for deeper data analysis and consideration of complexities involved Multiple data sources can be triangulated to strengthen reliability of conclusions drawn	Limited generalisability Cases need to be carefully selected to ensure they are representative of the relevant group or situation

A number of books are available describing methods of educational research in depth (e.g. Johnson & Christensen, 2017).

Ethical considerations when conducting research

When conducting research with humans or animals, a number of ethical guidelines must be followed. In Australia, these have been set 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 ensure research studies follow the appropriate guidelines.

Some of the issues to consider include:

- *Informed consent* – you must provide a description of the research, its purpose and what participation will involve, including any risks to the participant of being involved in the research. Parents' consent must be obtained when conducting research with children.
- *Anonymity and confidentiality* – you must ensure that you maintain confidentiality. This means that you should not include participants' names or other identifying characteristics in any

report 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 students' consent to participating in your research is informed and voluntary?

Reporting research

Having conducted your research, analysed the data and reflected on the findings, it is important to report your results to others; for example, to the students who participated in the research, to your colleagues and to the wider community. This can be done via a presentation or in writing. You may also have opportunity to share findings with the wider professional or academic communities through a peer-reviewed journal. In reporting research, it is important to maintain the confidentiality of those who participated, as previously discussed in the ethical considerations section. Details must be given about the research methods used, the research sample and method of analysis of the data, so that readers (or hearers) know the basis for any conclusions drawn. Guidelines for writing a research report are given in the online materials, in appendix 1.1.

GO FURTHER
Appendix 1.1
Research report

1.6 Concluding comments

As you study educational psychology, we hope that you will develop your skills of reflection and critical inquiry, and that it will help to broaden 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 – particularly 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 in contemporary classrooms.

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.

STUDY TOOLS

Chapter review

1.1 What is educational psychology?

- *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, of your students, and of the learning and teaching processes themselves.
- Understanding learners and the learning process contributes to effective learning and teaching.
- Effective teaching is linked to making effective choices, and educational psychology can help to guide teachers in both making and evaluating their choices.

1.2 Introducing reflective teaching

- Educational psychology informs and deepens reflection on teaching practice.

1.3 Reflecting on your 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.

1.4 Using research as a reflective teacher

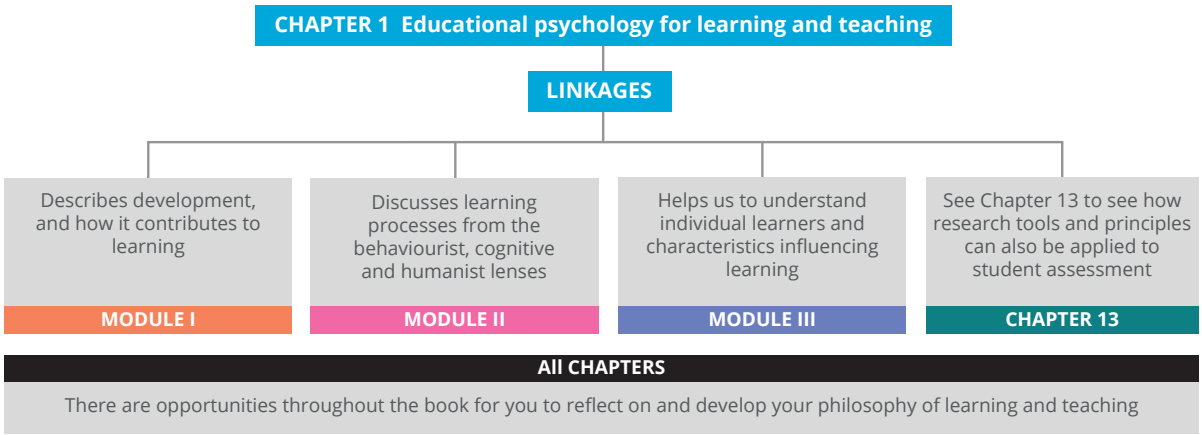
- Using existing research can inform practice, provide new ideas for teaching, evaluate choices and make sense of experiences.

1.5 Conducting research as a reflective teacher

- Conducting research involves asking questions and seeking answers to those questions. Methods include experiment, interview, questionnaire, observation, document analysis and case study.
- Research quality is determined by validity and reliability, as well as ethical considerations, such as confidentiality, informed consent and voluntary participation.
- Action research links reflection about teaching to research. It involves a cycle of reflection, planning and action.

Putting it together

Making links between 'educational psychology for learning and teaching' and material in other chapters.



Questions and activities for self-assessment and discussion

1 Draw a concept map to show how understanding learners and learning processes can contribute to effective learning and teaching. You could add to this as you read further chapters.
2 List some ways in which educational psychology can guide teacher reflection.
3 Identify strategies teachers can employ to reflect on their teaching and students' learning.
4 Name some research methods teachers can use in their work. What benefits could this have for students' learning and for your teaching?
5 What makes for quality research? What issues should be considered?
6 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?

Further research

Go further

The online appendices contain additional material that you should refer to when reading this chapter. The appendix available for this chapter is:

- Appendix 1.1: Research report.

Recommended websites

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

New Zealand Teaching Council: https://teachingcouncil.nz/assets/Files/Code-and-Standards/Standards_Teaching_Profession_english.pdf

Recommended reading

Johnson, R. B., & Christensen, L. (2017). *Educational research: Quantitative, qualitative and mixed approaches* (6th ed.). Sage Publications.

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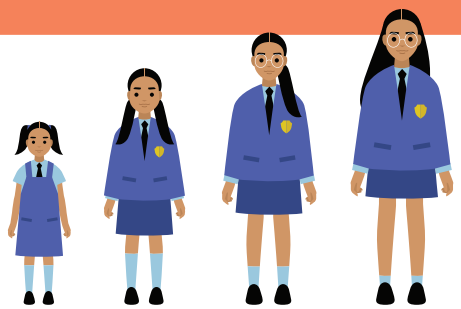
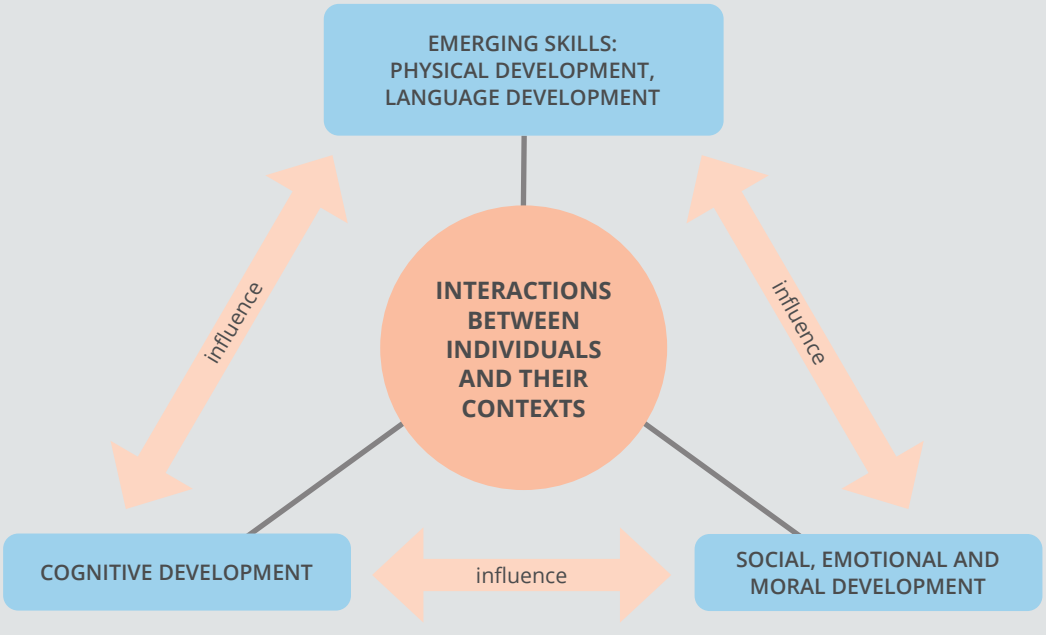
MODULE 1

The learner developing over time

MODULE CONTENTS





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, social and cultural factors (that we sometimes refer to as 'the environment') work with them to shape the individual as he or she develops. The actions of the individual themselves also play an important role in development, both influencing their environment, and determining developmental outcomes at each point in time that will provide a basis for future development.

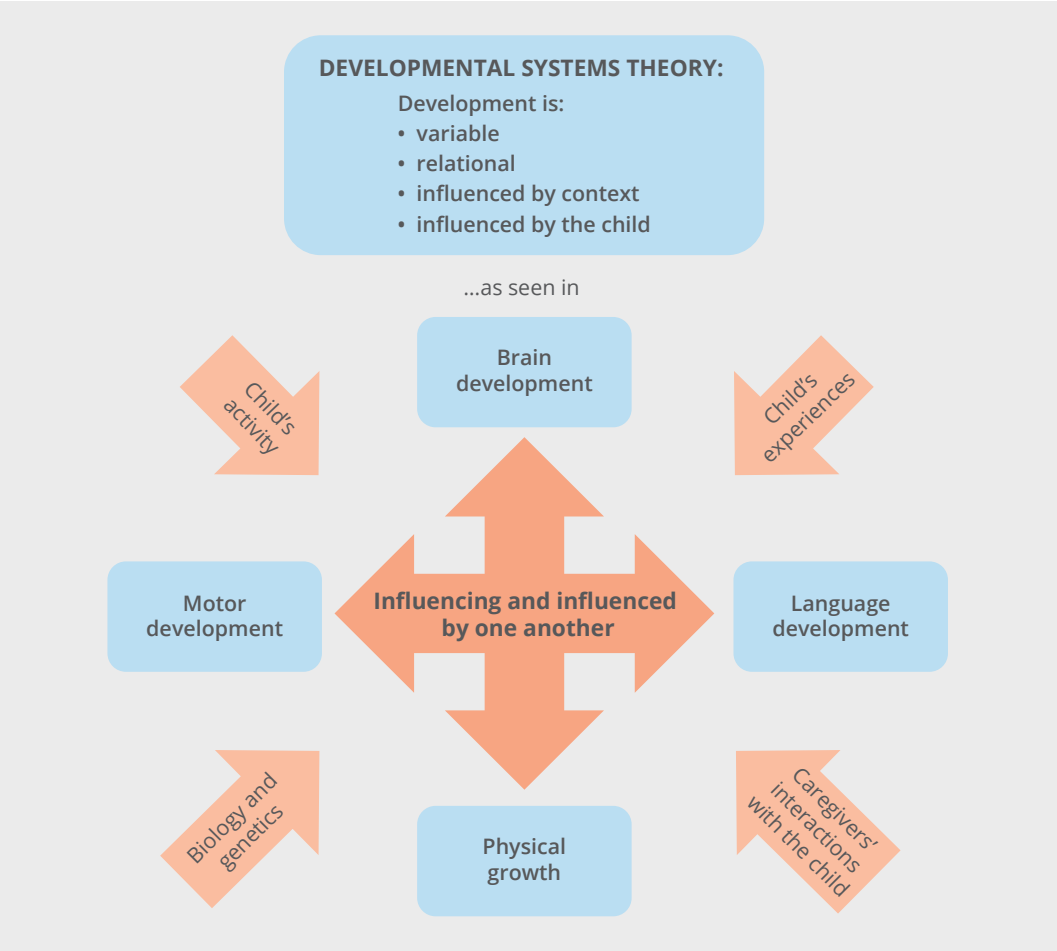
These two principles – of relations between developmental domains, and the interaction of person and context in development – result in the considerable variation we see across individuals in their development, with multiple pathways to a common result (e.g. of acquiring language), as well as multiple outcomes from a common event (e.g. experience of adversity). You will see both of these examples in Chapter 2 and are encouraged to look for further examples in the following chapters.

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. 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 can 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 the principles of development are at work, and how teachers can draw on these principles, adapting their teaching to cater for the varying developmental needs of students.

CHAPTER 2

Emerging skills



Chapter 2 concept map

KEY QUESTIONS

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

- To what extent is development universal? What role does context play in individuals' development, and how does this contribute to variations between people?
- What are some milestones of physical development from early childhood to adolescence?
- How are physical development and language development related? What are some examples of the relationships between them?
- How do developments in the brain over time explain the broad patterns of development seen in physical skills and language?
- Broadly describe the course of language acquisition. What influences it?
- What are some key principles of development? What are some examples of how these are evident in research on the development of children's body, motor skills, brain and language?

BEN, MIA AND JAI

A family is settling down to an afternoon of homework. Mum Jen is writing a letter to a family member overseas. She looks up at her children and reflects on how different they all are (see **FIGURE 2.1**).

Ben (9 months) is hitching himself across the floor rather than crawling. He showed no interest in moving from one spot just a month ago, and his siblings were all happy to bring him plenty of toys and people to interact with while they were home during the COVID-19 'lock down' and school holidays. His older brother Jai was walking by the time he was this age, while Mia crawled early too, spurred on by the desire to chase Jai around the house. Now that they are at school and sitting around the table more when at home, it seems like Ben has finally realised he needs to move to get to them but wants to keep them in sight while he does, and he is even pulling himself up on furniture to get up to their level.

Jen has also noticed that Ben is more vocal when the other children are at home. She reflects on how different he is in this respect than Mia was, who did not start talking until she was four years old (happy to let her brother talk for her), although she is now the most social of the three.

Jai (14 years old) interrupts her thoughts to say he is finished and going outside. When Jen objects because he has only just sat down, he launches into a detailed argument/explanation about why he needs to go outside. Jen sighs, smiling, and agrees for him to go, glad that there will be some years before Ben, too, is at this stage when his language is more exhausting than a delight to hear.

FIGURE 2.1 Development is influenced by complex interactions between person and environment. What factors might have interacted in the development of these children?

iStock.com/avdeev007

All the children look similar and even sound alike enough that their grandparents confuse them on the telephone. However, there are also clear differences between them. Mia (9 years old) is social, yet has become anxious following the bushfires that threatened their home over the summer; Jai is confident, outgoing and ready to try any physical challenge. Jen wonders who Ben will grow up to be most like, but suspects he, like the others, will develop into his own quite different person with a unique set of skills and interests.

Introduction

The family in our opening story is not unusual in that its members are both similar to and different from one another. Various skills have emerged out of each person's experiences as much as from their genetic makeup. Their individual choices have played a role in this as well. Developmental systems theories (Cantor et al., 2019; Lerner, 2015) recognise the interactions between multiple genetic, biological, psychological, family and contextual factors in development. In this chapter we will see various examples of how these factors work together as we look at the physical and

language skills that emerge during infancy, childhood and adolescence, as well as the changes in the brain that underpin them.

2.1 Developmental systems theories

Increasingly, research has built a picture of development that is complex and multifaceted, influenced by personal factors interacting with cultural, societal and immediate contexts, in the activities and relationships that occur within them (Cantor et al., 2019). It is a picture of dynamic changes throughout the lifespan, in response to varied experiences as well as biological changes. This also means that we see considerable variability among people, both in their characteristics and in the path that development takes.

Development as variable

Consider the variability of development in terms of the family described in the introduction. Each one is different, not only in personality and interests, but in their developmental paths: Ben started talking earlier that Jai or Mia, and Jai and Mia both crawled and walked earlier than Ben. Mia's experience of the bushfires has made her emotionally sensitive and tentative, which will affect her emotional development – she is already managing her emotions by choosing to avoid the TV. It has also changed Mia's awareness of the people around her (an aspect of social development) and influences how she contributes to Ben's development by moving things out of his path and protecting him from falling. As a result, Ben will not have those experiences the way his siblings might have had, which will influence the course of his physical development. Jai, on the other hand, also experienced the bushfires but has processed the experience differently both cognitively and emotionally, so that it has not dented his confidence in himself. While there are certainly universal aspects of development (all the children will walk, talk, reason and go through puberty) there is considerable diversity too. Be it how physically active or talkative an individual is, how they reach these milestones, or how they manage the changes of puberty, these things will vary from person to person.

Development as relational

This group of theories challenges views of development that focus on a single domain, such as physical development, cognitive development or social development, arguing that all domains are related to one another and interdependent. It also recognises the interrelations between people and their contexts, as for example in the case of Ben, whose development of pulling himself up has arisen from a combination of his own biological growth, development of muscle strength, and the social desire to interact with his siblings, as well as his immediate context – the family's growing tendency to work at the table in order to keep their things away from his exploring hands. He is influencing the family and their behaviour at the same time that they are influencing his development; and his social and physical development are interrelated. As a result the theory is sometimes called '*relational* Developmental Systems Theory' (Bornstein, 2019; Lerner, 2015) in reference both to relations between the different developmental domains and relations between individuals and their contexts in processes of development. In **CHAPTERS 3** and **4** you will be introduced to some older theories of development that had a singular focus on one domain. While these theories have important knowledge to contribute to our understanding of development in each domain, the principle of interrelationship between domains in development is important to bear in mind.

Development as influenced by context

An important outcome of research under this theory has been recognition of the importance of relationships for development: part of the social context that, as well as family, includes carers and educators, peers and community members. People's interactions with infants, children and young people influence development, and are 'developmentally positive' when they are warm, supportive, responsive and attuned to the individual (Osher et al., 2020). This has obvious implications for us as child carers and educators. We will see this influence in physical, language and brain development in this chapter, as well as other influences of context on development.

Development as influenced by the child

The child also plays an important role in their own development, both through their activity and choices, and by influencing the environment around them. For example, Ben influences how the family interacts and the development of his siblings, as well as choices of his parents that affect the others' development. They are watching less television in deference to Mia's sensitivity and access the news individually online.

You will encounter further examples of these principles of variability, interrelationships between domains, the importance of the environment, particularly interpersonal context, and the role of the child in development as we look at physical and language development. At the end of this chapter we will return to principles of development, drawing together examples of the principles in action.

2.2 Physical development over time

As we explore development in this chapter and throughout Module I, we will 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, such as changes in growth, motor skills and the structure of the body and brain, are accompanied by, influenced by and 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 a ball. 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 in later years – not just physical, but also social, emotional and cognitive.

Physical development, cognition and emotion

As discussed earlier, one of the principles of development is the interrelationship between domains. Infants' exploration of their worlds has far-reaching consequences for their development across domains, and motor skills facilitate that exploration. An infant's shift from

staying in one place to independent mobility has consequences parents rapidly become 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, with increased opportunities to explore the environment through crawling, as well as the physical work of crawling, which is itself linked to improvements in visual perception, wariness of heights, spatial search strategies and brain development (Anderson et al., 2013). Developmental scientists refer to these kinds of far-reaching consequences across time and across domains that are set off by achievement of a particular milestone, as **developmental cascades** (Adolph & Hoch, 2019). Another example is given by Bornstein and colleagues (2013) who were able to show links from motor and exploratory skills at five months to adolescent achievement at 14 through vocabulary and intelligence at four and 10 years, and academic achievement at 10.

developmental cascades
Far-reaching consequences for learning and development that are instigated by a particular developmental achievement

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? Or children who simply choose not to crawl? As we saw with Ben (and also with Mia's refusal to speak until four despite crawling early), many children may not fit the generalised pattern of development described in milestones tables, yet develop normal motor and language skills. There is a wide range of childrearing practices across the world, resulting in variability in patterns and timing of development, yet all children come to walk and talk, unless they have a particular disability that prevents them (Adolph et al., 2018). 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.

FIGURE 2.2 How might children's new achievement of walking affect their social, cognitive, emotional and physical development?
Shutterstock.com/Monkey Business Images.

With walking comes another developmental cascade, 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 et al., 2014). Language development is affected as the child interacts with their environment in new ways, prompting parents to respond by talking about their environment, thus building vocabulary. Walking infants are also reported by parents to be more independent, which relates to their socioemotional development (Walle & Campos, 2014). Emotional development is affected too as infants become frustrated by parents blocking their goals or experience joy at attaining them (Adolph & Robinson, 2015), as shown in **FIGURE 2.2**. Motor development, seen in the child's activity of crawling and later of walking, is an important force in their development.

The close relationship between physical, cognitive, social and emotional development is one that persists throughout childhood and adolescence. 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 a child's activity might prompt development in a number of domains. What does this reveal about the forces that shape development and how 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. Increased muscle strength and improved balance and coordination combined with brain maturation, a lower centre of gravity and children's activity itself, all support the development of children's motor skills (Adolph et al., 2018) (see **FIGURE 2.3**).

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

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

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** involve 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 and large writing implements to being able to write with a variety of pens and pencils between ruled lines on a page.

gross motor skills
Movement skills using large muscle groups

fine motor skills
Movement skills using small muscle groups

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**).

Motor-skill development is also both controlled by, and contributes to, neurological growth. Changes to the brain and body throughout childhood allow new movements, while the environment offers various constraints and opportunities for those movements to adapt to. In moving, new synapses (connections between nerves) are formed and neural networks are built and strengthened, so that practice of particular movements enables them to become more fluid and automatic. Brain development is addressed in detail later in the chapter. The child's body, brain and environment work together to result in the developments in motor skills we see (Adolph & Robinson, 2015).

Contributions to motor-skill development

Parents contribute to motor-skill development at home through 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 or formal preschool contexts. In the Torres Strait region of Australia, for example, 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 rēhia* – Māori recreational and leisure activities such as *poi*, *rakau* and *whai* (Oranga Tamariki – Ministry for Children, 2017).

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

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

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. In an Australian study, Macdonald and colleagues (2020) found that children's fine motor skills, in particular, predicted mathematics and reading ability in Year 1. A review of the literature confirmed this relationship by finding links between speed, agility, coordination, gross motor skill and academic achievement.

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 (see **FIGURE 2.5**).

Swimming, riding bikes and scooters, and similar activities enjoyed by children in their leisure hours are also important. In addition to contributing to health and motor-skill development, links have been made between physical activity and *social outcomes*, such as the learning of social skills, cooperation and teamwork skills and reduced aggression and disruptive behaviour; *emotional outcomes*, such as managing anxiety and stress, and increases in self-esteem, independence and confidence; and *cognitive outcomes*, such as concentration (Australian Department of Health, 2019). Reviews of research have found a positive relationship between physical activity and academic achievement (Castelli et al., 2015), effects on cognition and brain structure and function (Donnelly et al., 2016), as well as executive function (van der Niet et al., 2015), which has a role in cognition and behaviour (discussed in **CHAPTER 3**). Links have also been found between exercise and neuroplasticity, which is discussed later in this chapter (Hötting & Röder, 2013).

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

Newspix/Chris Eastman

The importance of physical education

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 rolling out Healthy Active Learning in 2020, with curriculum resources for schools, healthy food and water promotion, and physical activity advisers to work with schools and kura in strengthening play, sport and physical education in the schools, and to connect with providers in the local community. The Australian Government recommends at least one hour a day of moderate to vigorous physical activity for children and young people, as well as several hours of light physical activities, and activities that strengthen muscles and bones at least three days a week (Australian Department of Health, 2019), while the New Zealand government has adopted similar guidelines (New Zealand Ministry of Health, 2017). In addition, the Australian Sports Commission in 2015 initiated Sporting Schools, a program designed to engage sporting organisations across Australia, with a view to increasing children's participation in sport by delivering activities before, during and after school hours. The program is offered to primary and junior secondary classes. Links to the physical activity guidelines are in appendix 2.1 online.

GO FURTHER

Appendix 2.1 Physical activity guidelines

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 10 to 24 years (Sawyer et al., 2018) 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's changes are generally visible 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). The influence of the context of development is evident here, as is the variation that exists between different groups, as will be explored later in this section.

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 their voice 'breaks' with sudden changes in pitch. Even though it is defined by these physical changes, puberty involves far more in addition to the physical response to release of hormones, as we shall see in the following section.

Connections among physical, cognitive and socioemotional development in adolescence

One of the principles of development we introduced at the start of this chapter is the interconnections between domains in development, and adolescence – especially during puberty – is a period in which this is particularly apparent. 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. With widespread use of social media by adolescents, this has now become the focus of studies investigating influences on body image. Social media use has been related to body dissatisfaction, with appearance-based social comparison playing an important role (Holland & Tiggemann, 2016). Helping students to view images on social media platforms critically may help to reduce this negative effect: in an Australian study, viewing real images of people alongside the 'ideal' image, or viewing real images alone

decreased body dissatisfaction in the women who participated in the study (Tiggemann & Anderberg, 2019). See **CHAPTER 12** for further discussion on supporting students in their use of social media.

Body image issues and eating disorders in adolescence

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. A submission to New Zealand's child and youth wellbeing strategy (ActionStation, 2018) surveyed 1000 young people aged 12 to 24, and found body image was chosen as their second from a list of 18 possible concerns. (Top was 'succeeding in studies and getting good grades'). Australian young people similarly identified body image as the fourth-highest personal concern in Mission Australia's Annual Youth Survey 2019, although this did drop from third in the years from 2009–2017.

Body dissatisfaction is a concerning health issue, linked to negative quality of life in both male and female adolescents (Griffiths et al., 2017). In a minority of children, this widespread pattern develops into eating disorders, such as compulsive eating disorder, anorexia and bulimia. If teachers or parents suspect a child of having an eating disorder, it is important that they consult an expert because these illnesses are complex, difficult to treat and have potentially severe outcomes.

Puberty and coping with developmental change

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. Early maturing girls are 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 (Hoyt et al., 2020). However, a study that analysed data from the Longitudinal Study of Australian Children (LSAC) found that psychosocial difficulties seen in children who entered puberty early (at around 8–9 years) were evident in these children at ages four to five, and six to seven years (Mensah et al., 2013).

In Australia, early maturing boys *and* girls demonstrated more negative emotional states, poorer peer relationships and more school-related issues compared to their peers. However, these differences disappeared with age as peers started puberty, indicating that it is the experience of feeling out of step with the peer group that is problematic for early maturing adolescents (Warren & Yu, 2015). The link between physical and emotional development here is evident but complex, and 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. **IMPLICATIONS FOR EDUCATORS 2.1** 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.

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.

IMPLICATIONS FOR EDUCATORS 2.1

Contributing to motor development

	Motor developments	Contributions of body, brain and behaviour	Contributions of environments: what teachers and parents can do
Infancy  Shutterstock.com/spass	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  Shutterstock.com/Temych	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  iStock.com/FatCamera	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

>>

	Motor developments	Contributions of body, brain and behaviour	Contributions of environments: what teachers and parents can do
Adolescence  Shutterstock.com/Dotshock	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 involvement in physical activity, including vigorous intensity activities Break up time spent sitting

Adapted from Adolph & Berger, 2010.; Kopp, 2011; McDevitt & Ormrod, 2010.
Image sources: 1: © Spass/Shutterstock.com, 2: © Temych/Shutterstock.com, 3: Christopher Futcher/Getty Images, 4: Dotshock/Shutterstock

Environmental influences

A number of areas of physical (and as you will see in later chapters, cognitive, social and emotional) development are 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 (Dutta, 2015). Other influences may be felt later in the child's life; for example, exposure to poverty associated with stress in early childhood is associated with earlier onset of menarche, although secure attachment in infancy (described in **RESEARCH LINKS 2.1**) can reduce these effects (Sung et al., 2016). Whittle and colleagues (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. We discuss some examples of areas of physical development in which the effect of environment is visible in this section.

FIGURE 2.6 The timing of puberty varies from individual to individual
Shutterstock.com/wavebreakmedia

Differences in the timing of puberty

Adolescent girls in wealthy 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. 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. In remote agricultural societies the most common (median) age of menarche can be later than 18 years, whereas in wealthy industrial nations it is reported as younger than 12 (Worthman et al., 2019).

How do we define early onset of puberty? Typically, girls commence puberty between 10 and 11 years, and boys between 11 and 12 years, with the range for healthy children extending two years either side of these averages (i.e. 8–13 years for girls, and 9–14 years for boys) (Mensah et al., 2013). In Australia, drawing on data from the LSAC, Warren and Yu (2015) found that experiencing puberty early (8–9 years) was uncommon, with relatively few children (4% of boys and 14% of girls) showing any signs of puberty at this age. Most children (80% of boys and 96% of girls) had shown some signs of puberty by 14 years. They also found that mothers' and fathers' age of puberty was correlated with children's timing of puberty, indicating that both genes and environment are likely to be involved in pubertal timing. Another study, also drawing on the LSAC data, found that socioeconomic disadvantage played a significant role in pubertal timing, with boys from low socioeconomic backgrounds four times more likely, and girls from low socioeconomic backgrounds twice as likely to experience puberty early (Sun et al., 2017).

Piekarski and colleagues (2017) suggested that the shift in the timing of puberty is of concern, as the onset of puberty may coincide with the closing of a stage of greater brain plasticity in childhood that is important for learning of key skills, such as reading, writing and language. Shortening this period will also have effects, then, on learning; and given that earlier age of onset of menarche (and to some degree, also semenarche) is greater in lower socioeconomic groups, this may contribute to educational disadvantage.

Differences in growth rates

Differences in growth rates and eventual height also have been observed among people from different countries (Evelyth & Tanner, 1990). This is another example of variations in development seen between individuals and groups. 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.

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 children 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** further discusses the inclusion of children with additional 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 skills

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 and stability skills such as are used in balance tasks, while by six years, boys have better manipulative skills such as are used in catching, hitting and ball skills (Kokstejn et al., 2017; Rodriguez-Nero et al., 2019). This difference persists through childhood, with Australian primary school boys reported to be more proficient at object-control skills and girls at locomotor skills. In Years 8 and 10 boys and girls showed little differences apart from the fundamental movement skills of leaping (girls better than boys) and sprint run (boys better than girls) (Hardy et al., 2017). Motor skills are needed to participate in games and sports and related to both physical activity and fitness in later childhood and adolescence (Logan et al., 2015). 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. Links to resources for teaching fundamental movement skills are in appendix 2.2 online.

GO FURTHER
Appendix 2.2 Fundamental movement skills

Gender differences in physical activity and exercise involvement are more widespread than this, however. The 2018 LSAC annual statistical report (Australian Institute of Family Studies, 2019) tracked 11- to 12-year-old children's physical activity. In both Australia and New Zealand, health guidelines recommend 60 minutes of moderate to vigorous physical activity each day, made up of mainly aerobic activities (Australian Department of Health, 2019; New Zealand Ministry of Health, 2017). LSAC found that most children did not meet these guidelines, recording on average 32 minutes a day on weekdays, and 30 minutes on weekends of physical activity. Fewer girls (6.9% on weekdays; 11% on weekends) met the guidelines than boys (23.6% on weekdays; 21.2% on weekends).

Better overall results but similar gender differences are found in New Zealand. The Neighbourhoods for Active Kids study used accelerometers to track activity and found that in childhood (8–13 years) 53 per cent of boys, and 24 per cent of girls met the guidelines, while in adolescence (13–18 years) 46 per cent of boys and 36 per cent of girls met them (Smith et al., 2018).

Encouraging physical activity

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. However, the LSAC indicated that levels of children's physical activity appear to be declining

FIGURE 2.7 Physical activity can be encouraged through design of playground spaces as well as planned activities

Shutterstock.com/Monkey Business Images

over time (Australian Institute of Family Studies, 2019). Iivonen and Saakslahti (2014) argued that developing girls' object-control skills in early and middle childhood is an important part of the solution.

The effects of environment on physical development, as well as 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 (see **FIGURE 2.7**). **IMPLICATIONS FOR EDUCATORS 2.2** summarises some of the principles schools can consider in supporting students' physical development.

IMPLICATIONS FOR EDUCATORS 2.2

Physical development in schools

- 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 Australian Curriculum (Australian Curriculum, Assessment and Reporting Authority, 2014) and in the New Zealand Curriculum (New Zealand Ministry of Education, 2007).
- The New Zealand Curriculum adopts the Māori philosophy of health and wellbeing, or *Hauora*, which recognises the interconnection of *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.
- Involvement in physical activity on weekends and with support of parents and community is also important.

2.3 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, the role of relationships in that development, and how this development is related to visible changes in thinking and behaviour.

The brain's physical structures

The development of the brain begins soon after conception. **Neurons** or nerve cells develop and are responsible for storing and transmitting messages throughout the brain system. As the embryo grows, neuron proliferation results in between 100 and 200 billion neurons at birth; most of the neurons it will need to grow and develop.

Information is transmitted between neurons via a long arm-like projection known as an **axon**. When a neuron is activated or 'fired', an electrical impulse travels along the axon and crosses a gap or **synapse** between it and the adjacent neuron, 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 time, neurons develop in size and complexity, growing axon branches and dendrites that connect to other cells. More synapses are formed as thousands of neurons connect to each other, organised into networks that interact with other networks. A process of **myelination** also occurs, in which the axon is insulated in a fatty sheath that improves the speed of transmission across the neural networks by up to 100 times.

The developing brain produces many more neurons and synapses than are eventually used or needed. During the first two years, an estimated million or more synapses are formed every second (Center on the Developing Child, 2016). Some neurons die off naturally, and unused or unnecessary synapses are pruned. The adult brain contains only about half the number of neurons generated during the developmental phase. It is believed that this pruning enables faster and more efficient communication between the remaining cells and allows new connections to develop.

neuron
A nerve cell

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

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

Brain plasticity

The process of the brain changing and adapting itself in response to input and experience is known as **brain plasticity**. This is a relatively new concept; it was once thought that 'hard wiring' occurred relatively early in life. Although there seem to be 'optimal' periods of brain development, such as in early childhood and adolescence, the brain retains its capacity for change throughout life.

Different forms of brain plasticity enable the brain to develop and to recover certain functions. All these types of plasticity involve changes in synapses, or connections between brain cells. Developmental processes such as synapse pruning are one form. Learning and memory can also be considered as a form of plasticity, as our neural networks alter to accommodate new information or skills. This happens throughout

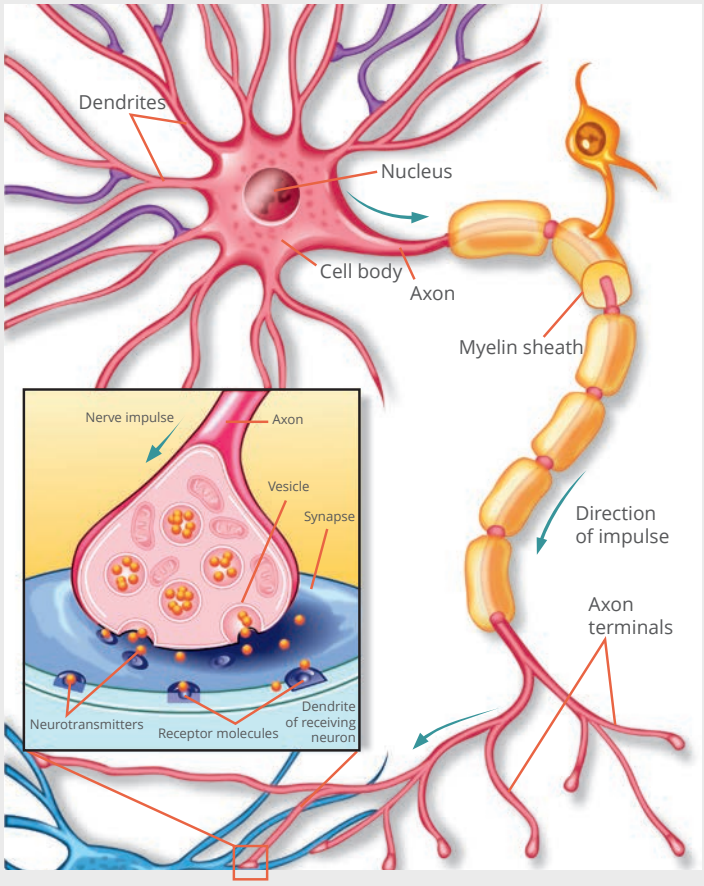


FIGURE 2.8 The neuron receives messages through its dendrites and passes them along its axons and across the synapse to other cells

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

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

life. Changes to sensory input, such as a change in eyesight, may lead to another form of plasticity (Vanderbilt Kennedy Center, 2020). Brain plasticity has also been observed in adults who have had a major neurological injury, such as a stroke, and then recovered some function by remapping the brain through activation of the motor cortex (Wiersma et al., 2017). However, with increasingly established patterns of connection and specialisation of the brain during development, this kind of plasticity requires increasing effort with age (Center on the Developing Child, 2016).

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 (i.e. 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

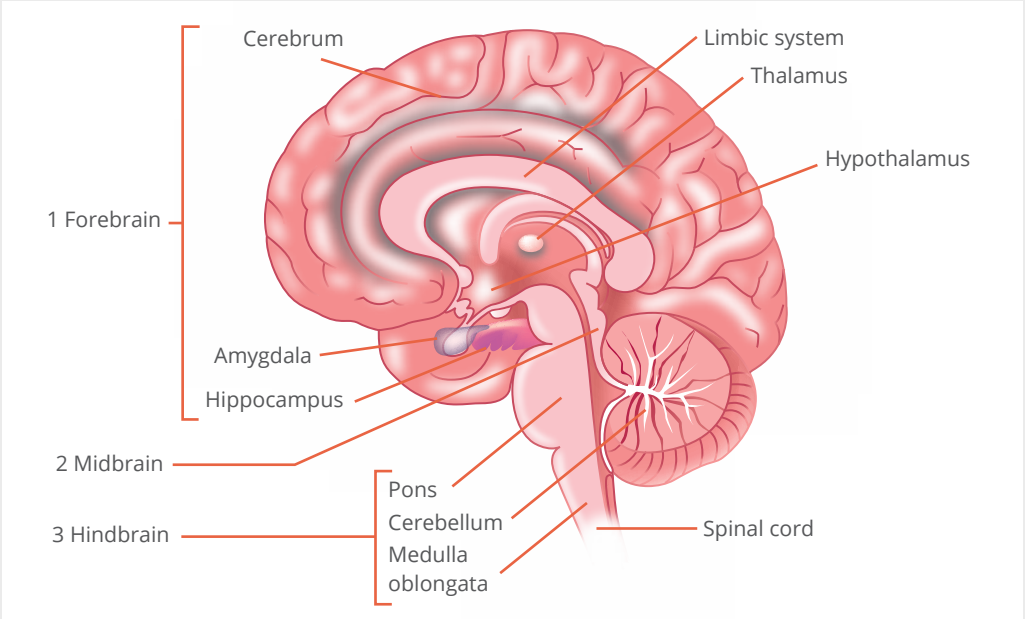


FIGURE 2.9 The internal brain structures

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

sleep patterns, hunger and 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.

The cerebral cortex

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.

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

The left and right brain, and lateralisation

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

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

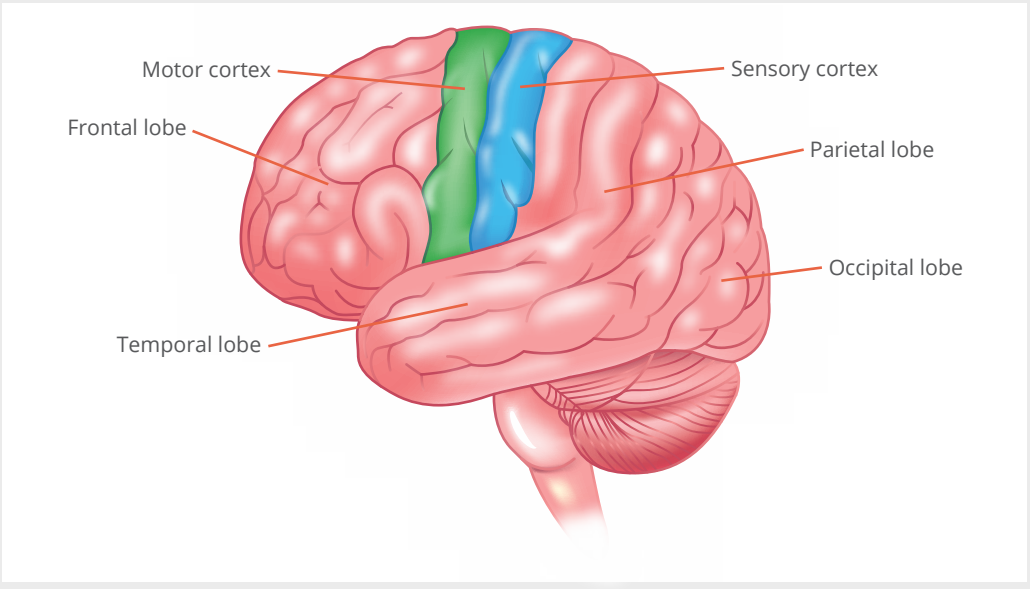


FIGURE 2.10 The cerebral cortex: particular functions are localised in specific areas of the cortex; most skills involve the coordination of messages from a number of areas

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

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 (e.g. 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; for example, emotion 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 also be less strong in females than males and left-handed people may have less lateralisation than right-handed people. Meta-analyses of the effect of handedness on cognitive ability have found no differences between right-handed and left-handed people (Papadatou-Pastou, 2018). In fact, most activities involve coordination of messages from both sides of the brain.

Thinking critically about brain research and the classroom

Research into brain development has been prolific over the past two decades, but applying this new understanding of how the brain works to classrooms is still in its infancy. Teachers around the world report 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 begun to investigate the applications of brain research to education. Links to centres of research into the brain and learning can be found in the online materials, in appendix 2.3.

GO FURTHER

Appendix 2.3 Centres for brain research

Horvath and Donoghue (2016) argued that if seeking to identify applications for learning and teaching, neuroscience research must always be translated into education through educational psychology research. Relational developmental systems theory, introduced at the start of this chapter, is an example of this: combining neuroscientific studies with a number of other fields of research to identify how development and learning occur and how they can be supported (Cantor et al., 2019). This has then been translated to identify specific implications for educators (Darling-Hammond et al., 2020; Immordino-Yang et al., 2019).

Therefore, teachers should be cautious of recommendations that are billed as being 'brain-based'. Sometimes this label is used to claim direct applications of neurological research to learning and teaching strategies that are not supported by research evidence. These are sometimes called 'neuromyths' (Organisation for Economic Co-operation and Development, 2007) and some examples are included in **TABLE 2.1**, with relevant research evidence.

TABLE 2.1 Examples of neuromyths

Neuromyth	Research evidence
Some educators have used brain lateralisation to explain children's academic strengths and weaknesses, describing students as being 'left-brained' or 'right-brained', and developing teaching strategies for one or the other. (An internet search for 'right-brained learners' or 'left-brained learners' will provide examples)	Nielsen et al. (2013) studied brain scans of over 1000 people. While they found localised skills based in the left or right hemisphere, there was no evidence of stronger networks in the right or left hemispheres of the participants. Lateralisation may explain handedness, but most thinking involves 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	Links between brain structure and behaviour have not been defined by research as yet. 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. This accords with psychological studies, which show more similarities than differences between males and females (Hyde, 2014). **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'	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
Brain development is rapid in the early years of life, so that birth to three is recognised as a sensitive period (a time when the effects of experience and environment are strong). As a result, it is sometimes assumed that the brain (or intelligence, or personality) you have in adulthood is set, with no further changes likely to occur	Brain development continues until the mid-twenties, with adolescence another sensitive period During sensitive periods, 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)

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 a 'sensitive 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.

Influences on brain development

attachment
The strong emotional bond established between infant and caregiver

In this period of life, the warmth and security of relationships with primary caregivers, known as the **attachment** relationship (see **RESEARCH LINKS 2.1**), is believed to be critical for the development of the social and emotional processing centres of the brain (Center on the Developing Child, 2015). 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 their 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 et al., 2018).

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 (see **FIGURE 2.11**).

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

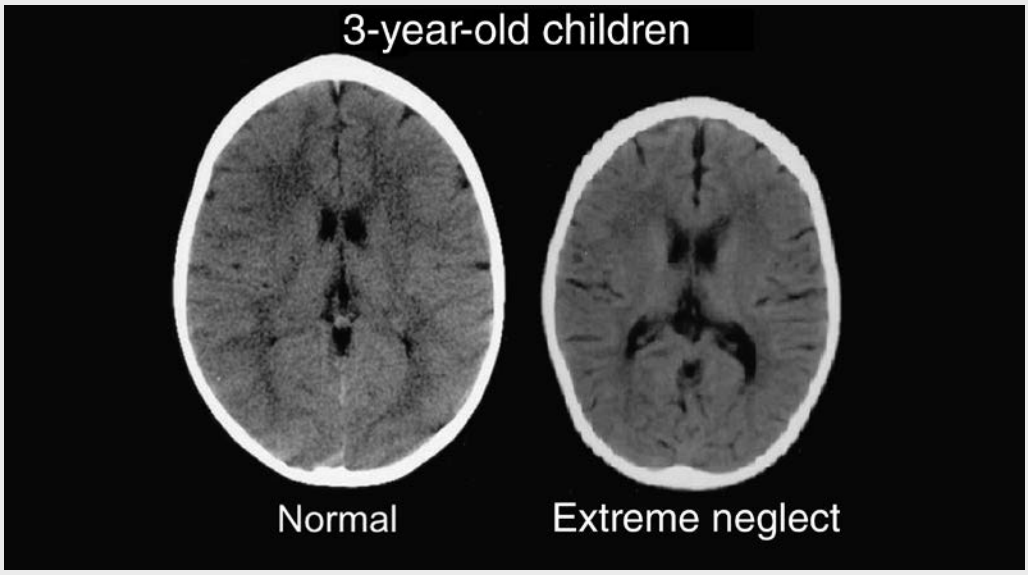


FIGURE 2.11 These images illustrate the negative impact of neglect on the developing brain. The CT scans are from three-year-olds – one healthy, on the left, with an FOC (head circumference) in the 50th percentile, and on the right is a child who experienced total global neglect (including sensory deprivation). The image on the right is 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)

Source: From studies conducted by researchers from the ChildTrauma Academy (www.ChildTrauma.org) led by Bruce D. Perry, M.D., PhD.

brain corresponds to the development of executive function skills, such as the ability to follow rules and directions and control impulses. 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 (Center on the Developing Child, 2011). (You will see more on executive function in **CHAPTER 3**.)

Stress and executive functioning

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 well as memory and emotional regulation 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 (Center on the Developing Child, 2020).

The impact of trauma and neglect on the developing brain

Brain development is experience-expectant (i.e. certain experiences are required to trigger development, particularly in infancy) and experience-dependent (i.e. both positive and negative experiences shape its development throughout life). This is part of the plasticity of the brain described above. In particular, sensitive and responsive parenting in childhood and adolescence is important to healthy brain development, while trauma or neglect can result in extreme pruning of pathways, and disrupted growth (Cantor et al., 2019).

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 amygdala (responsible for impulsivity and fear response) tends to show heightened reactivity, while the reward system shows a depressed response, and the hippocampus (managing memory of events) is smaller (Teicher et al., 2016). The limbic function (processing emotion) is also affected. Some of the changes may be protective, with additional particular changes specific to types of abuse (Patoine, 2018).

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).

Brain development in middle childhood

While infancy and early childhood undoubtedly see rapid and foundational brain growth, the brain continues to grow and develop throughout childhood and into adulthood. In middle childhood there is continued pruning and growth of synapses supporting reorganisation of the brain. This leads to increasingly complex connections between cognition, emotion and behaviour, as we have seen (Cantor et al., 2019). 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.

Social exclusion in middle childhood

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 (Tang et al., 2019). This provides vital evidence that an increase in bullying and social ostracism in the middle childhood years corresponds with the emerging capacity of the brain to understand and respond to this 'pain' (for more detail, see **CHAPTER 4**). In adolescence this response is fully formed and is stronger, but it is clearly evident in middle childhood.

Variations in development in middle childhood

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, a large international study found slower maturation of the prefrontal cortex during middle childhood (Hoogman et al., 2017), with smaller regions in the amydgala (which regulates emotion and response inhibition), caudate nucleus (involved in goal-directed action), putamen (linked to learning and responding to stimuli), nucleus accumbens (that processes rewards and motivation), and hippocampus (involved in memory). That this effect was related to maturation was deduced from the fact the differences were largest in children in the study, which sampled more than 3000 people with and without ADHD from four to 63 years. These differences may explain some of the notable differences in executive functioning for children with this condition, 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 end of the past century 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 at some time in the third decade of life, possibly as late as 25 years of age (Giedd, 2008). 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.

Adolescent brain development and risky behaviours

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 (Walker et al., 2017). 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 (e.g. driving very fast or sexual activities). Social rewards seem to be particularly powerful, with risky choices more likely to be made while peers are watching on (Dow-Edwards et al., 2019). 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; Walker et al., 2017). 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 outcome of their behaviour. The brain-maturation perspective suggests that the adolescent is not just making an excuse but has a real problem with connecting sensational activities to risky outcomes.

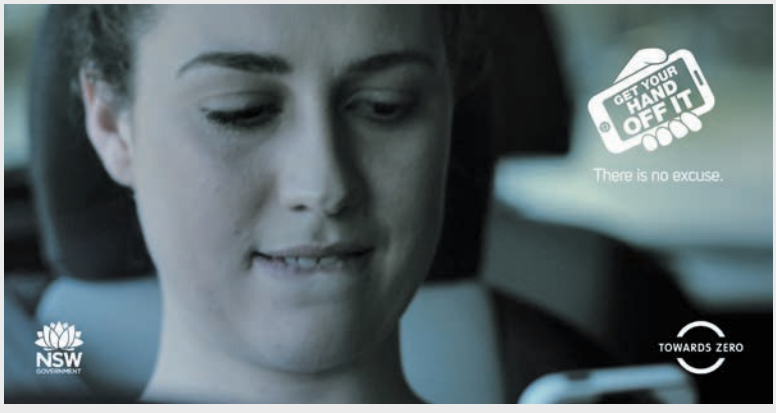


FIGURE 2.12 Campaigns such as this help adolescents to make good judgements about reasonable risk

Image courtesy Transport for NSW

Another view of risk-taking in adolescence

However, other neurological research has challenged this model of adolescent brain development. Romer et al. (2017) identified two types of risk taking in adolescence. One of these is unhealthy and associated with low impulse control – an indicator of weak executive function. However, this pattern of risk taking (and the negative outcomes that result from it, such as drug dependence, fatal car accidents, sexually transmitted disease, and depression and suicide) is limited to a fairly small group of adolescents, is seen to emerge before adolescence and extends into early adulthood for this group

(Bjork & Pardini, 2015). In view of our discussion earlier of the role of early-life experiences in shaping and setting up the foundations of a healthy future brain, it is possible that these patterns of behaviour owe their emergence to other factors than an imbalance in the development of regions of the brain in adolescence. For example, early-life exposure to toxic stress has been linked to several negative outcomes in adolescence, including suicide, drug use and development of addictions (Shonkoff et al., 2012). In fact, research suggests that the majority of adolescents show good impulse control from early adolescence (Humphrey & Dumontheil, 2016).

Another pattern of risk taking is based on sensation seeking and is adaptive, enabling adolescents to explore and to learn from experience in important ways that contribute to their development towards adulthood. When this kind of risk taking is paired with good executive function (impulse control), as it is for the majority of adolescents, it is associated with the weighing up of risk and reward, and with learning from experience (Romer et al., 2017). Hence, adolescents may explore drug taking or sexual activity within what they judge to be safe limits, but are likely to learn from their experiences and to benefit from public education campaigns about their dangers, such as the one shown in **FIGURE 2.12**. What happens with development in adolescence, then, is the gaining of wisdom – an increasing ability to judge between reasonable and unreasonable risks.

The role of the parent and school when approaching risk

There is clearly a role here for parents and schools to engage in discussions with adolescents around situations of possible risk, whether this be driving, using social media, sexual activity, or drugs and alcohol. Just as with other stages of brain development we have studied, the role of experience and nurturing guidance is likely to be as 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 impact of harmful substances on the adolescent brain

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 and cannabis use during this vital period of brain development are 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 (Lees et al., 2020), while cannabis users show similar difficulties with executive function tasks, and these difficulties remain even after abstinence of four weeks (Meruelo et al., 2017). Reduced brain volume in a number of areas that results from heavy drinking or regular cannabis use is likely to contribute to these deficiencies (Meruelo et al., 2017). Memory deficits in teenage drinkers are likely to be associated with a shrunken or underdeveloped hippocampus – an area 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 (Lees et al., 2020).

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. However, as a critical period of rapid growth, adolescence is also a time of considerable potential for positive outcomes as a result of supportive interactions with trusted others (Dahl & Suleiman, 2017).

The development of the adolescent brain

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 (e.g. accelerate into university at a young age) and great displays of empathy and community awareness (e.g. volunteering in their communities and abroad), and some show considerable 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?

Adversity, risk and resilience in development

Some children experience adversity that can significantly affect development through stress or through poor responsiveness from key family members as a result of their circumstances. As we have seen, stress can have significant effects on brain development, and just as we saw in physical development, and will see again when we discuss language development, the responsiveness of a parent or carer to the child is a vital input in the child's developing brain (see **FIGURE 2.13**). This responsiveness influences a multiplicity of domains: social, emotional and cognitive as well as neurological (Center on the Developing Child, 2016). Family stress can influence parents' ability to respond to their children, and hence influences the child's development in multiple ways. The US National Scientific Council on the Developing Child (2020) suggested caregivers can protect children from the effects of adversity by supporting positive relationships, minimising stress and strengthening their children's and family's core life skills, such as goal setting and monitoring, establishing routines, regulating behaviour and emotion, and supporting children's social-emotional development.

FIGURE 2.13 Parents' interactions with infants play a vital role in developing essential skills that support resilience as well as social, emotional, cognitive and language skills

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When vulnerable children show healthy adjustment despite these risks,

we call it **resilience**. It is important to note that resilience is not a character trait. Rather, resilience is the outcome of a process that is influenced by the complex interaction of characteristics of family, community and the individual over the lifespan (Luthar et al., 2015). It can therefore change over time with varying experiences and conditions, be different for different situations, and will vary for different children.

resilience
Positive adjustment despite the experience of significant risk or adversity

Family contributors to resilience

The foundations for resilience are established early. Responsive and supportive parenting helps to build brain networks in infancy that support resilience later in life. This can be as simple as a parent playing peekaboo with their child or looking and smiling in response to the infant's looks and smiles (Center on the Developing Child, 2016). Having at least one close and supportive parent also protects children from the effects of a wide range of stressful and adverse events (Masten & Barnes, 2018), and quality care from alternate caregivers can equally provide this protection (Luthar et al., 2015).

For this reason, a child having secure attachment to their caregivers is protective in adversity (see **RESEARCH LINKS 2.1**). These relationships also provide a developmental context for important skills that themselves support children to show resilience despite risk, such as self-regulation and executive function (Center on the Developing Child, 2015). Self-regulation and executive function are discussed in **CHAPTERS 3** and **4**. Other aspects of parenting that are protective in adolescence include the combination of high levels of warmth and demandingness or control, and monitoring and granting of autonomy (Luthar et al., 2015).

Community contributors to resilience

Community bodies such as schools and childcare centres can protect against adversity by supporting and working with families and encouraging teachers to develop supportive relationships with children (Luthar et al., 2015). Schools can also provide stability, safety and routine in an uncertain world (Masten & Narayan, 2012). Children's peers can offer acceptance and friendship and provide both a developmental context for building of key skills and protection from some of the effects of adversity. Peer social support was found to be particularly protective in a review of research, with most studies focusing on adolescence (VicHealth, 2015). Some neighbourhood characteristics can reduce risk for children; these include a sense of belonging, cohesion and participation in community groups (Luthar et al., 2015).

Individual contributors to resilience

Biological, genetic, psychological and neurological elements interact with one another in complex ways to support resilience in individuals. Individual differences occur in genetic sensitivity to environmental inputs, so that two individuals may have varying biochemical responses to a stressful event. Sensitive children may respond strongly both to stressful events, *and* to interventions (Boyce, 2016), indicating the importance of the interaction between individual and environmental factors. Brain chemicals are influenced by early life experience of stress, and can then influence later stress responses. Cognitive skills such as executive function and self-regulation help children to respond to adverse situations, to generate solutions to problems and to plan. So too do a sense of mastery, self-efficacy, humour, and religious or cultural practices that support hope and optimism. Emotional intelligence (see **CHAPTER 9**) is also important to adaptive coping, enabling children to recognise, manage and reason about their own and others' emotions (Luthar et al., 2015). Community and family factors interact with these individual factors in creating the means for resilience; for example, interaction with parents is vital for the development of self-regulation (Center on the Developing Child, 2015).

RESEARCH LINKS 2.1

Attachment and development

Attachment illustrates the important role of relationships in human development as well as how individual characteristics and environment interact in the process of development. This close emotional bond between infant and caregiver is influenced by the interaction of parents' sensitivity and responsiveness with children's temperament and dispositions. Bowlby (1969, 1973) proposed that attachment is an evolutionary mechanism by which survival is ensured through children staying close to their parents and their parents nurturing and protecting them. This is evident in infants using parents as a safe haven and a secure base from which to explore the world. Bowlby's theory proposed that attachment arises from parents' interactions with their infant over time (particularly in the first two years of life), and that the quality of attachment influences personality in later life (Sroufe, 2005).

Mary Ainsworth and colleagues (1970, 1978) developed a means of evaluating the quality of attachment between an infant and their parent, called the Strange Situation, in which a one-year-old infant is observed in a series of three-minute combinations with their parent, a stranger, parent and stranger, and alone. Children's behaviour is recorded in terms of seeking and maintaining proximity and contact with the caregiver, exploratory and search behaviours, and displays of emotion. Ainsworth and her colleagues were able to identify three patterns of attachment: secure, avoidant and resistant (Ainsworth & Bell, 1970), with a fourth pattern, of disorganised attachment, identified later (Main & Solomon, 1990).

- *Securely* attached infants actively explored the environment while their mother was there, even moving out of her sight, but became distressed and stopped exploring when she left. They were readily comforted on her return to the room. These children were friendly to the stranger in the room when the mother was there, but avoided her once the mother had left. Approximately 70 per cent of infants showed secure attachment.
- *Resistant* infants were clingy when the mother was in the room, and reluctant to explore. They became extremely distressed when the mother left, showing fear of the stranger, and were not easily comforted on the mother's return, even pushing her away. Fifteen per cent of infants were characterised as resistant.
- *Avoidant* infants did not show distress when the mother left, and little interest on her return to the room. They were not concerned by the stranger's presence, whether or not the mother was in the room, and when distressed, were comforted equally by the mother or the stranger. Fifteen per cent of children showed avoidant attachment.
- *Disorganised attachment* is characterised by fearful, disjointed and difficult to explain responses of infants upon being reunited with their mother. It is seen in children who have been mistreated or come from high-risk environments (Ainsworth et al., 1978).

The *Minnesota Longitudinal Study of Risk and Adaptation* commenced in Minnesota, USA in 1975, to follow parents and their children from three months before birth until the current day. Researchers have looked at family factors, such as attachment, as well as individual factors in multiple domains of development across a range of contexts. Here we look at their findings on attachment (Sroufe, 2005; Sroufe et al., 2005; Sroufe et al., 2010).

Through their data, the research team observed that patterns of attachment in infancy predicted children's later self-regulation, curiosity and successful interaction with peers at preschool; friendship and competence at primary school; and identity, intimacy and self-reflection in adolescence (Sroufe, 2005). However, the links between attachment and these later skills are probabilities rather than inevitabilities; attachment was proposed to form a foundation on which later experiences could build further developmental skills.

Numerous factors following the initial two years can build on, or move away from the initial start made in the infant–parent relationship, with parents and others (e.g. peers and siblings) providing multiple developmental supports, with context also playing a role. The researchers concluded, in line with Bowlby's theory, that the child's total developmental history influenced outcomes, rather than attachment alone, and that all periods of development are vitally important (Sroufe, 2005). As they were looking at the families at multiple points over time, the researchers were also able to see shifts and changes in

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circumstance and how these influenced development. For example, some children who had displayed insecure attachment (either avoidant or resistant) in infancy did not experience negative effects in childhood following changes in family circumstance (reduction of stress) and greater support, while quality romantic relationships in adulthood were transformative for others who had experienced avoidant attachment early (Sroufe et al., 2010). The study also identified ways in which effects of early attachment patterns were still observable following changes in circumstance, and this has contributed to the work on risk and resilience. Go to the study's website to see more about this study: https://innovation.umn.edu/parent-child.

2.4 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. Awareness of the influence of the combination of sounds in a word on their production, such as 'cc' making a single hard 'c' sound when it follows 'o', as in 'occupy', but a double, hard and then soft sound when followed by 'e', as in 'accept', is an example of phonological knowledge. For the majority of us, our knowledge of phonology, and indeed, of all the systems, is implicit, and how children learn the rules without any explicit teaching of them is one of the questions explored by developmental linguists.

phonology
The sound system of 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.

semantics
The system of meanings associated with language

- **Pragmatics** is concerned with the communication of meaning in social interaction; 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. Also included are the inferences we make about intended meaning. If I say 'that's great' while rolling my eyes or looking downcast, you might infer that I am being sarcastic, whereas if I say it with a smile and a 'thumbs up', you would infer that I am genuinely pleased. You may have used emojis in text messages to add pragmatic meanings to the typed message.

pragmatics
Meaning of language in social interaction

- **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.

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

- **Syntax** refers to the grammatical systems that combine words into phrases and sentences. For example, in English, we order phrases by subject, then verb, then object, which enables you to understand 'the cat ate the mouse' as a logical statement, and 'the mouse ate the cat' as unlikely.

syntax
The grammatical system that orders the construction of sentences

Linguists tend to describe these 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.

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.

Sounds and gestures

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 (see **FIGURE 2.14**). A number of studies have linked young children's use of gestures to growth of vocabulary and the shift to two-word utterances (e.g. Blake et al., 2005; Özcaliskan & Goldin-Meadow, 2005).

FIGURE 2.14 Infants' gestures contribute to their language development and extend their communicative competence at this early stage of development

Getty Images/Westend61

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.

First words and vocabulary development

A child's 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').

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.

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

Links to cognitive and emotional development

There are links in this early development to cognitive and emotional development (Perszyk & Waxman, 2018). 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 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) argued 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; Perszyk & Waxman, 2018) and cognitive flexibility (MacWhinney, 2015).

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.

Language, errors and problem-solving

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 (e.g. an **overextension**) or to refer only to their own dog (e.g. an **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:

> 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].

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

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

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:

> 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.

Grammar, finding patterns and forming categories

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.

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

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 et al., 1989).

Developing semantics and syntax

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 (e.g. 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 (see **FIGURE 2.15**).

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 (e.g. 'although', 'however', 'nonetheless') and more complex words using prefixes and suffixes (e.g. '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 (e.g. 'It was taken by him' rather than 'He took it') and

FIGURE 2.15 Adolescents must navigate the academic language used in classrooms

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nested clauses (e.g. '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

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.

The role of adults in language acquisition

There are a number of ways in which those around the child influence his or her language acquisition, through the things they say, responses to the child, and even interactions that might not involve language. The importance of adult input to children's language acquisition has been described as 'language nutrition' (Zauche et al., 2016), essential to healthy development. At the same time, we also see variability in children's developmental pathways, with children in cultures that do not direct language to children in the ways western parents do still progressing in language and cognitive development (Sperry et al., 2019).

Joint attention

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

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 et al., 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. It is the child's attention that is key to their language development in joint attention sessions, while the adult's joint attention may support sustained attention by the child (Yu et al., 2019).

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

Adults in many cultures 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 (Shneidman & Woodward, 2016). 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 (Frank et al., 2020), and its use in the first year is positively related to infants' language comprehension at 18 months (Golinkoff et al., 2015).

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

The content of child-directed speech is also important in children's language development. Cameron-Faulkner and colleagues (2003) found that there was a limited number of phrases that mothers in their study used to initiate utterances from 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 in which they show an interest. Mothers also tailor their language to children's ability level (Uccelli & Pan, 2013).

Expansion and recasting

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 has 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, and a review of the literature suggests that they positively contribute to grammar (Cleave et al., 2015).

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

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 metalinguistic awareness. It has been estimated that children are exposed to an average of 3000 new words in every school year (Nagy & Anderson, 1984). 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, while teachers' input also affects children's development of syntax (Kidd & Donnelly, 2020).

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 where children had a third of the interaction and experience with language of children in families from higher socioeconomic strata. However, Sperry and colleagues (2019) challenged Hart and Risley's methods and findings, saying that they did not recognise speech directed to the child by others, or overheard speech. In a study that partially replicated and extended Hart and Risley's methods, they found that the number of words spoken by primary caregivers to children was in fact greater in one 'poor' sample than the middle-class sample, and there was considerable variability within each group. When language from all caregivers to the child was considered, the same 'poor' group of children had an even greater advantage in language directed to them, possibly because of their number of

older siblings. Overheard language was greater still in this group, although its role in language acquisition is not established. Others have argued that the amount of language heard is less important than its quality, with reciprocal, responsive communication ('conversational duets') particularly important (Golinkoff et al., 2019). This recalls our discussion of the role of joint attention. There is some evidence that the contribution occurs at the neurological level, with one study showing greater activation of Broca's area (associated with language processing) during story listening in children with more experience of conversational turns (Romeo et al., 2018).

What about children from communities that do not emphasise child-directed interactions? Shneidman & Woodward (2016) proposed that children in those cultural contexts may attend to information in different ways, allowing them to learn through observation and overheard speech to a greater extent. The fact that children in all cultures acquire language at roughly the same rate, despite a variety of experiences of language input (Sperry et al., 2019) is an example of the multiple pathways possible in development. 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.

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 and colleagues (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 in language acquisition

Adults (parents and others) are not the only ones who influence children's development of language. Throughout this chapter, we have seen a number of ways in which children's activity contributes to their development, and language acquisition is no exception. Siblings and peers also play an important role.

Language play

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 **CHAPTER 3**). 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 others (Smith Gabig, 2014), as seen in **FIGURE 2.16**. Language both contributes to and is influenced by the social development of the child. We explore social development in greater detail in **CHAPTER 4**.

Examples of the principles of development at work

Language acquisition provides another example of the principles of development at work. Language, neurological, cognitive, social and emotional development are interlinked; children's emotions, thoughts, actions and social interactions with the people around them (their environment) make important contributions to their language learning; and there are both consistent patterns and variability in development.

FIGURE 2.16 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

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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 et al., 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.

IMPLICATIONS FOR EDUCATORS 2.3 describes some implications for educators of the principles of language acquisition discussed in this section of the chapter.

IMPLICATIONS FOR EDUCATORS 2.3

Language development and the classroom

Some of the principles drawn from how children learn language provide suggestions for initiatives that teachers can implement in classrooms to contribute to language development, including:

- 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.

Language for and in learning at school

Children's prior experiences in language and other areas contribute to their understanding and to their learning in school. This interconnection includes language's support for other learning, and that learning's contribution to further language development. For example, one study found two-year-old children's vocabulary predicted their behaviour, reading and mathematics skills at school entry (Morgan et al., 2015), while another longitudinal study showed language at school entry supports learning in language, mathematics, reading and social skills in the primary school years (Pace et al., 2019). At the same time, children's and young people's activities and development at school contribute to further language development. We saw an example of this in adolescents' learning of figurative language, passive forms and complex sentences, which are taught directly in school, and practised in writing tasks that require decontextualised language. You may have found yourself further developing this aspect of your language skills at university. Reading is another example of a skill taught and practised at school, that contributes to building vocabulary, syntax and pragmatics (Bohn & Frank, 2019). Pace et al.'s study also showed that, as we would hope, school can make up differences between students' abilities on entering school. As Zauche et al. (2016) argued, immersion in language-rich environments (at school as well as at home) is just as important to development in the school years as it is in the years prior to school.

2.5 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**. **FIGURE 2.17** outlines these principles. The principles are as follows:

Development involves a series of progressive and orderly changes building to maturity

Development involves change of a particular type, and is generally orderly (e.g. we first learn to crawl, then walk, then run). It is also directional; that is, the changes, at least in childhood and adolescence, 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 questions in theories of development has been about whether we describe it as continuous or discontinuous. Skills emerge over time and the progress of development is uneven. Different areas of the body and brain develop at different times, as do different functions. In addition, there are cascade 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 cascade events that similarly create opportunities for developmental shifts across domains; for example, in western cultures such an event is starting school.

FIGURE 2.17 The principles of development show the importance of relationships and the child's activity alongside biology to shape development and the individual differences we see

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 Erikson's theory in **CHAPTER 4**. However, dynamic systems research shows that the progress of development is not predetermined by a genetic blueprint as was once believed. Rather, each child's experiences, relationships and environment determine the turning on and off of genes, as is described below in the section on epigenetics, and by Cantor et al. (2019). As a result, variability is the norm rather than the exception.

As an example, 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 to 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 between individuals as well as within each individual

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, including variations within individuals, with development in different domains, and sometimes within a single domain, proceeding at different rates. The discussion of brain development in adolescence is an example of this. The chapters in Module III of this book examine a number of these sources of difference in detail. In general, while genes play a role, the variability in development can be explained by looking at the multiple and complex interactions between forces affecting that development.

There are 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 and language development. The Specificity Principle (Bornstein, 2019, p. 342) states that 'specific experiences affect the development of specific characteristics in specific individuals at specific times in specific ways'. This means that while there may be broad similarities in developmental processes, such as that the individual themself is active in development (another of the principles), there are important differences in these processes too, with each person's activity shaping their development in individual ways.

epigenetics
Throughout life, environmental influences result in chemical signals that turn on and off the expression of genes

Epigenetics: how nature and nurture work together in development

Epigenetics is significant in development as it explains the process by which our experiences and genes together influence the development of our brains, body, emotions and cognition (see **FIGURE 2.18**). This research also has important implications for carers, educators and policy makers as it highlights the power of experiences for future learning and development.

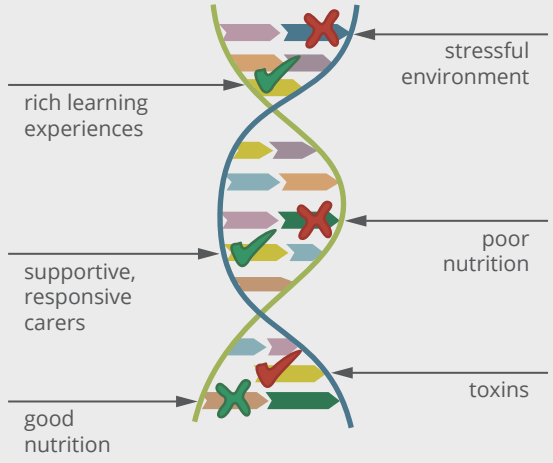

FIGURE 2.18 Epigenetics: nature and nurture work together in the development of our brain, body, emotions and cognition

While earlier editions of this and other texts have framed the roles of genes and environment in development as 'the nature–nurture debate', research increasingly builds a picture of the effects of genes and environment as inseparable, working in relationship as development progresses (Cantor et al., 2019). Questions of how much either nature or nurture contributes have become meaningless as the processes of epigenetics become clear (Witherington & Lickliter, 2017).

The effect of experience

If genes written in the DNA of an individual can be thought of as an 'instruction manual' for their development, then experience (i.e. the child interacting with the environment) creates the epigenes that determine which of those instructions will be carried out and which are set aside. These

chemical signatures are written onto genes, turning them on and off by determining whether they produce the proteins needed for their activation. Some epigenes affect a gene for a short time. Other epigenetic effects are felt throughout the lifespan, as when repeated experience of stress early in life releases the hormone cortisol, creating an epigenetic change influencing stress responses when much older (Center on the Developing Child, 2010). A small number of epigenes, generally affecting the foetus during pregnancy, can even affect the operation of a gene across generations (Champagne, 2010). Later experience can also undo epigenetic effects, as a reminder that environmental effects continue to influence epigenetics throughout life, and that they can have positive as well as negative effects (Kentner et al., 2019; see **FIGURE 2.19**). For example, activation of learning and memory neural networks is able to trigger epigenetic changes that support more effective learning in the future (Sweatt, 2019).

FIGURE 2.19 Warm and responsive parenting leaves a chemical signature, turning on genes for positive development and health

iStock.com/AzmanL

Experience and genes work together in development

Siegel (2020) explained how genes and experiences form part of a single process in development, acting together. Genes have been shown to be a set of probabilities rather than certainties, their expression determined by the individual's experience, and their response to this in turn is guided by their genes. Consider this in the example of a child who, from infancy, has tended to react to experience with strong emotions and is energetic and highly active. This directs his response to experience and it also has meant his parents have learnt to be calm and measured in their interactions with him while spending time outside to cater for his physical activity (and save their house from damage). These experiences in turn influence the expression of his genes and the particular neural networks that are strengthened. So, the child's biology and activity both influence and are influenced by his experience, which affects expression of genes that direct synapse development and pruning, and in turn, brain development.

This is one reason for the variability we see in development, and also for the similarities that exist between people with similar cultural experiences. Even identical twins with the same genes and raised together have slightly different experiences that influence the expression of their genes, resulting in different characteristics (Siegel, 2020). Rather than genes driving development, Cantor and colleagues (2019) describe them as followers, their expression determined by the particular experiences of the individual in the environment.

As we have seen throughout this chapter, both innate and environmental forces combine to influence development across the physical and language domains. **CHAPTERS 3** and **4** in this module similarly illustrate the influence of a combination of innate and environmental forces in development. Other ways of thinking critically about development can be found in appendix 2.4 online.

GO FURTHER

Appendix 2.4
Thinking critically about development

Development occurs in context and is influenced by environment

Examples are the environmental influences on language development in the social interactions children hear and are involved in, and the importance of parent–infant interactions for brain development in infancy. In terms of physical development, family and community activities and the formal activities of school contribute to children's motor skills. However, it is not the environment alone, but children's interaction with it that shapes their development.

FIGURE 2.20 Children's activity contributes to their development and shapes their environment. How is the children's play in this photograph changing the social environment they are interacting in and adding to their development?

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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. These attempts may result in errors, but they are testimony to the important role children play in their own development in all domains. Children's activity also shapes their environment; for instance, as parents respond to their children, teachers respond to individual students in their classes, and children respond to their peers, as shown in **FIGURE 2.20**.

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 it and 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.

IMPLICATIONS FOR EDUCATORS 2.4 looks at a number of the implications for educators of considering the developmental principles.

IMPLICATIONS FOR EDUCATORS 2.4

Considering development in the classroom

- Physical, cognitive, language, social and emotional development occur in tandem. Social and emotional learning are as important as academic learning in schools, to support the child's learning, development and wellbeing.
- Because development is orderly and progressive, teaching must be tailored to children's developmental levels, and these levels may not align with their school year for all children. This then involves teachers being aware of the course of development across a number of domains. This chapter and others in Module I can help you develop such knowledge.
- Developmental variations are important for teachers to consider. These might be individual, and might also be particular to the sociocultural group. **CHAPTER 11** explores sociocultural factors in learning.
- 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. Darling-Hammond and Cook-Harvey (2018) emphasised the importance of supportive, responsive relationships for learning and development, from early childhood education and care to primary and secondary schools. 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. It is also important to check on students' understandings of new material. What sense are they making of these new experiences?
- 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.

2.6 Concluding comments

Development is influenced by the complex interaction of 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. In **CHAPTER 3**, we look at some theories of cognitive development.

STUDY TOOLS

Chapter review

2.1 Developmental systems theories

- Developmental systems theory recognises the interactions between multiple genetic, biological, psychological, family and contextual factors in development

2.2 Physical development over time

- There are connections between physical, cognitive, language, social and emotional development throughout the lifespan.
- Maturation, parents, the community and school, the physical environment and the child's own activity all contribute to 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.

2.3 Brain development

- Brain development also shows complementary influences from genetics, environment and the child's activity. Each of these things affects the others in the child's development.
- 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.

2.4 Language development

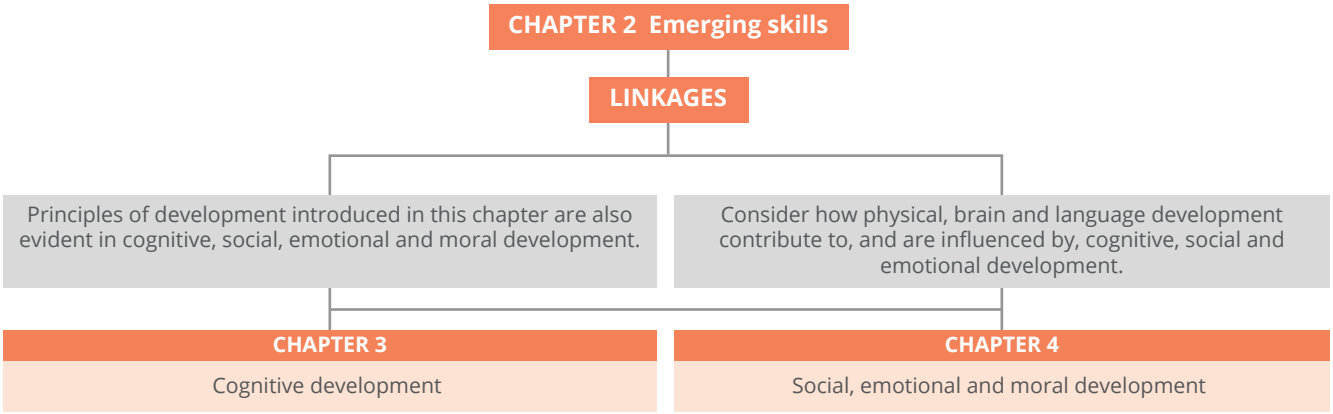
- The course of first-language acquisition is remarkably consistent across cultural and language groups. It shows children's active involvement in their acquisition of language.
- Adults make important contributions to language development, which continue into a child's school years.
- Children's active involvement in making sense of their world shows itself in their understandings about language from the first days after birth. In schools, we build upon these early understandings and so need to be aware of and recognise them.

2.5 Principles of development

- 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.
- Rather than being driven by an individual's genes or determined by their environment, development shows the interaction of genes and environment in the epigenetic process.
- Development also occurs in context, with elements of the individual and the environment interacting to produce the results we see. It is influenced by both the individual's maturation and their learning from interactions with the environment.

Putting it together

Making links between 'emerging skills' and material in other chapters



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 What factors contribute to resilience for children at risk of poor developmental outcomes? Draw a diagram of the factors and their interaction.
6 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?
7 What aspects of physical, brain and language development support learning in school?
8 Identify an event that triggers a developmental cascade, the opportunities it presents for development and the consequences for development in other domains.
9 Provide examples of how children's activity contributes to their development, and of the contribution the environment makes. How do these things interact?
10 Consider an example of development from your own experience or the experience of someone you know. What evidence of the interaction of nature and environment can you discern in this example? What influences on development are evident, and how have they interacted with one another?

Further research

Go further

The online appendices contain additional material that you should refer to when reading this chapter. The appendices available for this chapter are:

GO FURTHER

- Appendix 2.1 Physical activity guidelines
- Appendix 2.2 Centres for brain research
- Appendix 2.3 Thinking critically about development.

Recommended websites

Centre for Educational Neuroscience (UK): http://www.educationalneuroscience.org.uk

Science of Learning Centre (AUS): http://qbi.uq.edu.au/science-of-learning-centre

Recommended reading

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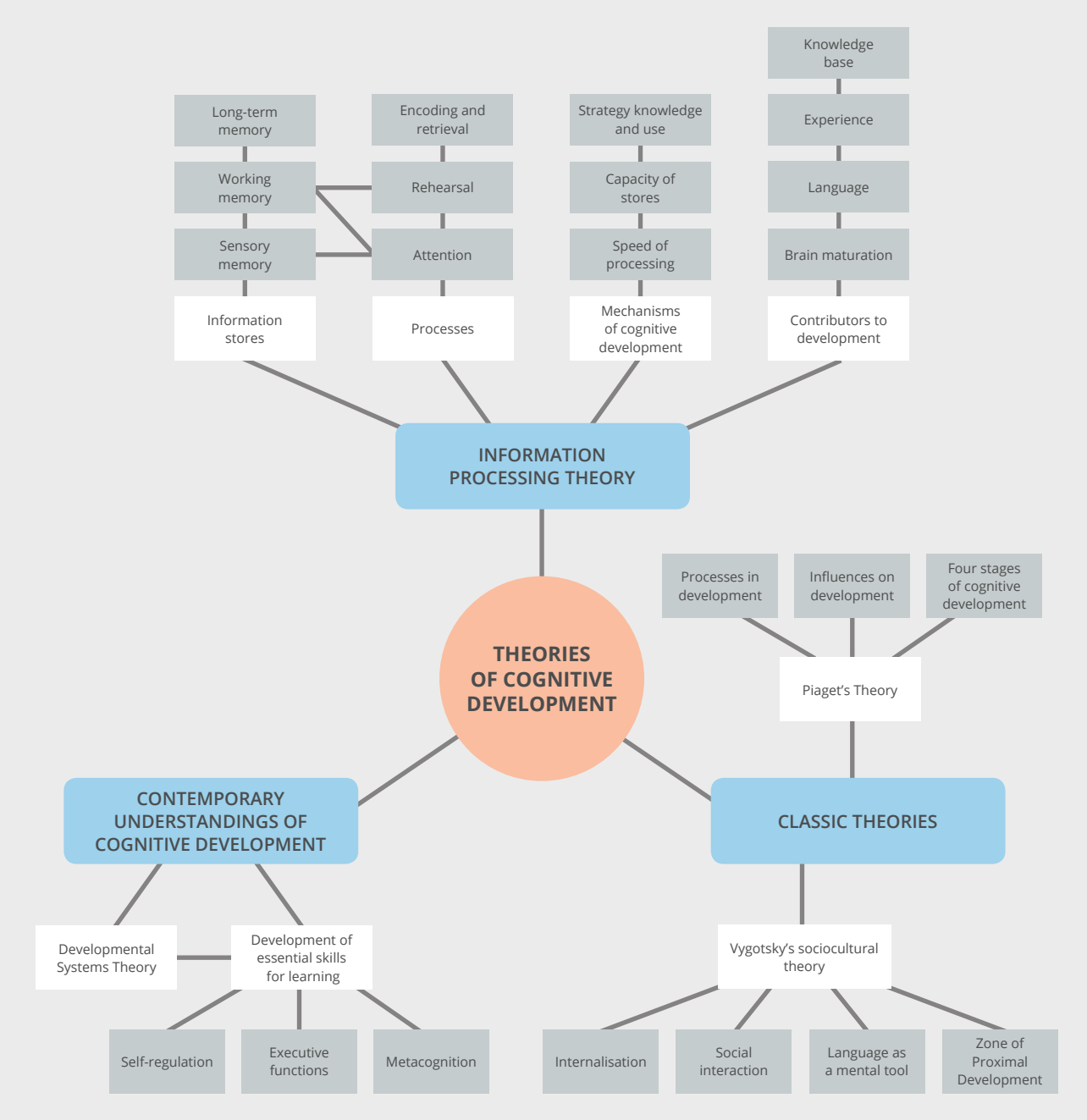
CHAPTER 3

Cognitive development



Chapter 3 concept map

KEY QUESTIONS

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

- How do the changes we observe in children of different ages come about?
- What are the four factors that, according to Piaget, contribute to the development of thinking from infancy to adulthood?
- What roles do social and cultural influences play in Vygotsky's ideas about children's cognitive development?
- How does a child's context and relationships influence their cognitive development?
- What are critical cognitive capabilities for learning, and how do these change over time?
- 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? What additional mechanisms could be involved?

MIA AND JAI

Mia (9) and Jai (14) are sitting at the kitchen table quietly completing their homework. Mia's homework task is to practise spelling her 'tricky words'. The task requires Mia to read each word, cover it with her hand, attempt to write the word herself, then check her answer. In the quiet kitchen she is finding the task relatively easy and makes few mistakes. On a few occasions she becomes momentarily distracted and needs to sound out the word in her head before writing her response. Jai is using his iPad to find examples of chemical and physical changes to complete his science homework. While it would be easier for him to copy the information directly from a website, Jai resists this urge and instead formulates his own responses to write in his book.

In the next room, their younger brother, Ben (9 months), is playing with blocks under the supervision of their Mum, Jen. Ben becomes frustrated when he cannot make the rectangle-shaped block fit into the square-shaped hole and starts to cry. Jen calmly comforts Ben, and once he has settled, she guides him to push the block through the rectangle-shaped hole. Ben squeals and babbles with delight when the block fits in the hole. The noise distracts Mia from her homework and she leaves the kitchen to join in the game with Ben and Jen. On the other hand, Jai ignores the distracting noises and continues to focus on completing his homework.

While each child in the family is completing a developmentally appropriate task, there are substantial differences in their capacity to focus, ignore distractions and complete their tasks independently. Ben is almost entirely dependent on his mother to help him to regulate his thinking and behaviour, while the older children use different strategies to complete their homework tasks. How are their different thoughts and responses a reflection of their cognitive development? How are these thoughts and the activities themselves contributing to that development? These questions are typical of those developmental psychologists might ask about cognitive development.

Introduction

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

Cognitive development is concerned with our ability to think, to reason, to understand and to remember the world around us (see **FIGURE 3.1**). 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**.

FIGURE 3.1 Cognitive development results from individuals' actions in response to experiences in their environment and is influenced by relationships with others

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So, what are the factors that influence cognitive development, and how do the changes we observe in children of different ages come about? While our understanding of cognitive development has changed considerably over time, two classic cognitive development theorists have laid the foundations for current theories – Jean Piaget and Lev Semenovich Vygotsky. We will begin by examining how their ideas have contributed to our current understanding of cognitive development. We then consider information processing theory, which explains the role of components such as attention and memory in children's cognitive development. Finally, we explore developmental systems theory, which highlights the importance of relationships and context in cognitive development. We will use developmental systems theory to examine the development of key cognitive skills for learning and development.

3.1 Piaget's theory of cognitive development

Nine-month-old Ben is sitting in a highchair. He drops his cup and observes it fall. Jen picks it up and replaces it. Ben drops it again and Jen picks it up for him. He will continue to drop the cup as many times as there is someone there to retrieve it. Nine-year-old Mia has moved on to her science homework. She is developing her 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?' she thinks. 'Are they land animals, because they don't fly, or birds, because they have feathers and lay eggs?'. Fourteen-year-old Jai is also finishing off his science homework. In responding to the question, 'Why should society support scientific research?', he is imagining what the world would be like if Alexander Fleming had not discovered penicillin.

The theorist Jean Piaget (1896 –1980) 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. Ben is not just dropping a cup; he is observing and learning about gravity (when I let go of something it falls), cause and effect (when I drop something it is picked up), and his relationships with others (I can influence their behaviour by dropping my cup). Mia is reflecting on her experiences and knowledge of the physical world to organise and reorganise her thinking. Jai is using his knowledge of the world to hypothesise about an imaginary event.

Piaget also 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

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.

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

Factors and processes in cognitive 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 makeup, 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: maturation, activity, social interaction and equilibration (see **FIGURE 3.2**). Read about Piaget and his contributions to our understanding of cognitive development in appendix 3.1 online.

GO FURTHER
Appendix 3.1
About Jean Piaget

Maturation
Maturation of the brain provides children with the ability to reason in more advanced ways

Activity
Children act as 'miniature scientists', learning by experimenting through physical and mental activity. The child actively constructs knowledge, rather than passively receiving it from parents or teachers

Social interaction
Children's thinking is challenged by their peers, who think in similar ways but have different perspectives. The resulting sociocognitive conflict is one of the key processes in development

Equilibration
Equilibration involves balancing new knowledge with what is already known. Children make mental adaptations to ensure that new experiences fit with what they know

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FIGURE 3.2 Four factors that influence development

Maturation

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**, when children's activity leads to the strengthening of neural networks and the pruning of inefficient pathways.

Activity and social interaction

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

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

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. As we have mentioned, according to Piaget's perspective, children actively exploring their world are acting as 'miniature scientists', learning by experimenting through physical and mental activity. Rather than passively receiving knowledge passed on from parents or teachers, children actively construct 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 of schemas and reorganisation of knowledge are central to this process of construction.

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** (i.e. 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

Equilibration

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

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

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. Piaget theorised that equilibration is the most important influence driving cognitive development. In order for people to align new experiences with what they already know, they are required to make mental **adaptations**. Piaget's ideas about how understanding is built from new experiences are still influential to this day, and these processes are discussed in detail below.

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 (i.e. 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 in the following text.

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

Building knowledge of the world through experience

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 (i.e. assimilate it) into existing schemas, and add new schemas to allow for (i.e. 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.

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 (see **FIGURE 3.3**). This organisational process is essential so that we can store and later retrieve information.

FIGURE 3.3 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?

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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).

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?

The process of adaptation

readiness
Having the prior experiences and knowledge needed for learning

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

There is one proviso that is 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 (e.g. 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.

Piaget's stages of cognitive development

Piaget believed that rather than being continuous, children's cognitive development proceeds sequentially through a series of distinct steps or 'stages' from birth to adulthood, with thinking at one stage building on the one before, and being qualitatively different from it. Piaget believed that the stages he identified had two very important properties: first, they are universal (i.e. they apply to everyone); second, they are invariant (i.e. unchanging), meaning that the order in which children pass through the stages does not vary from one person to another. For each of his stages

of cognitive development, Piaget identified what he called 'developmental milestones' – key achievements that are 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 **FIGURE 3.4**.

Children must progress through them in sequence, beginning with the sensorimotor stage, although some may never reach the final stage of formal operations. More recent research generally supports a sequence of changes, although researchers take issue with Piaget's notion of stage-like development. For example, researchers have pointed out instances in young children's behaviour of taking others' perspectives into account (e.g. when they use baby talk to talk to younger children), and the ability to show higher levels of reasoning when tasks are simplified or put into a familiar context. Children also show evidence of reasoning from a hypothesis earlier

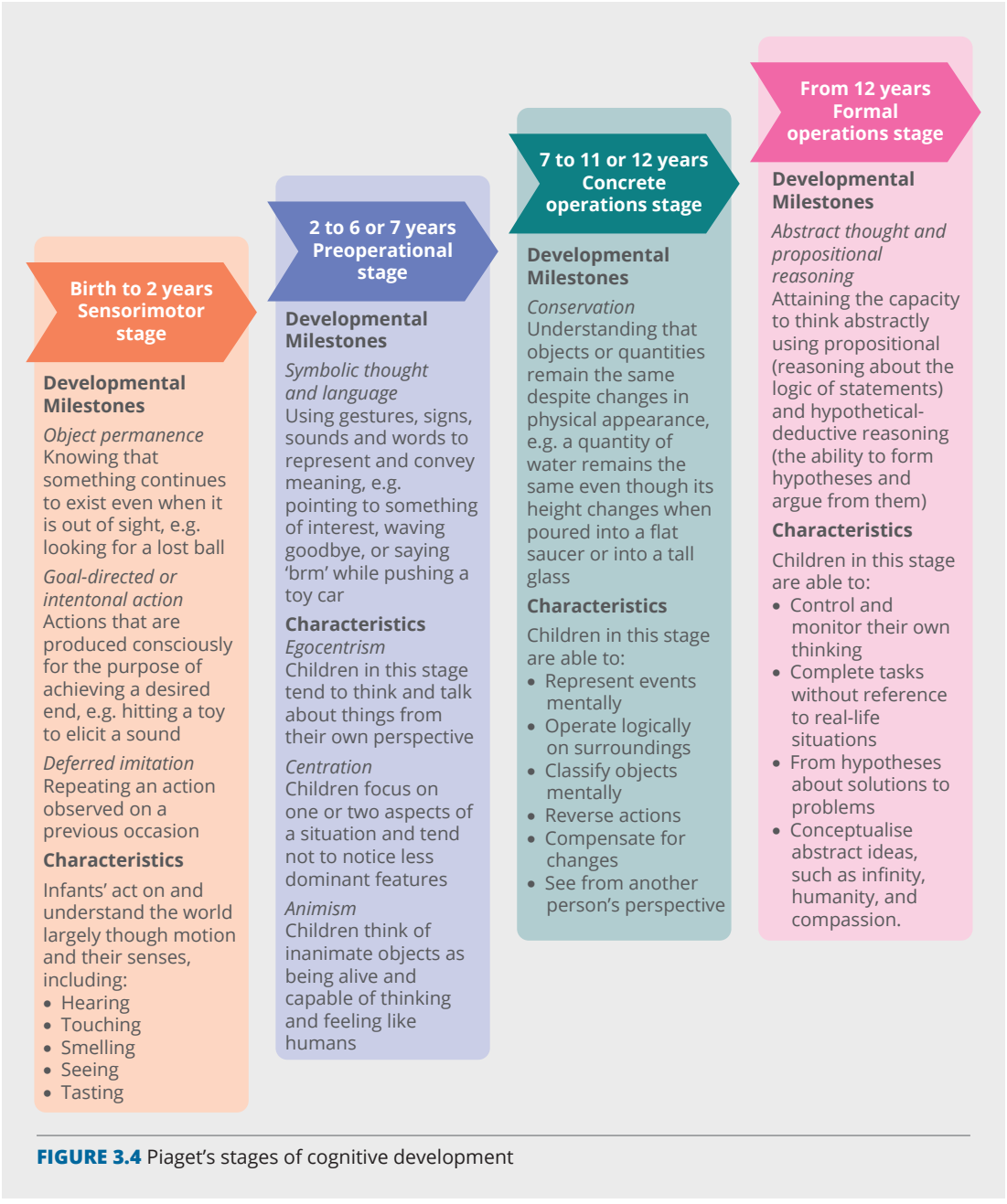

FIGURE 3.4 Piaget's stages of cognitive development

than Piaget proposed, with gradual improvements over time towards formal reasoning (Kuhn & Franklin, 2006). 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.

TABLE 3.1 includes some suggestions for classroom activities derived from Piaget's stages of cognitive development.

TABLE 3.1 Classroom activities aligned with Piaget's stages

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 (i.e. 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 (i.e. 'cow, duck, dog' or 'moo, quack, woof-woof') Provide a variety of materials for play; model appropriate behaviour
Preoperational (2–6 or 7 years)	Hands-on experiences that allow the child to 'construct' their 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 (i.e. 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 (7–11 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, find solutions as needed (e.g. work out how to better organise the space in the classroom so that students 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

Strengths of Piaget's ideas

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 (e.g. 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 are extensions of this principle (see **CHAPTERS 6** and **7**). Piaget's theory also reminds us that children's thinking is not the same as 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.

Limitations of Piaget's ideas

Anyone who strives to develop a grand theory is likely to be criticised, and this is true of Piaget. Such criticism is inevitable given he produced a very large number of major publications on children's cognitive development and collected huge amounts of data spanning from the 1920s until 1981 (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 his 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. 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 occurs in the way children think, rather than the ages at which such changes occur.

Evidence from studies showing partial understanding of formal operations (e.g. deductive reasoning) earlier in childhood, and an ability to take others' perspectives in early childhood, raises doubts about Piaget's notion of stages. 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) described development within a domain as proceeding in a stage-like manner, but rather than a single staircase, Case described development as multiple staircases that link together. Fischer and Bidell (2006) described 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. Current models describe development as dynamic and influenced by interactions between characteristics and actions of people and environments, that shift in various contexts (Mascolo & Fischer, 2015). We discussed this view in **CHAPTER 2** and will return to it 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.

FIGURE 3.5 Social interaction is an important contributor to cognitive development

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Role of social context and other factors in development

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, as seen in **FIGURE 3.5**, 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 (i.e. disequilibrium) and to achieve shared solutions (i.e. equilibrium) that are more mature than individual efforts (Brown et al., 1996). The place of peer interaction is particularly evident in Piaget's work on moral development (see **CHAPTER 4**).

While Piaget's theory had obvious implications for education, there was 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.

Affect

Other limitations often attributed to Piaget's model, particularly by theorists interested in information processing, emotion and motivation (see **CHAPTERS 4, 6** and **8**), are that it does not sufficiently take into account memory, motivation and emotion (i.e. 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 (i.e. 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. 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. For example Piaget did not report any differences in the ways in which males and females develop intellectually (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 (Greenfield, 2018). 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 et al., 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) described 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 (Molitor & Hsu, 2019).

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. **IMPLICATIONS FOR EDUCATORS 3.1** contains some issues relevant to classroom applications of Piaget's ideas.

IMPLICATIONS FOR EDUCATORS 3.1

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 3.1**) 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, and recognise 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, and provide 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, and challenge 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.

ACTIVITIES

1. Design a learning activity in which students can take on the role of 'miniature scientists' in your teaching area.
2. Why did Piaget believe that children's interactions with their peers was important for learning? How could you apply this idea in your teaching area?

3.2 Vygotsky's sociocultural theory

Lev Semenovich Vygotsky 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) reported that Piaget and Vygotsky communicated and exchanged ideas for about five years, and suggested that they may each have adjusted their theories as a result. The major differences in their ideas reflected, in part, the differences in their social and cultural backgrounds. For example, Piaget focused on the individual yet Vygotsky's concern was with learning and development occurring within a sociohistorical and sociocultural context, which was largely a result of the social and political system operating in the Soviet Union at that time. 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. Read about Vygotsky and his contributions to our understanding of cognitive development in appendix 3.2 online.

GO FURTHER
Appendix 3.2
About Lev
Semenovich Vygotsky

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 (e.g. 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. As explained in **IMPLICATIONS FOR EDUCATORS 3.2**, different cultures have diverse approaches to supporting children in their knowledge and skill development within their community.

Vygotsky described humans' mental abilities as:

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

Vygotsky argued that children learn to control lower mental functions and begin to acquire higher-level functions through social interactions.

IMPLICATIONS FOR EDUCATORS 3.2

Rogoff's notions of cognitive apprenticeships and guided participation

Barbara Rogoff (1993, 2003) examined children's learning through their participation in communities, arguing 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 may involve children being taught directly, being involved in conversations and activities alongside adults, or being involved as observers. Different cultural groups may place more emphasis on one of these levels than another.

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.

ACTIVITIES

1. Can you identify other examples of guided participation in school and non-school settings?
2. How might you be able to use guided participation in your future teaching area?

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.

In a study that explored this issue, Zack and Barr (2016) asked mothers to teach their 15-month-old child to press a button on a 3D object using an equivalent 2D image on an iPad, without directly demonstrating the task (i.e. the mothers were not allowed to press the button on the 3D object). Children were deemed to successfully complete the task if they pushed the button on the 3D object within a five-minute period. The study found that the quality of the interaction between the mother and child significantly predicted the likelihood of the child completing the task. High-quality interactions were observed when the mother provided a variety of instructions that adapted to the responses of their child. This finding demonstrates that the mother's and the child's involvement in the task influences the extent to which successful learning takes place. As Vygotsky argued, it is neither a matter of the child constructing understanding without any input from others; nor of children passively receiving input from others in their environment (see **FIGURE 3.6**). Rather, children are active in processing the information they receive from others, and language is a key element in that process.

FIGURE 3.6 In Vygotsky's view, adults and older or more knowledgeable children play important roles in the development of children's thinking

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THINK ABOUT

What are some of the contributions a parent might be making while helping their child to learn a new skill?

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 smartphones, tablets and computers on his list of mental tools. These devices 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, a sextant and a chronometer. 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 diverse 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.

Private speech and self-talk

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 (e.g. counting on fingers) to speech that is 'internalised' (i.e. '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.

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

Research since has 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 et al., 2006). External (verbalised) private speech may also be relied on by children with behavioural difficulties to control their behaviour and thinking (Corkum et al., 2007). When this self-talk is relevant to the task, it should be encouraged, as it may help with self-regulation.

Vygotsky suggested that private speech represents 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.

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

Zone of proximal development

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

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.

This is illustrated in the following example. 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. The support provided by the teacher is an example of **scaffolding**, a term first used by Jerome Bruner to describe the provision of support to help learners complete a task (see **IMPLICATIONS FOR EDUCATORS 3.3**).

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

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 (i.e. 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 eight-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 nine-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 et al., 2003; Warwick & Maloch, 2003).

THINK ABOUT

1 Do you learn best alone or with others – studying by yourself or with the help of experts?
2 Consider something you have learnt recently. To what degree did your learning result from direct instruction, from discussion, from assistance 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 two-year old Natalie 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, she will learn about and practise how to coordinate her actions and wishes with others in the game, regulate her emotion and

IMPLICATIONS FOR EDUCATORS 3.3

Bruner's notion of scaffolding

Revisit the example of the teacher helping the child with his mathematics task. 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 et al., 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
- breaking the task into small parts
- directing the learner's attention
- giving both general and specific strategies to solve the problem
- providing lessons in 'how' to learn.

However, there is also a gradual ongoing exchange of knowledge between teacher and learner. 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.

ACTIVITIES

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.

FIGURE 3.7 Vygotsky believed that pretend play enables children to learn skills by taking on new roles and perspectives

Alamy Stock Photo/csm

behaviour to fit the game, and explore how adult and child talk is different, as well as what happens at school (**FIGURE 3.7**). In taking the role of another person, her 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 (e.g. a broom for a horse or 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' (Australian Department of Education, Employment and Workplace Relations [DEEWR], 2009, p. 46).

Bodrova and Leong (2005) found that quality play experiences in the preschool 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, in particular, metacognition, both of 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).

Strengths of Vygotsky's theory

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). 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 of Vygotsky's theory

As with Piaget, criticisms of Vygotsky's ideas are frequently associated with the vagueness or the 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 et al., 2002; Kunsch et al., 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 (see **IMPLICATIONS FOR EDUCATORS 3.2**). In cross-cultural studies, she has shown that in many societies, observation and participation in activities

IMPLICATIONS FOR EDUCATORS 3.4

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) (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.

ACTIVITIES

1 Identify some examples that illustrate components of Vygotsky's theory that you have experienced as a learner at university.

2 Think of a concept in your teaching area that may be challenging for students to understand. How can Vygotsky's ideas be applied to support students to understand this concept?

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 the individual's 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 **IMPLICATIONS FOR EDUCATORS 3.4**) 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.

Linking Piaget and Vygotsky in classroom practice

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, Cognitive Acceleration through Science Education (CASE) and Cognitive Acceleration through Math Education (CAME) (Adey et al., 2001; Adhami et al., 2002). Oliver and Venville (2017) implemented the CASE program in seven Australian secondary schools, with the aim of enhancing the cognitive development of students in Years 8 and 9. The CASE program includes Piagetian-type activities that were implemented using a Vygotskian framework, including a combination of discussion and individual work. Shayer (2003) 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 Australian study showed that students experienced significantly greater cognitive gains in comparison to a control group who did not participate in the program (Oliver & Venville, 2017). Students from disadvantaged schools experienced smaller gains compared to those from more advantaged schools, with the study authors noting that disadvantaged schools reported a higher rate of teacher turnover, thus reducing the number of staff who were trained in the CASE program. Explore a case study of a mathematics lesson using Piagetian and Vygotskian principles in appendix 3.3 online.

GO FURTHER
Appendix 3.3
Piagetian and
Vygotskian case study

Linking social interaction

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.

3.3 Information-processing components of 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.

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

multistore model
Depicts how information is processed and stored in memory

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**.

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 (e.g. Baddeley & Hitch, 1974). **FIGURE 3.8** 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.

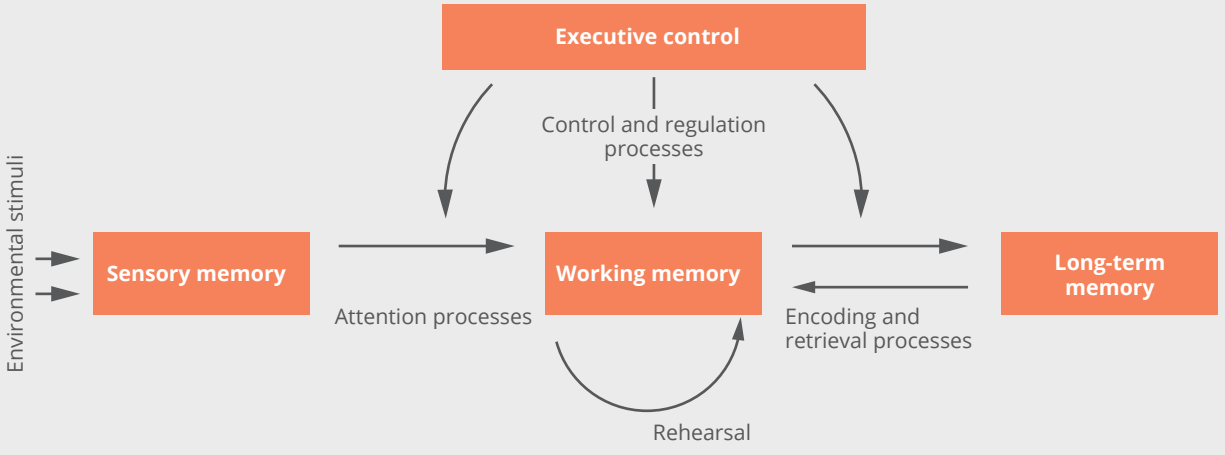

FIGURE 3.8 The multistore model identifies a number of stores of information and processes that move information between these stores

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.

Information stores and processes

In **CASE STUDY 3.1**, there are a number of fundamental thinking processes at play as Shani interacts and learns in her classroom:

- *Sensation* (i.e. sights, sounds, smells, tastes and 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 is 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 (e.g. Case, 1992; Demetriou et al., 2002; Halford, 1993).

Later in this chapter, we summarise the factors associated with information processing that influence cognitive development. 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.

CASE STUDY 3.1

Information processing in context

Shani comes to class with her friends, who are chatting 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. Suddenly, she realises she forgot to get her pen out of her bag. 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.

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; for example, the visual cortex is fully developed by the time the child is in preschool (Kellman & Arterberry, 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, 2016; 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. At the same time, many actions are complex, and we need to plan (i.e. give attention to) what actions to take in particular order. 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 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 (see **FIGURE 3.9**). 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. This influence of social, emotional and contextual factors on attention is an important revision to the original information – processing theories that has emerged in research over the past decade (Ristic & Enns, 2015). You will see further examples of this interaction between social, emotional and cognitive domains as we look at each of the processes.

FIGURE 3.9 Social and emotional processes influence cognitive processes such as attention

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In middle childhood, this capacity for 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 executive function (discussed in the following) 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 executive control of processes such as attention and strategies such as elaboration and organisation, which 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 and you 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 have 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 et al., 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	

Capacity

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. 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 et al., 2004) and the acquisition of vocabulary (Baddeley et al.,1998).

There are also qualitative improvements in working memory with age prior to the age of 6; 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.

Automaticity

One contributor to improvements in working memory with age is *automaticity*; that is, 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
In Baddeley's theory of working memory, it controls what working memory attends to, and how it interacts with long-term memory

Baddeley (1986, 2012) proposed that as well as storing and processing information, the working memory contains a **central executive**, which controls that processing. Consider, for example, a mathematics problem in which you must count backwards orally by threes from 231, stopping when you reach the closest number to 199. At the same time, you are attending to the number you are currently counting back from, identifying the number three less from it (perhaps by drawing on your long-term memory of number facts or simply of number sequences), and maintaining memory of the task, with the number that is your goal in this exercise (199). The central executive allows you to maintain your attention on the relevant activity, and draw from long-term memory, while keeping the goal in mind. This central executive is also called by other researchers *executive control*, *central attention* and *executive attention*, depending on their focus (Vandierendonck, 2016).

In Baddeley's model, 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 central executive may help us inhibit or suppress attention from distracting stimuli, and may help us process more than two types of information simultaneously. Thus, in this theory, 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.

Executive functions

As discussed later in this chapter, other theorists have proposed a different mechanism: the executive functions, which regulate cognition (not just working memory as the central executive is proposed to do), and include working memory among other functions that also influence regulation in the social and emotional domains. While there is some overlap with Baddeley's model, there are also important differences. We discuss the development of executive functions in detail below.

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 back into the working memory in order to be manipulated (i.e. 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

Rehearsal strategy

We introduced the strategy of **rehearsal** 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 strategy

In learning the list of words, you may perhaps have grouped them in particular ways. This is called **organisation**. Organising information helps to provide cues that facilitate their retrieval, thus improving memory. Children spontaneously use organisation strategies from about eight years of age, and may at first do this inefficiently – simply pairing items together rather than using larger categories (Galotti, 2016).

organisation
Process associated with storage and retrieval of information in long-term memory

Elaboration strategy

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. One example of a simple organiser is shown in **FIGURE 3.10**. This strategy tends not to be used by children until approximately 12 years (Galotti, 2016). Elaboration and organisation are not just useful for learning lists of words.

elaboration
Process of linking new information with what is stored in long-term memory

FIGURE 3.10 Younger students may not spontaneously use strategies of organisation and elaboration, but teachers can encourage this through use of graphic organisers

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.

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.

Planning and using strategies

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 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 & Bjorklund, 2003, for a detailed review of the research on memory strategy use.)

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 what is seen in children's use of memory strategies, such as rehearsal, organisation and elaboration described above.

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

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 (2006) found that this process is adaptive whereby high initial variation in strategy use predicted later learning on a task.

Mechanisms of cognitive development according to information-processing research

Information-processing approaches consider cognitive development in terms of changes in children's ability to process information. **FIGURE 3.11** outlines the several important changes in the mechanisms through which information is processed that underpin developmental increases in cognitive capabilities.

The mechanisms in **FIGURE 3.11** are driven by the interconnected contributors to information-processing development shown in **FIGURE 3.12**.

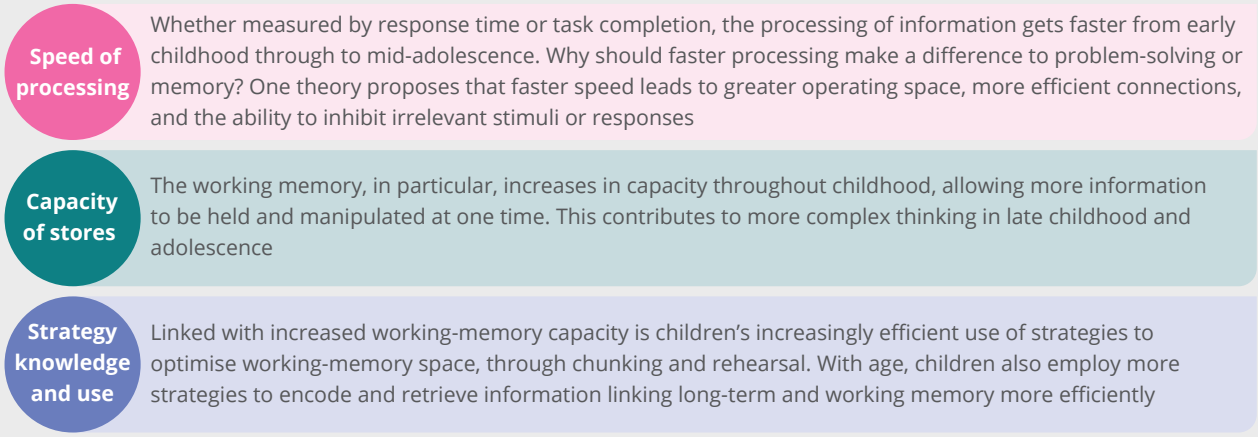

FIGURE 3.11 Mechanisms of cognitive development

Adapted from Demetriou, Christou, Spanoudis, & Platsidou, 2002; Case, 1992.

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.

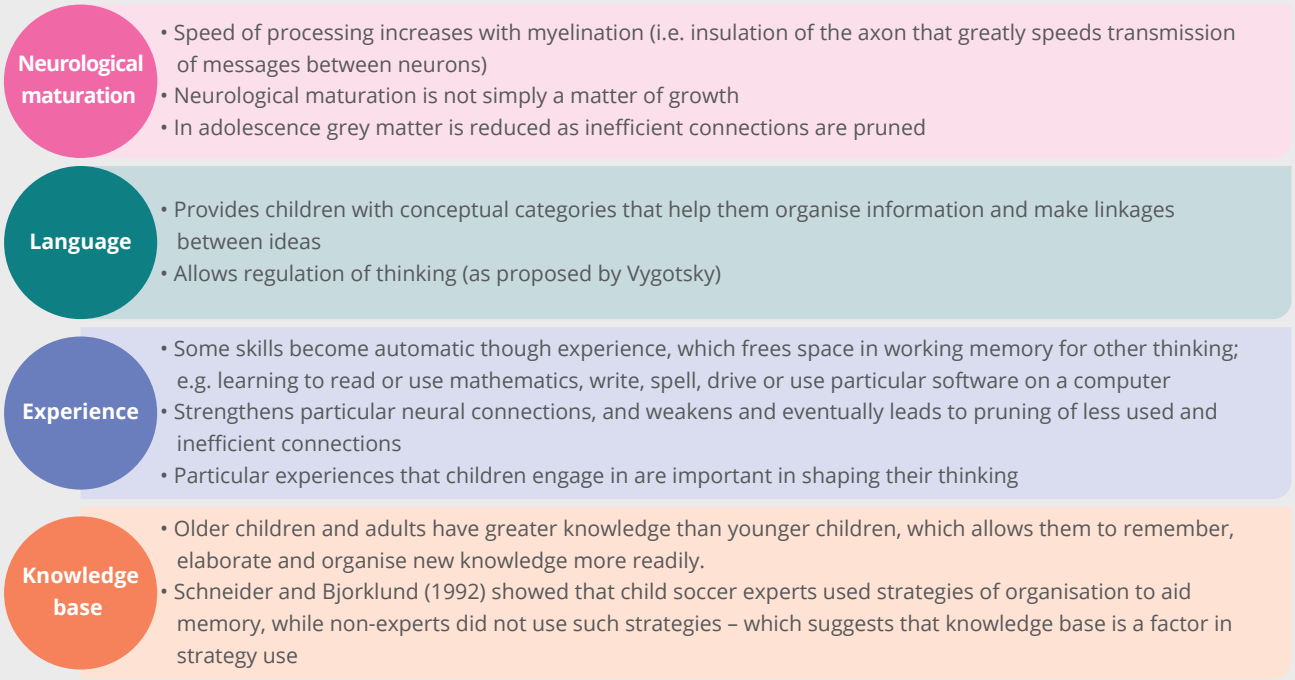

FIGURE 3.12 Interconnected contributors to information-processing development

Adapted from Casey et al., 2000; Schneider, W. & Bjorklund, 1992; Chi, 1978.

Strengths of information-processing theory

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 of information-processing theory

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 within the information-processing theoretical model 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? More recent work has moved beyond the traditional paradigm, finding complex processes at work in everyday life, as discussed below.

Finally, information processing describes one part of the picture of cognition, but not the whole picture. Demetriou and colleagues (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.

Moving beyond traditional information-processing models

Still focusing on the key processes of perception, attention, memory and reasoning, recent research has looked at how adults and children choose what to prioritise (i.e. are agents in their development – see **CHAPTER 2**), and how social, emotional and motivational factors influence those choices. For example, Kensinger and colleagues (2016) found that memories for emotional events were more likely to be remembered faithfully than for neutral events, and were more likely to resist distortion by social interactions around that event.

Tyng and colleagues (2017) reported influences of emotion on a wide range of cognitive processes, including perception, attention, reasoning, learning and problem-solving as well as memory (see **FIGURE 3.13**). For examples of social influences, think back to our discussion of parent–infant interactions in **CHAPTER 2** and earlier in this chapter. Ristic and Enns (2015) pointed to such social interactions as examples of ways the social and cognitive domains are interconnected; they are essential to infants' developing understanding of the world, directing what they should pay attention to and how they should interpret it. They also reported findings from studies showing that social–emotional content takes priority for attention.

THINK ABOUT

1 How do social and emotional factors influence your processing of information?
2 How could you use social and emotional processes to support your learners' attention, memory and learning?

Psychological models have traditionally viewed cognition as a 'cool' system separate from 'hot' emotions (Ristic & Enns, 2015; Tyng et al., 2017), but more recent work has challenged this view, showing how emotion and cognition are integrated into one complex system (e.g. Okon-Singer et al., 2015). As individuals' personal characteristics (including their emotions and motivations) interact with aspects of their social and physical environments, cognitive processes are put into play, and in their turn influence ongoing development (see **IMPLICATIONS FOR EDUCATORS 3.5**).

Traditional models of information processing are 'bottom-up' theories, in that they have a stimulus at the starting point of information processing, as is visible in **FIGURE 3.8**. 'Top-down' models start from the learner's prior experience and conceptions, arguing

FIGURE 3.13 Parent–infant interactions illustrate the importance of social influences in processes such as attention

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IMPLICATIONS FOR EDUCATORS 3.5

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 only 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 do not have to use working memory to remember them. Allow students to use other strategies (e.g. 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 3.10**)
  - 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.
- *The impact of social, emotional and contextual factors on information processing* – information processing does not occur in isolation. Motivation, past experiences, social relationships and emotions surrounding the current situation all influence processing of information. Activating these things can support students in processing new information; and knowledge of what is operating on their processing is vital for teachers to consider.

In **CHAPTER 6** we look in detail at the implications of information-processing research for learning.

that these shape processing of information. Executive functions are an example of a 'top-down' model. The current models of theorists, such as Ristic and Enns, and Okon-Singer et al., look at the interaction of these processes, operating in multiple directions, and influenced by factors operating at multiple levels. Marshall (2015) argued that current neuroscience shows cognition as 'embodied' in action and experience – it is no longer thought of as something that happens separate from other domains; instead brain, body and behaviour interact together with the sociocultural environment.

3.4 Contemporary understandings of cognitive development

While the work of Piaget, Vygotsky and information-processing theorists has laid important foundations for our understanding of cognitive development, current theories emphasise the key roles of context and relationships in cognitive development, and in doing so, have challenged some of the core elements of the earlier theories of Piaget and Vygotsky. Developmental systems theory (introduced in **CHAPTER 2**) suggests that interactions between individuals and their context and culture drive development, with relationships underpinning these interactions (Osher et al., 2020). When applied to cognitive development, developmental systems theory advocates for a move away from universal, stage-based changes, and instead suggests that cognitive development is highly influenced by the contexts in which children live and learn. Just as these contexts are highly variable, the progression of children's cognitive development can also be highly variable.

While developmental systems theory can be applied to all aspects of child development, it has some important implications for cognitive development:

- Cognitive development is highly individualised and variable, meaning there is no one 'pathway' to healthy cognitive development. Children vary in the environment and culture they live in, relationships they experience and how they respond to stimuli. They also vary in how their development is influenced by risk and protective factors (Cantor et al., 2019). While variability is observed between children, it is also possible to observe variability in cognitive functioning within an individual, as their capacities can differ in different contexts (Bjorklund & Causey, 2018).
- Cognitive development is influenced by internal and external factors and the relationships between them (Bjorklund & Causey, 2018). As discussed in **CHAPTER 2**, epigenetic processes influence all aspects of development. A child's genes and their environment interact and influence one another to direct the development of cognitive abilities. Early childhood and adolescence are considered to be 'sensitive periods' for cognitive development – the role of experiences in shaping the development of cognitive skills is heightened during these periods (Fuhrmann et al., 2015).
- Cognitive development occurs in the context of social relationships (Bjorklund & Causey, 2018). Cognitive development is supported by relationships with adults that are warm, responsive to the child's needs, and scaffold the development of cognitive skills. On the other hand, children who regularly feel unsafe or threatened may experience physiological stress responses that disrupt healthy brain development, with long-term consequences for memory and cognitive regulation (Center on the Developing Child, 2011).

From infancy, children increasingly develop control over their own thoughts and behaviours (Bjorklund & Causey, 2018). The ability to control or regulate thought and behaviour in a developmentally appropriate way is increasingly seen as being vital to learning and social success. As shown in **FIGURE 3.14**, in a typical classroom there can be many distractions that students need to ignore in order to focus their attention on the learning activities provided by the teacher. When faced with a challenging problem, students may need to alter their

problem-solving approach and try a different strategy. In the playground, students need to navigate the social conventions of their peer group, and ensure that their play adheres to school rules to keep them safe. All of these tasks require students to regulate or control their thinking and behaviour. The groups of foundational cognitive capabilities that allow students to do this are *self-regulation*, *executive functioning*, and *metacognition*. These capabilities are interrelated and vital to student learning. In this section, we will examine the development of each of these capabilities from infancy to adolescence, with a particular focus on the roles of context and relationships on skill development.

FIGURE 3.14 To learn in a busy classroom, children need to be able to employ cognitive skills to focus their attention on tasks and ignore distractions

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Self-regulation

Self-regulation refers to the capacity of individuals to control their thinking, behaviour, reactions and emotions, while resisting alternative responses that may be more dominant or enjoyable (Howard et al., 2019). When students self-regulate, they may change their behaviour or thoughts to achieve a goal, follow rules or meet expectations in a particular setting. Self-regulation is supported by automatic (i.e. non-conscious) and intentional processes in the brain that act in balance to produce appropriate and productive responses in different situations (Center on the Developing Child, 2016). Self-regulation is a broad capability that includes cognitive and non-cognitive (e.g. emotional and behavioural) components. In this chapter, we place more emphasis on the cognitive components of self-regulation, and will return to emotional self-regulation in **CHAPTER 4**.

While there are many different models of self-regulation, the process of successful self-regulation includes: '*goal setting*, to behave in a self-regulated way; *motivation*, to remain self-regulated when this becomes difficult; and *capacity* to sustain attention toward goals, while resisting contrary impulses and distractions' (Howard et al., 2019, p. 186). It is possible for self-regulation failures to occur in any of these three processes (Hofmann et al., 2012). Academic capabilities that are reliant on self-regulation include problem-solving, maintaining attention, persistence and planning. Examples of self-regulation failures commonly seen in classrooms include students not paying attention to a task, having emotional outbursts or not being able to wait to take a turn.

Self-regulation is recognised as a critical capability for success in educational settings, as well as being vital in other facets of life, such as relationships and work. A recent meta-analysis found that children with higher levels of self-regulation in preschool demonstrated better academic performance and mental health in later childhood (Robson et al., 2020). In the same study, greater self-regulation in the early years of school positively predicted academic achievement, and better physical and mental health in early high school. Self-regulation also plays an important role in a child's ability to successfully navigate peer relationships. For example, research has shown that children with higher levels of self-regulation in preschool are more likely to be rated as prosocial by their teachers when they reach school, in comparison to children who have lower levels of self-regulation (Williams & Berthelsen, 2017). Similarly, adolescents with poor self-regulation capabilities are less likely to help others and more likely to engage in destructive behaviours in relationships, such as picking fights (Farley & Kim-Spoon, 2014). Together, these studies highlight the importance of self-regulation for academic and social functioning.

Development of self-regulation

The development of self-regulation is an ongoing shift from external to internal regulation that begins in infancy and extends through to adulthood (Berger, 2011). Self-regulation development

is highly influenced by the child's environment and relationships. Parents and other caregivers are considered to act as 'co-regulators', providing support to children as they develop self-regulation skills (Murray et al., 2014). The amount of support required for optimal self-regulation development changes over time: children are almost entirely dependent on their parents for self-regulation in infancy, but become increasingly able to regulate their own thoughts, behaviour and emotion as they progress through childhood and adolescence.

It is important to acknowledge the role of a child's context in their development of self-regulation. Children who experience minimal risk factors, such as poverty or excessive stress; enjoy supportive relationships; and have quality learning opportunities are more likely to develop self-regulatory capacities (Osher et al., 2020). On the other hand, high levels of chronic stress, particularly in early childhood, can change the neurological circuits that are critical for self-regulation (Thompson, 2014). For example, a recent study found that five-year-old children from lower-income families had poorer cognitive self-regulation capabilities than those from higher-income families. This is likely to be associated with stress and its effects on family functioning linked to poverty. Higher family incomes were found to reduce the impact of other risk factors on cognitive self-regulation (Li et al., 2017). See **CHAPTER 11** for more on poverty and education. The development of self-regulation is also influenced by the child themself, via their interactions with others. As noted by Vink and colleagues (2020):

> ... low levels of self-regulation early on can impede development of self-regulation later. For example, very impulsive children tend to elicit negative reactions from others, which can limit their opportunities to practice and acquire self-regulation skills at older ages, subsequently creating a feedback loop of maladaptive behaviour and negative reactions. (p. 2)

TABLE 3.2 outlines some of the characteristics of self-regulation that are expected to emerge during different periods of development. While self-regulation capabilities develop across an extended period of time, there are two developmental periods that are considered to be sensitive periods for the development of self-regulation: early childhood and adolescence (Murray et al., 2014).

Shifts in self-regulation

During the preschool years, self-regulation shifts from being largely co-regulated (i.e. highly assisted by parents and caregivers) and reactive to incorporating more self-directed, cognitive forms of self-regulation (Montroy et al., 2016). Underlying this shift are developments in many different cognitive skills, and the increasing capacity to integrate them. For example, following the rules of a game involves the integration of remembering the rules of the game, controlling impulses to violate the rules, and planning to behave in ways that align with the rules. Language development also affects self-regulation development during early childhood, as expressive language capabilities allow children to express their thoughts and feelings (e.g. telling an adult about feeling angry) rather than relying on behavioural self-expression (Montroy et al., 2016). Given the importance of self-regulation for academic and social functioning, it is not surprising that self-regulation is considered a key factor when determining a child's readiness for school (Blair & Raver, 2015).

The second period in which substantial changes in self-regulation occur is adolescence. During this period, self-regulation is expected to become more proactive, integrating more advanced goal-setting and planning for the future (Gestsdottir & Lerner, 2008). These improvements are driven by changes in the brain that increase the speed and efficiency of neural signalling (Vink et al., 2020). Despite these improvements, adolescence is also a developmental period in which decreases in self-regulation are evident, particularly in the presence of peers or in situations that induce strong emotions. As explained in **CHAPTER 2**, a combination of increased valuing of rewards with a relatively immature prefrontal cortex is evident during adolescence (Walker et al., 2017). This imbalance is believed to be responsible for adolescent behaviours that

TABLE 3.2 Development of self-regulation

Period of development	Self-regulation characteristics
Infancy (Birth–12 months)	• Mostly externally regulated (i.e. reliant on caregivers) • Can shift attention away from stressors • Use self-soothing behaviours (e.g. sucking fingers)
Toddler (1–2 years)	• Begin to select and shift attention (attentional control) • Can adjust behaviour to achieve simple goals • Delay gratification and inhibit responses for short periods when there is structure and support • Emotions are stronger than cognitive regulation
Preschool (3–5 years)	• Focused attention increases but is still brief • Begin to use rules, strategies and planning to guide behaviour • Delay gratification and inhibit responses for longer periods • Language begins to control emotional responses and actions
Middle childhood (6–10 years)	• Use cognitive strategies and internal speech to control behaviour • Increased cognitive flexibility, attentional control and more accurate appraisal of situations • Emerging ability to manage emotion 'in the moment' • Social problem-solving emerges
Early adolescence (11–14 years)	• Increased focus, task completion, goal-oriented behaviour and self-monitoring • Manage time more independently • Emotional arousal stronger than cognitive controls • Poor decisions made 'in the moment' and strong reward-seeking
Late adolescence (15–17 years)	• Focus and persist on complex and challenging tasks • More complex and independent planning and time management • Future orientation may influence behaviour • Consider others' perspectives in goal-setting • Make less emotional decisions

Adapted from Murray, Desiree W., Rosanbalm, Katie, Christopoulos, Christina, and Hamoudi, Amar (2014). Self-Regulation and Toxic Stress Report 1: Foundations for Understanding Self-Regulation from an Applied Perspective. OPRE Report # 2015-21, Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.

reflect poorer self-regulation, such as impulsiveness and greater risk-taking (Vink et al., 2020). Peers are also an important factor in the development of self-regulation during adolescence and can have a positive or negative influence on self-regulation depending on the quality of the relationship (Farley & Kim-Spoon, 2014). Strategies for supporting self-regulation in educational settings are discussed in **CLASSROOM LINKS 3.1**.

Executive functioning

Executive functions facilitate individuals' capacity to self-regulate their thinking and behaviour by allowing individuals to ignore distractions, focus on and use information, and switch between tasks or ideas (Hofmann et al., 2012). Core components of executive function include inhibition of impulses, such as the ability to selectively attend to a stimulus and screen out distractors; working memory; and cognitive flexibility. These support one another, and in turn support the next level of higher-order executive functions: planning, reasoning and problem-solving (Diamond, 2013; Serpell & Esposito, 2016). Executive functions are proposed to operate in a 'top-down' manner on other processes during goal-directed activity, and are important processes of self-regulation (McClelland et al., 2015).

executive functions These control the processing of information. Key executive functions include inhibitory control, working memory and cognitive flexibility

CLASSROOM LINKS 3.1

Strategies for supporting self-regulation in educational settings

Darling-Hammond and colleagues (2020) highlight the importance of creating supportive learning environments to enhance the development of self-regulation. Such environments are characterised by positive student–teacher relationships, students feeling safe and valued, and promotion of cultural responsiveness by schools and teachers. Other strategies that support the development of self-regulation include:

- *Early childhood* – in preschool settings, children require scaffolding and support to develop self-regulation skills. Educators can support children by talking with children about feelings, allowing children to make decisions, and encouraging them to persist with difficult tasks. Play can also be used as an opportunity for children to learn and practise self-regulation skills, such as following rules, turn-taking and problem-solving.
- *Middle childhood* – in primary school, teachers can continue to support the development of self-regulation via explicit teaching of self-monitoring (e.g. mindfulness, meditation and revision of work) and positive ways to manage negative emotions. While primary-aged students are increasingly able to sustain attention, this can be further supported by providing regular, short breaks to help students refocus.
- *Adolescence* – as shown in **TABLE 3.2**, by the time students reach high school they may have developed a range of independent self-regulatory capacities. Teachers can support further developments by providing opportunities for students to set their own learning goals, allowing students to take ownership and control of their learning, and designing learning activities that encourage students to explore the perspectives of others.

Development of executive functions

Executive functions develop in connection with structural and functional changes in the pre-frontal cortex of the brain (see **CHAPTER 2**). However, while the pre-frontal cortex does not complete development until early adulthood, young children show the beginnings of executive functions in infancy; it is the efficiency of these processes that increases with further brain development. The relationship is not simple, moreover; there are different patterns of development for each of the executive functions, and evidence that activities such as self-directed play, involvement in structured physical activity, mindfulness exercises, and even starting school strengthen and support development of executive functions (Müller & Kerns, 2015; Serpell & Esposito, 2016). Language is another important influence on development of executive function, helping children to regulate their thinking, in line with Vygotsky's theory.

FIGURE 3.15 Playing games like 'Simon Says' can help children to develop executive function

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An activity called 'Head-Toes-Knees-Shoulders' (Ponitz et al., 2009) in which children do the opposite of what the experimenter directs (e.g. touch their toes when instructed to touch their head) can be used to measure the executive functions of inhibitory control, as well as working memory and cognitive flexibility (see **FIGURE 3.15**).

Inhibitory control
The cognitive ability to inhibit preferable responses and impulses in order to respond or behave in an appropriate manner

Inhibitory control

Inhibitory control refers to the ability to inhibit impulses or preferable behaviours. It allows children to focus on tasks by ignoring distractions, take turns and resist temptations to hit or yell at others (Center on the Developing Child, 2011). When we ask children to 'stop and think' before they act, we are asking them to exercise inhibitory control.

Inhibitory control appears at around three years of age, with children showing ability to inhibit responses between three and four years. This capacity develops further throughout childhood and adolescence, with responses increasing in accuracy with age. Neurological measures indicate increased efficiency of use of brain networks in these tasks with development (Best & Miller, 2010). Best and Miller suggested that brain maturation contributes to development, along with improvements in metacognition (see the following), the ability to use rules and to cope with complexity of tasks. Inhibitory control also supports developments in attention.

Working memory

The second executive function is **working memory**, which is used to hold and work with information after it is no longer available (Diamond, 2013). Working memory is also an important part of the multistore model, discussed earlier in this chapter. As an executive function, working memory is used when:

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

- making connections between concepts
- updating understanding and goals when presented with new information
- using prior understanding and knowledge to make sense of a new task (e.g. completing a maths problem in your head or relating a chemical's position on the periodic table to its reactivity)
- reorganising information and considering alternatives (Diamond, 2013).

The development of working memory as related to executive function is closely related to inhibitory control and to cognitive flexibility, involving ability to selectively attend to information held in the working memory, and to switch attention between pieces of information. What changes with development is the number of things that can be held in consciousness and manipulated at one time. In the Head-Toes-Knees-Shoulders task previously described, younger (4–5-year-old) children are able to succeed at this task for two instructions (heads and toes) while older (5–6-year-old) children can succeed for four (heads, toes, knees and shoulders) (Ponitz et al., 2009). In accordance with this, Best & Miller (2010) reported in their review that working memory improves from preschool through childhood and adolescence, with older children being able to master more complex tasks, involving multiple items. Brain activity associated with working memory becomes more localised with development.

Cognitive flexibility

Cognitive flexibility represents the third executive function, and involves the ability to take different perspectives, switch between tasks or take a different approach to a problem. In this way, creativity (discussed in detail in **CHAPTER 9**) draws on cognitive flexibility. Cognitive flexibility also allows us to adhere to different conventions in different situations or contexts (Center on the Developing Child, 2011). For example, children employ cognitive flexibility when they understand that behaviours that are acceptable in the playground are different to those expected inside the classroom.

cognitive flexibility
The ability to adjust thinking and behaviour to align with changing requirements, situations or contexts.

Cognitive flexibility develops later than inhibitory control and working memory, and depends on these capacities (Diamond, 2013). Typically, tasks measuring cognitive flexibility ask children to sort objects by one characteristic, such as colour, and then by another, such as shape. By four-and-a-half to five years, the majority of children are able to switch sorting dimensions, and by seven to nine years, they can do this in ways that are more resourceful and better organised, adopting a strategy for their responses to a set of similar tasks, rather than reacting to each one separately; and slowing down with age to improve accuracy (Diamond, 2013).

Executive functions at school

Executive functions are essential to both academic and social-emotional school readiness (Center on the Developing Child, 2011; Mann et al., 2017), linking to learning of literacy and mathematics skills at school (Diamond, 2013), as well as to social and emotional understanding (Mann et al., 2017). The importance of executive functions extends beyond the beginning years of school, with their influence being demonstrated throughout schooling (Best et al., 2011). They also link to self-regulation of emotion and social skills, important to school success (McClelland et al., 2015).

Importantly, executive functions can be supported and strengthened throughout childhood and adolescence (Serpell & Esposito, 2016). Parenting plays an important role here, although other experiences have been demonstrated to affect executive function, such as involvement in team sports and other structured physical activities (including games like 'Simon Says', shown in **FIGURE 3.15**), learning of a musical instrument, sociodramatic play, computer-based training of specific executive function skills, and mindfulness training (see **CHAPTER 7**) (Müller & Kerns, 2015). Serpell & Esposito (2016) argued that many of these activities can be built into school programs.

Metacognition

metacognition
Higher-order thinking that involves knowledge of and control over our own cognitive processes

Another important aspect of cognition related to self-regulation and executive function is **metacognition** – or our capacity to think about our own thinking. Perhaps you just read that sentence, and wondered to yourself what it meant. You may even have read it over again slowly, to help to make sense of it. These are both examples of metacognition, as you monitor and reflect on your understanding, and put strategies in place to improve it. Metacognition was considered 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).

Self-regulation and executive function capabilities are considered to be prerequisites for metacognition (Cantor et al., 2019). It is therefore likely that the factors that influence the development of self-regulation and executive function (e.g. genes, context and relationships) also influence the development of metacognition.

Metacognition is theorised to have several components: metacognitive awareness; metacognitive knowledge, which includes knowledge of self, of tasks and of 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. Developments in metacognition allow children to regulate their interactions with their context, particularly in educational settings (Cantor et al., 2019). For example, metacognition allows students to use strategies that are relevant to particular learning tasks and to learn from their mistakes. In this way, developments in metacognition influence learning in general, as well as literacy and numeracy learning in particular (see **CHAPTER 2** for more on the development of these skills).

Metacognition in children

Children have been shown to have awareness of thinking from quite young; for example, three-year-olds have awareness of thinking as separate from action (Flavell et al., 1995), although they tend to see this as passive rather than active thing. 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 of brain development).

3.5 Concluding comments

As we have seen in this chapter, Piaget, Vygotsky, information-processing and developmental systems theorists have asked similar questions about the origins of children's cognitive development and the reasons they think and behave in the ways that 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.

STUDY TOOLS

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.

3.1 Piaget's theory of cognitive development

- Piaget identified four universal and invariant stages of cognitive development, and 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.

3.2 Vygotsky's sociocultural theory

- 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.
- 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.

3.3 Information-processing components of cognitive development

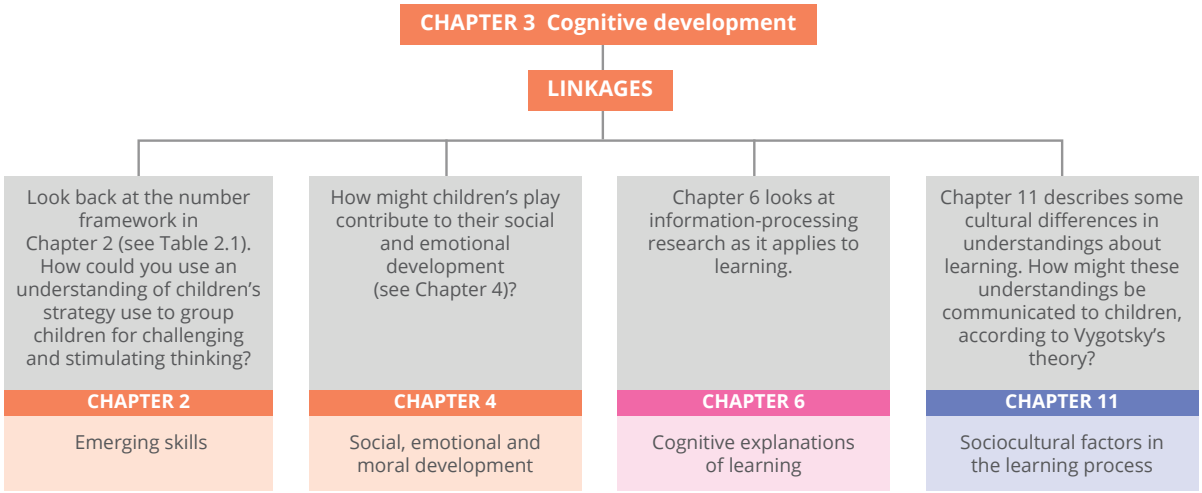
- Information-processing theorists study the mechanisms, strategies and structures by which we process information. They argue that cognitive development results from changes in these aspects of information processing.
- The multistore model proposes a number of stores of information (i.e. the sensory memory, working memory and long-term memory) and processes that move information between the stores (i.e. attention, rehearsal, encoding and retrieval). An executive control operating within working memory 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 and in its ability to explain the complexity of thinking in real-life situations, and is limited to one part of cognition.

3.4 Contemporary understandings of cognitive development

- The developmental systems theory of development reflects current understanding of cognitive development as just one part of a complex system, with language, social, emotional and cognitive development all interacting and mutually influencing each other. Internal (e.g. genes, disposition) and external (e.g. contexts, relationships) interact to influence cognitive development. Variation in cognitive development is normal and expected throughout infancy, childhood and adolescence.
- Self-regulation includes cognitive, behavioural and emotional components, and is critical for success in educational and social contexts. Self-regulation develops from infancy through to adulthood, as children shift from being largely externally regulated in infancy to increasingly internally regulated in adolescence and beyond.
- Executive functions of inhibitory control, working memory and cognitive flexibility, control processing of information and support thinking. They develop throughout childhood and adolescence and can be supported through activities at school.

Putting it together

Making links between 'cognitive development' and material in other chapters



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 does the notion of the zone of proximal development help to explain the process of cognitive development?
4 What did Vygotsky refer to as 'mental tools'? How do they work to shape thinking?
5 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?
6 How can the ideas of Piaget and Vygotsky be applied to teaching, learning and assessment?
7 Draw the multistore model and describe the way you processed the information you have been learning about in this chapter through its components.
8 Create a visual representation of the factors influencing cognitive development of information processing. How might this help you to remember the ideas?

9 How does our current understanding of cognitive development differ from the ideas of Piaget and Vygotsky? How have their ideas influenced our current understanding?

10 What are the main implications of developmental systems theory for cognitive development?

11 Why are self-regulation and executive functions considered to be critical for success in learning? How can educators help children and adolescents to develop these capabilities?

Further research

Go further

The online appendices contain additional material that you should refer to when reading this chapter. The appendices available for this chapter are:

- Appendix 3.1 About Jean Piaget
- Appendix 3.2 About Lev Semenovich Vygotsky
- Appendix 3.3 Piagetian and Vygotskian case study.

Recommended websites

Educational Psychology Interactive – the information processing approach: http://www.edpsycinteractive.org/topics/cognition/infoproc.html

Jean Piaget Society: https://www.piaget.org

Lev Vygotsky archive: https://www.marxists.org/archive/vygotsky

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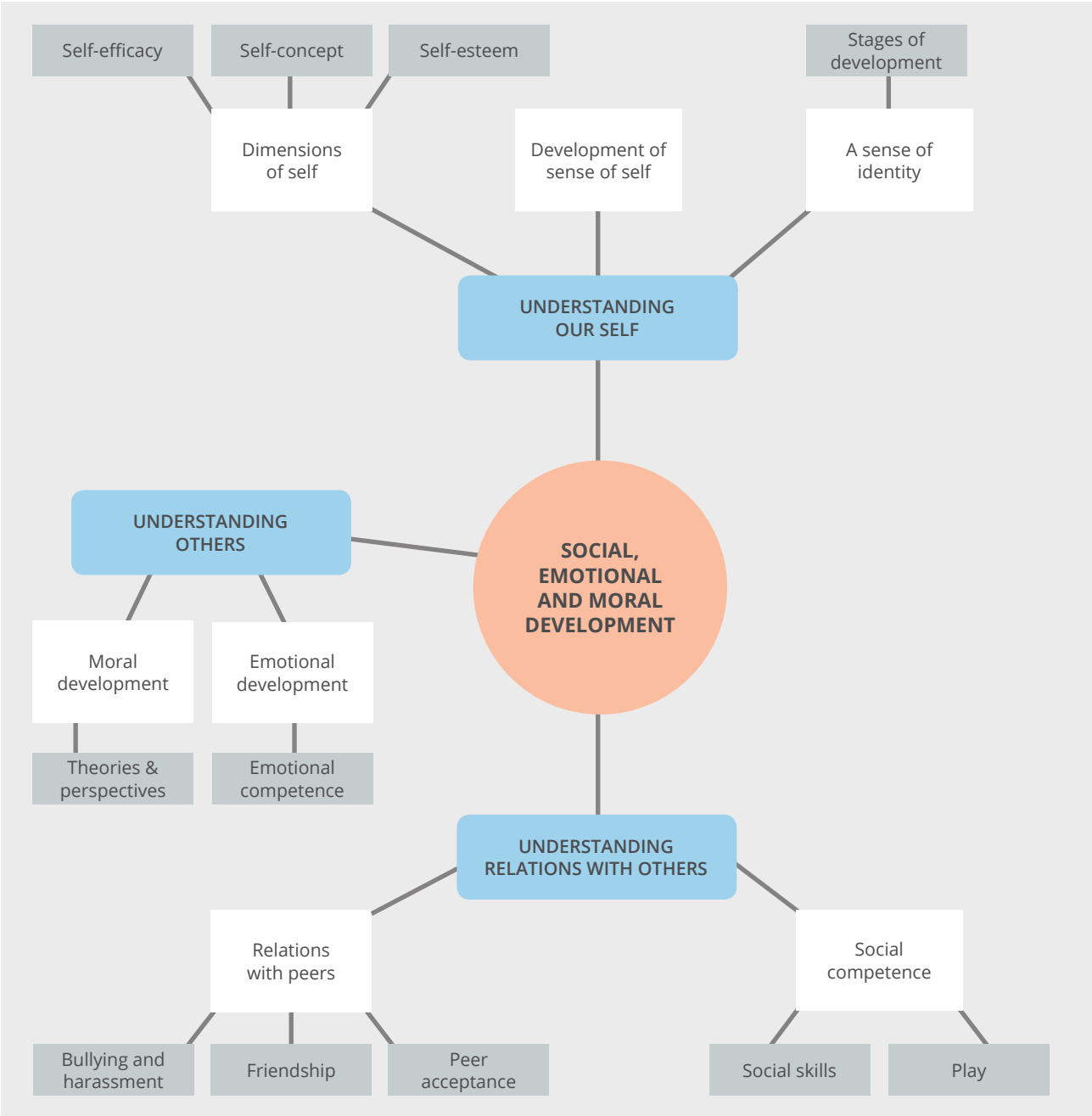
CHAPTER 4

Social, emotional and moral development



Chapter 4 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following key 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?

JAMIE, LIA AND CALEB

Jamie is 'nearly five' years old, her sister Lia is 11 years old and their older brother Caleb is 15. Fairly recently Jamie has started to talk about herself using terms like 'I'm a big girl now', 'I'm starting school next year', 'I've got one brother and a sister', and 'My favourite colour is purple'. Meanwhile, Lia has been confident and talking about herself and her friends for a while now: 'I'm a pretty good swimmer and so are my friends. We are fairly competitive but muck around a bit too. I try to do the right thing; not like Olivia; like she found a pair of sunglasses in the change rooms the other day and she kept them; we tried to talk her into handing them in to the office, but she didn't want to. I don't do things like that; I think it's wrong'. Caleb seems to have a very well-developed sense of himself: 'I'm 15 years old and I'm a pretty good footy player on the wing. I like to play video games online; I'm good at it ... well, compared to my friends I've got the highest score! I think I'm OK as a person, like I've got a fair few friends and they are pretty nice people. You know, we help out at the club with junior footy, and we don't muck up much. We all do OK at school too, like we are in the top classes, mostly. My best subjects are technology and science, but I'm only average at English, especially public speaking. I can get a bit anxious, and I stuff up my lines'.

As Jamie, Lia and Caleb have grown up, their understanding of self, notions of right and wrong, and their relationships with other people have developed and changed over the years. How does development explain why Jamie's self-description is so different to Caleb's? What are the social factors that might influence Lia's sense of right and wrong when she is hanging out with her friends? Why is Caleb able to describe himself and his emotions and abilities in different subjects so well, while Jamie and Lia didn't mention these things?

Introduction

This chapter introduces three major areas in the study of personal development. First, it focuses on the development of our concepts of self and then looks at the gradual development of moral, emotional and social understanding. This chapter also explores the formation of relationships with other people, looking closely at peer relationships, and the interactions between the developing young person and other contexts, such as schools and classrooms.

4.1 Understanding our self

Our sense of self is very closely related to our cognitive development (see **CHAPTER 3**). As we can see in the opening case, Jamie talks about herself in very concrete and tangible ways, while Lia's self-report is more detailed and introduces her friends and their personal qualities. She is increasingly able to distinguish between her own personal self-worth and the values and behaviours of her peers. Increasingly, our self-understanding is related to the wider social context or activities we undertake in these contexts, such as participation in sporting groups and undertaking a wide range of school subjects. Like Lia and Caleb, we may also compare ourselves to friends or classmates as we make these self-judgements. As our cognition and emotional understanding develops, we become much better at making these comparisons and using emotional labels to describe ourselves or other people, as shown in Caleb's recognition of his own anxiety. Each young person is 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. We can also see that Jamie, Lia and Caleb are growing up in rich social contexts where their development and their engagement in the social world are closely connected.

self
Who we are, what makes us unique and who we believe ourselves to be

Dimensions of the developing self

Susan Harter (2012, p. 1), is one of the most prominent researchers in the area and claims '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'. These theories of 'self' have changed over time and today the word 'self' is commonly associated with terms such as self-concept, self-efficacy and self-esteem. 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 (Marsh et al., 2012). These self dimensions develop and become more complex over time as we mature and interact with our environment.

Self-concept

Self-concept refers to the knowledge, ideas, attitudes and beliefs we have about ourselves. It is a cognitive appraisal, which means it has no outward or observable features as seen in areas of physical development, but it plays an important part in understanding ourselves and others. 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 4.1**, it is also influenced by **social comparison**, such as comparing performance or grades with those of classmates.

self-concept
The information, ideas, attitudes and beliefs we have about ourselves

social comparison
The cognitive process of comparing our abilities to others or to social standards

Multidimensional self-concept

For many years it has been accepted that self-concept is multidimensional and differentiated (Marsh et al., 2012). This means that self-concept can be measured and distinguished in different areas of academic and social abilities (Marsh et al., 2012). This is evident when we look at Caleb's self-report. Caleb clearly has a *multidimensional* view of his self-concept in academic domains such as science, technology and English. However, his self-concept is also *differentiated* in that he can distinguish between these areas. He reports a high or very positive sense of self in science and technology but does not feel so sure of his ability in English and specifically public speaking. Caleb also seems to have a positive self-concept about his relationships with other friends, and if we measured Caleb's self-concept we might find that he has another level of self-concept for his relationships with the wider peer group.

FIGURE 4.1 This learner may be engaging in social comparison as he compares his work to that of his peers

Matthew Duchesne, © Milk and Honey Photography, 2010.

Caleb's sense of academic self-concept is derived from views of his personal achievements in specific curriculum areas such as technology and English. Research confirms that as we develop as learners, our self-concept perceptions become more defined and specific across academic areas we are studying (Marsh et al., 2012). One of the most enduring questions in educational psychology research concerns the link between academic self-concept and academic performance. In particular, researchers have been interested in a 'Which came first: the chicken or the egg?' type of question; that is, does academic self-concept influence our academic performance or does our academic performance influence our academic self-concept? Some of the most important findings illustrate a reciprocal link between our academic self-concept and academic achievement. Researchers have now suggested that in the case of academic self-concept in particular a *reciprocated effects model* explains the relations between academic self-concept and academic performance (Arens et al., 2017; Seaton et al., 2014). This means that academic self-concept can influence academic performance but knowledge of our academic performance can also influence our academic self-concept (Marsh & Martin, 2011). View the material on measuring self-concept in the online materials, in appendix 4.1.

GO FURTHER
Appendix 4.1
Measuring self-concept

THINK ABOUT

What are the implications of the reciprocal effects model for classroom practice? For example, when would the teacher focus on enhancing a child's academic self-concept and when would it be appropriate to enhance their skills to improve their performance?

Social comparison and academic grouping

Another very important research finding concerns the way in which we develop our self-concept. In the case of academic self-concept, researchers have considered two forms of social comparison: first, we may engage in social comparison to external sources of information, such as our peers; and second, we may make comparison to internal sources of information, such as our ability in one subject versus another. This idea of social comparison to external sources has been used to examine the effects of different types of academic grouping or streaming on student self-concept (Guo et al., 2018).

In schools where academic grouping or streaming occurs (i.e. 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. For example, comparing oneself to someone of lower ability (i.e. downward comparison) is somewhat protective of the self-concept and does not lead to lower self-views. In contrast, if Caleb compares himself to his peers who perform better than him in English, this is a type of upward comparison; such comparison to students better than himself can result in feelings of inferiority and a low self-concept. This paradoxical lowering of self-concept is known as the 'big-fish-little-pond effect' (see **RESEARCH LINKS 4.1**), in which a student's self-concept may actually decline once they are no longer the biggest and 'brightest' fish in the school pond (see **FIGURE 4.2**). Read the case study about the big-fish-little-pond effect in the online materials, in appendix 4.2.

GO FURTHER
Appendix 4.2
Big-fish-little-pond effect

RESEARCH LINKS 4.1

Big-fish-little-pond effect

Research demonstrates that students in 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., 2014). Researchers have found similar effects for academically disadvantaged students in comprehensive classrooms (Marsh et al., 2012). This effect is known as the 'big-fish-little-pond effect'. As students move from relative success in one classroom where they are like a big fish dominating a little pond, to a classroom where the average ability of the whole class is higher, academic self-concept tends to suffer and self-esteem declines. The student is now comparing their academic ability to a pond of similar or even higher-ability fish. This effect can increase and be maintained for several years after the student graduates from high school (Marsh et al., 2007).

FIGURE 4.2 shows 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 big-fish-little-pond effects have been found *within* classrooms, meaning that students are mostly comparing themselves to students within their own classes (Marsh et al., 2014). Using data from the Program for International Student Assessment (PISA) database, Seaton and colleagues (2009) demonstrated that the big-fish-little-pond effect 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* lower-ability students.

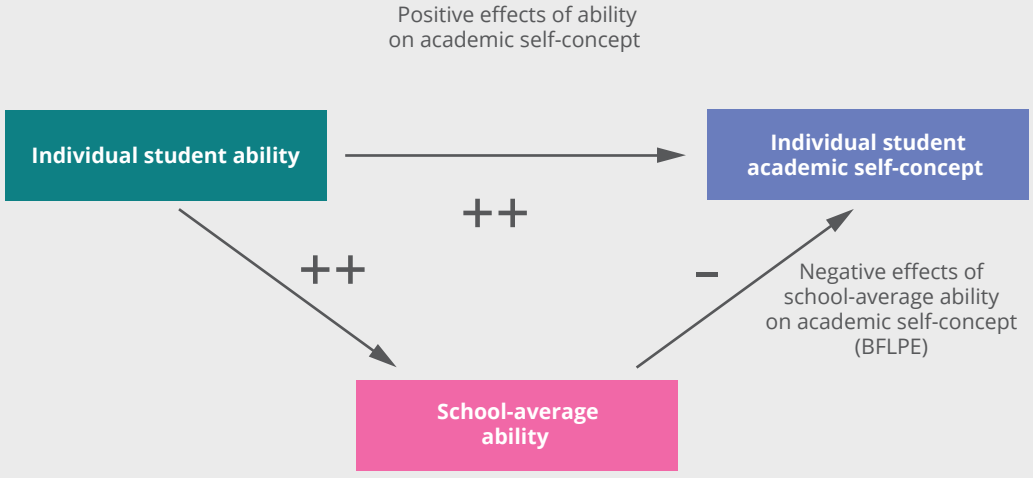


FIGURE 4.2 The big-fish-little-pond effect: theoretical predictions

Marsh and Hau (2003), diagram p.370, reprinted with permission.

Self-esteem

Self-esteem is defined as a subjective evaluation of our worth as a person. This notion of *subjective* is very important because like self-concept, self-esteem is not a tangible, objective characteristic rather it is a self-guided feeling of personal acceptance and attitude toward the self. However, having positive self-esteem does not mean that a person views themselves as better than others or is self-centred. A positive sense of self is generally related to positive and prosocial behaviours towards others (Orth et al., 2018).

self-esteem
The level of satisfaction and pride that individuals have in the self

Self-esteem and self-concept appear to be closely related concepts, but theoretically, self-esteem and self-concept 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 (e.g. Caleb states he is good in technology and science subjects but not so good in English and more specifically public speaking). Self-esteem, on the other hand, is believed to reflect a higher-order cognitive evaluation of the self that describes our integrated sense of our worth as a person. In the case of Caleb, despite having an area of low self-concept, he still maintains a positive self-esteem and believes he is 'OK as a person'. As such, self-esteem is *not* a simple summary of our differentiated self-concept but rather a more global cognitive view of the self (Harter, 2012).

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, which can also be 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 than other forms of self-perception for young children right through to adult populations. For example, in studies of gifted children and children with learning disabilities 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 of these studies 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.
- 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 (Orth et al., 2018). Research indicates a connection between low self-esteem, depression and drug abuse (Sowislo & Orth, 2013), suicide risk (Lakey et al., 2014) and eating disorders (Preti et al., 2011). The research in this field is expansive and numerous associations with many states of health and behaviour have been found.

Due to the benefits associated with having a positive and stable sense of self, researchers have attempted to increase the self-esteem of those with low self-regard. Unfortunately, many of these interventions show weak effects. Worse, many are not based on good research evidence (Guindon, 2010). In a review of quality evidence-based interventions Guindon points to five different types of intervention that appear to be supported by research studies, including increasing the social support of the person, cognitive behaviour therapies, individual, group or family therapies, increasing physical fitness and activity, and other therapies such as reality therapy.

It seems that interventions that work are based on a strong theoretical grounding of self-esteem and a therapist or practitioner who understands the self-esteem concern of the child or adult (Guindon, 2010). Teachers in schools must be guided by these reports of evidence-based therapies if they are to avoid the waste of time associated with administering ineffective self-esteem interventions.

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 reflects 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 to accomplish specific actions and tasks effectively. For this reason it is known as our 'can do' judgement of self. Of all the self-constructs, self-efficacy is the most specific form of self-judgement. This specific form of self-judgement explains variation in self-efficacy beliefs across sometimes related tasks. For example, Caleb may have high self-efficacy for playing specific types of video games but low self-efficacy for giving a speech about playing video games.

human agency
The ability for people to intentionally influence, control and direct their actions to make things happen

Self-efficacy is based on Albert Bandura's theory of **human agency**. This theory proposes that people can intentionally influence, control and direct their actions to make things happen (Bandura, 2001). In other words, human beings have a sense of agency, and through this agency self-efficacy develops. This idea of human agency may not seem unusual to you today but when Albert Bandura proposed this idea in 1977, it represented a major shift from the behaviourist philosophy of the time.

As discussed in **CHAPTER 5**, behaviourist approaches posited that humans had little or no influence over their own behaviour and instead learnt by responding 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 linking of the external and internal influences on human cognition became known as *social-cognitive theory*, reflecting the combined influences of social (external) and cognitive (internal) processes.

Like other self-theories, self-efficacy is also shaped by the social-comparisons and other judgements we make of our ability. These social and cognitive processes are reflected in four sources of information about the self that are known to build and shape our sense of efficacy (Bandura, 1997):

1 *Enactive mastery experience* – 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 'I can do it!' belief and does not build self-efficacy.
2 *Vicarious experience* – 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).
3 *Social persuasion* – the social and verbal feedback we get from other people, which has a powerful persuasive force. Teachers must provide such feedback very carefully and realistically within the bounds of the person's capability. Negative feedback undermines self-efficacy. Young children are particularly susceptible to verbal persuasion from adults or older peers. As children get older, 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 *Physiological and affective state* – feelings caused by anxiety and stress (e.g. 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. You might recall such feelings the last time you sat an exam or went for a job interview.

Addressing a poor sense of 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 (Bandura, 1997). Such interventions, whether they be in health or educational settings, provide opportunity for mastery experiences, effective modelling from positive role models and positive verbal persuasion. These interventions must also reduce the stress or anxiety the person may feel while trying new tasks. These strategies are demonstrated in **CLASSROOM LINKS 4.1**, which explains how teachers might intervene to increase the public speaking self-efficacy of students like Caleb, who finds speaking publicly difficult.

CLASSROOM LINKS 4.1

Intervention to enhance public speaking self-efficacy

For teenagers such as Caleb, the school curriculum can place additional demands on their sense of efficacy as the tasks became more demanding. Caleb's teachers decided to address students' speaking and explanation skills by engaging them in Year 10 'work experience', or service-learning projects, which involved interaction with members of the community and presentation of projects. They sent one group of students on a service-learning project intervention while a control group of students completed regular classroom-based projects. They tested all students' public speaking self-efficacy and public speaking anxiety before the experiment and again afterwards. Students answered questions such as 'How confident do you feel you can deliver a well-organised, interesting and engaging presentation?'

The students in the service-learning intervention worked in small groups to identify a community organisation to work with; they consulted with the leadership team of the organisation to plan a meaningful project and they implemented the project in public settings with community members. These projects included activities such as helping at a local homeless shelter, running a cancer awareness event, and providing workshops to vulnerable Year 8 students who were at risk of school dropout. Both groups of learners had to deliver a group presentation about the outcome of their project.

The teachers found that the students in the service-learning intervention developed significantly higher self-efficacy for public speaking, had less anxiety and performed better in their presentation compared to the control group students. Caleb reported: 'My anxiety is like, one tenth of what it was. I still get butterflies in my stomach, but I think "I can do this, I've got this!"'.

Adapted from McNatt, 2019.

THINK ABOUT

- Why do you think the service-learning intervention enhanced public speaking self-efficacy for Caleb and his peers?
- Can you identify the four sources of self-efficacy and how they were addressed in this style of intervention?

Self-regulation

Our sense of self-efficacy is particularly associated with **self-regulation** – a key factor associated with academic success. Self-regulated learning behaviours, such as goal setting and self-monitoring of learning, are associated with higher levels of self-efficacy (Zimmerman & Cleary, 2006). We can see in the intervention in **CLASSROOM LINKS 4.1**, that students in the service-learning intervention were required to practise and exercise good self-regulation. They had to present themselves to the

self-regulation
A metacognitive activity that involves planning, directing and evaluating one's cognitive processes

public, control their anxiety and practise their self-presentation skills. Individuals with a strong sense of self-efficacy for self-regulation are able to manage their time well, organise themselves effectively and have lower levels of anxiety (Usher, 2015). Self-efficacy theory proposes that feeling efficacious promotes a sense of agency and control. Hence high-efficacy learners generally have a greater sense of control over their work and may even select more difficult tasks if given the choice. In contrast, learners with low self-efficacy often feel powerless and incompetent.

Development of our sense of self

Our sense of self across the various self-constructs develops gradually and typically changes over time. In early life many of these changes are influenced by other processes of development, including the development of more sophisticated cognitive skills (e.g. 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.

Research appears to show that a global sense of self is revealed when we develop the verbal ability to make global statements about our sense of self (Harter, 2006). Indeed, the measurement of the global sense of self often uses abstract higher-order questions, such as 'Do I feel that I am a worthwhile person?' It is harder for younger children like Lia to articulate the less concrete and rather more abstract sense of personhood or 'worthwhileness' that the global self-esteem is thought to reveal. At this stage of life, research suggests that the view of the self is very positive and steadily improves throughout childhood. As summarised in **TABLE 4.1**, younger children's self-descriptions are often associated with concrete, tangible and sometimes quite 'unrealistic' accounts of exceptional feats of strength and bravery, as described by this three-year-old child: '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

From the school years through to adolescence Orth et al (2018) report the steady improvement of self-esteem until adolescence, where it begins to stabilise and remain steady throughout adolescence. Self-descriptions start to become differentiated, reflecting different skills, abilities and different contexts of the young person's life. For example, Caleb recognises he is outgoing and not at all shy about speaking in front of his friends but is very shy and anxious speaking in front of a peer group in the classroom. Lia may report a high self-concept or self-efficacy for swimming but not for running. As verbal skills improve so does the richness of the self-description with a sense of stable, personal characteristics emerging in self-descriptions – 'I'm an OK person', 'I'm smart', 'I'm dumb at maths' (Harter, 2012).

The differentiated sense of self grows in adolescence to acknowledge the multiple roles that a person may take on in different contexts, and the expanded range of skills and tasks to which the adolescent is exposed. The social context appears to be particularly relevant during early adolescence (see **FIGURE 4.3**). The point of transition to high school has been identified as a vulnerable time when many young people report a decline in self-esteem and academic self-concepts (Eccles & Midgley, 1989). Eccles and Midgley (1989) proposed that the changed environmental (and social) context of high school prompts such a decline. For example, researchers comparing Year 6 and Year 9 students found a successive decline in science self-efficacy from Year 6 to Year 9. The most significant decline occurred in Year 9 when these students transitioned from middle school to high school (Lofgran et al., 2015). However, other research has shown that the overall sense of self, as measured in self-esteem, tends to stabilise in adolescence before growing and improving in adulthood (Orth et al., 2018).

Gender differences in self-perceptions are not easily summarised because the research findings vary depending on domains of ability or personal attributes assessed. For example, studies often show that female students' self-perceptions for science or maths are consistently

FIGURE 4.3 Rejection by peers contributes to a low sense of self

Matthew Duchesne, © Milk and Honey Photography, 2010.

lower than male students' beliefs (Lofgran et al., 2015). In another example, for decades it was assumed that a significant gender difference could be seen between girls' and boys' body image or physical appearance self-concept, with girls reporting significantly worse body image than boys. However, there is a growing concern about boys' body dissatisfaction as well (Agam et al., 2015). For example, it is recognised that both males and females report body dissatisfaction after viewing idealised body images they encounter in social media; boys can be vulnerable to stereotypical depictions of the male body and social media can be a source of such social comparison (Dudley et al., 2019). If any gender differences exist, these may be explained by the different sources of social persuasion, feedback or social comparison that may be experienced by both girls and boys in classrooms, family environments and social media.

IMPLICATIONS FOR EDUCATORS 4.1 discusses programs and strategies that relate to building and enhancing self-concept, self-efficacy and self-esteem in the classroom.

IMPLICATIONS FOR EDUCATORS 4.1

Building self-concept, self-efficacy and self-esteem

Enhancing learners' self-perceptions is central to teaching and preparing students for life beyond school. Given what we know about how self-concept develops, the sources of self-efficacy and the global sense of self-esteem, we know there are several ways to support young people to develop a positive self-perception in the classroom:

- Create a healthy climate of *social comparison* by allowing students to engage in peer feedback, group discussion of their work, sharing their output. Avoid unhealthy climates of social comparison where rankings and achievement charts are displayed or there are limited opportunities for all students to gain points or win a prize.
- Ensure *mastery experiences* with careful use of explicit instruction, followed by scaffolding and then independent student experience – this allows the teacher to monitor and ensure success.
- Provide *vicarious role modelling* experiences by supporting peer collaboration, peer modelling of learning strategies and opportunities to engage with older more 'expert' peers, such as in cross-age activities.
- Use multiple forms of *social persuasion*, such as constructive teacher feedback, peer assessment activities, multiple opportunities to share, present and display work for diverse audiences, including stories for young children, presentations for elders, a project to take home, or community work (see **CLASSROOM LINKS 4.1**).
- Teach *self-regulation* 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.
- Become familiar with the signs of common learner *physiological and affective states* like stress, anxiety, withdrawal and avoidance behaviours. There are strategies to support student mental health and wellbeing in the classroom (see **CHAPTER 8**).

THINK ABOUT

- How will you identify students with low self-perceptions in your classroom?
- Think of a teaching area and a practical strategy you could use to enhance student self-concept and build their self-efficacy in your teaching.

A sense of 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'. Two prominent psychological theories that have shaped our view of child and adolescent 'identity' today are those of Erik Erikson (1982; 1997) and James Marcia (1980, 1993, 2002). Their theories reflect the significant influence of lifespan and stage-based theories of identity development.

identity
An internal self-structure in which we organise our beliefs, abilities, needs and self-perceptions

Erikson proposed a series of eight **psychosocial development** stages across the lifespan in which our identity and sense of worth may be developed or crushed. Marcia drew heavily on Erikson's work but focused specifically on adolescent development, proposing four stages of identity development during adolescence. During these stages, our identity development is theorised to be dependent on how we resolve 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 identity development. According to these theories, individuals can either resolve these crises in a positive or a negative way. As individuals resolve crises they develop psychosocial strengths, 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. Marcia proposed that adolescents must commit to an identity or this can lead to great role confusion.

psychosocial development
Psychological development in a social context

psychosocial crisis
A 'turning point', where individuals experience a temporary state of conflict and disequilibrium

Stages of identity development in the school years

Each of the theories proposes a number of stages that are named according to the psychosocial conflict or 'crisis' the young person faces. In each stage, the child's relationship with significant others is clearly implicated in how they resolve the crisis. **TABLE 4.2** shows Erikson's stages from infancy to adolescence and Marcia's four stages of adolescent identity development.

The preschool and kindergarten years

In the 'initiative versus guilt' stage, young children may attempt to show initiative by trying adult activities such as cleaning the house or attempting simple chores, and using toys that are just like Mum and Dad's 'big tools'. Encouraging children to take the initiative and to think for themselves is one of the first steps in learning that their actions lead to consequences and thus they can learn a sense of responsibility through such initiatives. If, however, the child is punished for the inevitable mistakes or mishaps that occur, or playing with adult belongings or tools is described as 'naughty', the child may develop a sense of guilt and shame. The application for the modern teacher is seen in childcare approaches that encourage free play, choice of materials and educative approaches that we start to explain the consequences of behaviours to children to encourage them toward more positive behaviours.

The primary school 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 live from the land and learning important cultural information (Crain, 2000); while in western

TABLE 4.2 Stages of identity development

	Stage	Psychosocial crises	Characteristics
Erikson	1. Infancy (0–1 year)	Basic trust vs basic mistrust	Warm and positive care helps the infant develop trust. Infants who are treated harshly or not comforted develop mistrust
	2. Early childhood (2–3 years)	Autonomy vs shame and doubt	Children desire autonomy and want to test new skills and abilities. 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 or punish children for their actions
	4. School age (7–12 years)	Industry vs inferiority	Children develop a sense of 'industry' through schoolwork 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
Marcia		Identity achievement	May explore several identity roles, but resolves the conflict and feels comfortable with who they are
		Identity foreclosure	Avoids the 'crisis' of role confusion by adopting the occupational and ideological goals of significant others, such as parents or other influential social groups. May follow in the footsteps of others without working through identity issues for themselves
		Identity diffusion	Has no direction for the future, unclear goals and uncertain about what occupation to pursue. May feel confused and frustrated
		Moratorium	Postpones a definitive commitment to a single identity or set of values. Chooses to take time out between childhood and adulthood

Adapted from Erikson, 1982, pp. 32–33; Marcia, 1980, p. 161.

cultures, children typically attend school and learn basic literacy and numeracy skills. Families and teachers play a particularly important role (Erikson, 1959), as they can encourage skills and a sense of competence among learners. Children need to experience feelings of success (see **FIGURE 4.4**) because repeated failure experiences can lead to a sense of inferiority or incompetence. Erikson also recognised that inferiority arises from experiences of racism, sexism and other forms of discrimination.

The high school years

In Erikson's theory the primary task during adolescence is to develop an identity, which lays the foundation for adulthood. 'Identity' versus 'role confusion' occurs when adolescents have

difficulty deciding which roles to play in life, which may stem from uncertainty about their place in the world. In Marcia's theory the adolescent must seek a committed identity. The avoidance of any commitment can cause role confusion. If the adolescent does not explore different roles or pathways this may lead them to prematurely 'foreclose' or shut off their search for 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 et al., 2013). In contrast, those in moratorium generally have higher anxiety scores (Lillevoll et al., 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 et al., 2011).

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 (see **FIGURE 4.5**). The term 'crisis' should be used with caution, however. Some people have a stereotypical perception that adolescence is a tumultuous period characterised by risk taking and 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 (Bowers et al., 2010) emphasises the strengths of positive development during adolescence by focusing on the 'Five Cs': competence, confidence, character, connection and caring (Lerner et al., 2012).

FIGURE 4.4 Students need opportunities to experience success and demonstrate competence

AAP Image/TRACEY NEARMY

FIGURE 4.5 What issues of identity might these students face over the next few years? What approaches could they take to dealing with identity?

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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 identity theories

Identity theories have a significant role to play in much western thinking and are reflected in many disciplines of western thought, such as psychology, philosophy and sociology. However, all theories face critique and interrogation and should always be interpreted in light of possible limitations.

A stage theory

Erikson and Marcia propose a stage approach that is helpful because it provides a framework for interpreting psychosocial development across the lifespan. However, stage theories have limitations (see **CHAPTER 3**). Questions have also been raised about the universal applicability of the order of stages and the relevance of a 'lock-step' approach to development. For this reason, some theorists prefer to view identity formation as a continuous process of moving between commitment to an identity, exploration of those commitments and a reconsideration of those commitments (Meeus et al., 2011). As such, a 'continuity' view of identity development is more accepted today.

collectivistic culture
Typically group-centred, viewing individuals in terms of their relationships, roles and responsibilities in the community

individualistic culture
Focuses on the self as an autonomous individual; successful pursuit of individual goals is valued

The role of society and culture in self and identity

Theories developed in one cultural context may not have applicability in other cultural contexts. Each of the self and identity theories examined in this chapter were developed in a western context based on western assumptions about personal qualities and behaviours at certain stages of life, such as getting a job in adolescence, or leaving home. Scholars have argued that some of these concepts and these stages do not apply across cultures and across historical contexts. For example, Barrett (2000) questioned whether Stage 2 (autonomy versus shame and doubt) holds true for **collectivistic cultures** in which autonomy and independence are not valued as highly as they are in **individualistic cultures**.

FIGURE 4.6 A sense of belonging to a cultural group stems from communal activities, shared values and common goals

Alamy Stock Photo/david hancock

After many years of little cross-cultural research, recent investigations have acknowledged the role of context in shaping intergroup differences (Megreya & Ahmed, 2011). Indeed Erikson did acknowledge that 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. Various cultural factors (e.g. religious values; Megreya & Ahmed, 2011), and experiences (e.g. racism) can shape the development of self and identity (Kickett-Tucker & Shahid, 2019). Australian research with Aboriginal and Torres Strait Islander youth suggests that contact with their community and Elders, and their peer relationships for example, are positively associated with their self-concept for reading and mathematics, but structural inequalities, such as isolation or racism, can also influence their sense of identity (Kickett-Tucker & Shahid, 2019; Prehn et al., 2020; see **FIGURE 4.6**).

4.2 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

As children's sense of self develops, they encounter situations that extend and challenge their thinking about what is right and wrong. We saw in Lia's self-description that her sense of right and wrong was challenged by Olivia's taking the pair of sunglasses from the change rooms. The concept of **morality** is a contested and ill-defined term (Dahl & Killen, 2018); in this chapter we acknowledge the broad conceptualisation of morality as concerned with fundamental questions of right and wrong, justice, fairness, basic human rights and the welfare of others. We also consider that cultural values and norms have a strong bearing on how individuals think and act, so notions of 'morality' are mediated by environmental or sociocultural factors (Miller & Bland, 2013). The study of moral development in the psychology of children is particularly interested in *when* young people develop or learn a sense of right and wrong, and *how* they reason about challenging social or moral issues (Turiel, 2018).

Theories of moral development and reasoning

Theories of moral development and reasoning in children and young people have been reflected in several psychology approaches and theories over the last century. Early views of development were often based on *innate* views of development or the view that children are born with a moral sense. In contrast, *learning* views posit a socialisation view whereby children learn from adults and must internalise these adult values and standards to acquire a sense of morality (Dahl, 2018). Today such dichotomies of innate versus learned (nature versus nurture) are not considered as useful and it is more widely accepted that development occurs through a combination of genetic, cognitive, neurological, behavioural and environmental processes (see **FIGURE 4.7**) that reflect the child's interaction and response to their environment and context (Dahl & Killen, 2020).

The theories of Jean Piaget (1932) and Lawrence Kohlberg (1963) marked a shift from these early views of moral development and instead refocused the debate on developmental processes in moral reasoning ability. These 'constructivist' theories of morality proposed that children 'construct' ideas about right and wrong and this ability to engage in moral reasoning shapes the development of their thinking about moral issues. Piaget and Kohlberg believed that the development of moral reasoning was closely linked to cognitive development and involved the capacity to think analytically. Both researchers

FIGURE 4.7 We learn to behave morally, in part, from observing or participating in the social interactions around us

Matthew Duchesne, © Milk and Honey Photography, 2010.

moral dilemma
A moral problem requiring individual judgements and moral reasoning

developed stage-based theories of moral reasoning and both used carefully constructed stories or '**moral dilemmas**' to explore the development of this analytical reasoning ability. For example, Kohlberg's research employed the 'Heinz dilemma' (**RESEARCH LINKS 4.2**), which was presented to research participants, and their answers were analysed to provide an insight into their moral reasoning.

RESEARCH LINKS 4.2

Kohlberg and 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 – it cost him $200 to make a small dose of the radium and he charged $2000 per dose. 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? Why or why not?

Adapted from Kohlberg, 1963, p. 19. Published by Karger Medical and Scientific Publishers.

From the analysis of responses to these type of dilemmas Piaget proposed two levels of moral reasoning in children and Kohlberg eventually developed three levels with six stages of moral reasoning abilities (see **FIGURE 4.8**). This developmental approach acknowledged that moving

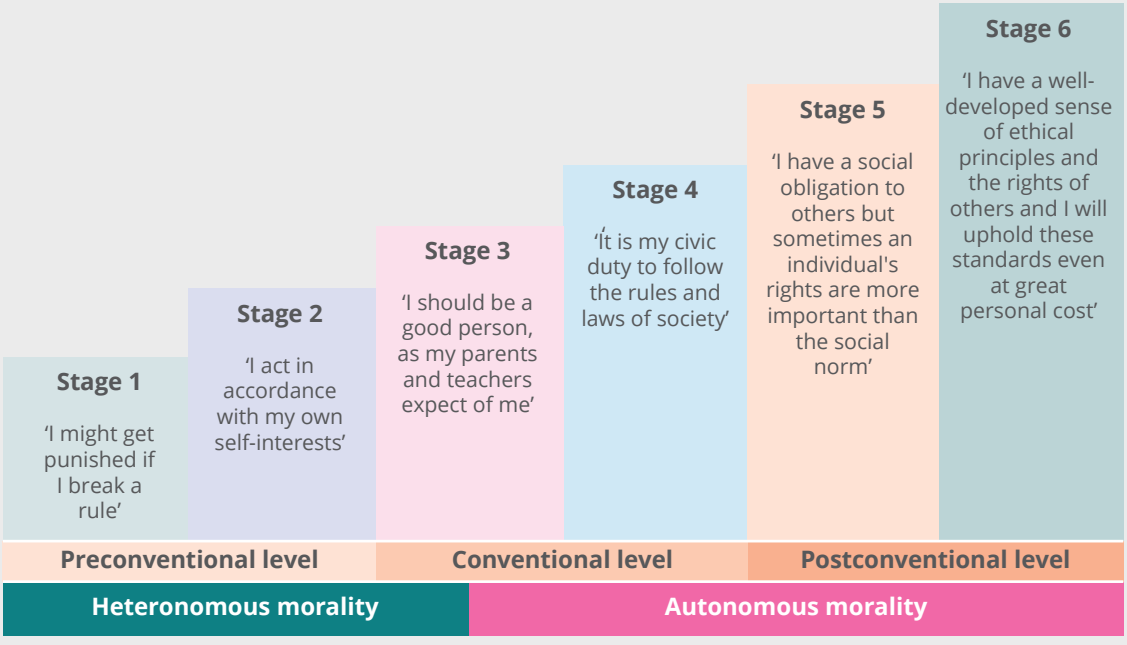

FIGURE 4.8 An image of the moral stages as theorised by Kohlberg and Piaget

Adapted from https://www.carloscardosoaveline.com/kohlberg-and-the-stages-of-moral-development/ or https://www.helenablavatsky.org/2019/02/kohlberg-and-stages-of-moral-development.html

from one level or stage to the next requires a combination of cognitive development and a range of social experiences and social interactions. As children like Lia interact with others, they learn to appreciate differing viewpoints and have their own views challenged. Lia's reaction to Olivia's behaviour might stimulate new ways of thinking and reasoning about the moral issues and hence both Lia and Olivia's moral reasoning ability develops in interaction with their social environment.

Moral development by stage

In the earliest stages of moral reasoning both Piaget and Kohlberg held the view that younger children and those in the lowest levels of moral reasoning engaged in a form of 'heteronomous morality' and were somewhat incapable of independent moral reasoning. In this stage the child unswervingly obeys adult figures; the moral authority of adults and the need to follow 'rules' is seen as absolute. In **FIGURE 4.8** we can see that Kohlberg labelled this stage '**preconventional morality**' in which children gradually move from heteronomous reasoning to a form of individualistic reasoning where they are still self-focused and reason in terms of what will benefit them.

preconventional morality
Morality is seen as a set of rules handed down by adults

Both Piaget and Kohlberg saw the capacity to appreciate the perspectives of others and act out of concern for others as a higher level of reasoning and characteristic of older children. Piaget labelled this second level of reasoning ability as 'autonomous morality', reflecting the ability to reason independently and hold one's own views on moral issues. Kohlberg labelled Level II of reasoning '**conventional morality**', which includes Stages 3 and 4, where older children and adolescents start to see themselves as conventional members of society and being a good person and helping those close to them, 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.

conventional morality
Being a good member of society and helping those close to you is a priority

Kohlberg's theory develops further levels and stages beyond Piaget's two stage theory, and considers the highest stage of moral reasoning to occur at Level III where the person, typically an adult, is capable of '**postconventional morality**'. This includes Stages 5 and 6, whereby the person can reason about what is best for the wider society and on ways of promoting justice. While at the lower Level II a person may be more concerned about maintaining social harmony, avoiding social conflict and the smooth functioning of society, at Level III of moral reasoning 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 is possible to suggest a range of responses to the Heinz dilemma (see **RESEARCH LINKS 4.2**); including, that it is right to steal the drug because the right to life is a value above all else, it is wrong to steal the drug because others may need it too, or stealing the drug prevents everyone from benefiting from the drug. However, due to difficulties with scoring responses at this stage, Kohlberg eventually labelled it a 'theoretical' stage and collapsed Stages 5 and 6 in his later analyses (Colby et al., 1987).

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

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 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 one's convictions; being courageous and persisting despite obstacles (Bebeau et al., 1999; Rest, 1986).

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 et al., 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.

GO FURTHER
Appendix 4.3
Defining Issues Test

Strengths and limitations of the stage approach to moral development

Piaget's and Kohlberg's work provided us with a deeper understanding of how moral reasoning progresses through cognitive stages. 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, these stage-based theories have several limitations. Read more about the Defining Issues Test on the online materials, in appendix 4.3.

Problems with stages

We have learnt 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 (e.g. Rest, 1986). Recent analysis has also shown that the order and sequence of Kohlberg's stages are reflected in participant responses to scenarios today (van den Enden et al., 2018). However, the stages are not self-contained; children or adults may be predominantly in one stage, but may reason at a different stage depending on the situation. There is some evidence that people may change their moral values and reason at a lower stage of morality out of self-interest or when the personal stakes are higher (DeScioli et al., 2014). Self-interest can include such things as the opportunity for financial gain. This has been labelled the 'self-interest bias' and can also alter our moral judgements about the actions of others (Bocian & Wojciszke, 2014). For example, if we hold a self-serving bias we may justify poor behaviours in ourself and others if these behaviours suit our interests. Earlier research has also shown that 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 why even mature adults may not own up to damaging someone else's property, such as in a minor carpark accident that causes a scratch on another car? Could their fear of punishment or monetary cost (e.g. DeScioli et al., 2014), affect their level of moral reasoning?

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; Wu & Liu, 2014). However, as detailed above in the case of financial self-interest, 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 the 'car park dilemma' – if you scratched or dented someone's car, would you leave a note owning up to the damage? 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.

Gender and age considerations

Did you know that Kohlberg's initial research, on which he based his stages of moral reasoning, was conducted exclusively with males aged 10 to 16 years of age? These males also came from middle- and lower-class families in Chicago. Moreover, Kohlberg's moral dilemmas are predominantly male-oriented, such as Heinz's dilemma (see **RESEARCH LINKS 4.2**). 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, and a recent study shows that women may reason differently to men only if the moral dilemma is very personal with strong emotional significance to them. The same study shows no differences between men and women in reasoning about dilemmas of less personal and emotional significance (Capraro & Sippel, 2017). Increasingly, the role of emotion in shaping our moral decisions is being recognised and this will be discussed more below (Garrigan et al., 2018).

At what age do children begin to reason about moral issues? The age at when moral reasoning begins and when it changes and develops has been addressed by researchers interested in the early development of moral and ethical thinking. While Kohlberg and Piaget assumed that moral reasoning became evident in late childhood, research has indicated that children as young as two to three years of age demonstrate moral reasoning and behaviours (Turiel, 2018). This is often assessed in the ability of children to choose prosocial and positive behaviours over aggressive behaviours or the ability to know that an act of aggression is wrong. For example, Swit and colleagues (2016) have noted that children between the ages of three and five years develop in their understanding and reasoning about acts of aggression, expressing an increasing sense of 'wrongness' about aggressive behaviours and choosing more prosocial behaviours in this early period of life.

Cultural considerations

Another problem associated with stage-based theories 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 (e.g. Power et al., 1989; Snarey, 1985), many of whom were Kohlberg's contemporaries.

Despite this evidence, past research criticised Kohlberg for failing to take account of the importance of cultural differences, social conventions and contexts on the development of moral reasoning (Miller & Bersoff, 1992). The concern with any generalisation about moral reasoning in any culture is that these cultures are far from homogeneous, and there is likely to be variation in moral reasoning and moral behaviours *within* these cultures as well as between cultures.

Recent research has considered in greater depth the elements of cultural differences in the way people reason and develop morally. This research shows that although there are cultural

variations in moral reasoning, these variations also reflect the situational and personal factors we have noted above as influences on moral reasoning and behaviour. More specifically, there is evidence that people internalise the values of their social context and also resist and react against these values in some cases (Turiel, 2012).

Despite these limitations, stage-based theories have inspired ongoing research and debate in the field of moral development. The continuation of 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 (i.e. as being always the case), or as qualified principles (i.e. as being sometimes the case)?

Further perspectives on moral development

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, Eisenberg's theory of prosocial moral reasoning, and Bandura's theory of moral agency and disengagement, which we will not discuss.

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 (1982) suggested an alternative three-stage theory whereby individuals moved from a *self-oriented* stage similar to Kohlberg's preconventional reasoning stage; this was followed by an *other-oriented* stage whereby self-sacrifice to the needs of others emerges and goodness is equated with showing caring for others. In this stage satisfying one's own needs start to become less of a concern. Finally, as in Kohlberg's highest stages, the person reaches a *universal obligation* stage, being concern with care for all and a rejection of all forms of violence and exploitation of others. Gilligan views the self and care for others as deeply intertwined.

Gilligan's views have been challenged (Crain, 2000; Walker, 1984; see also Evans et al., 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 et al., 1996), another approach is to realise that both the justice and the care-and-compassion orientations may exist in females and males; for example, a recent study by Maftei and Holman (2020) asked seven- to nine- year-olds to give examples of moral and immoral behaviours in their own words.

The researchers found that girls were significantly more likely to give examples of behaviours reflecting the care for others orientation while there was no difference between boys and girls in their use of justice-oriented examples of behaviours. 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 et al., 1987).

Eisenberg's theory of prosocial moral reasoning

Prosocial moral reasoning is concerned with reasoning about moral dilemmas in which our thinking is in conflict with another person's needs, in situations where laws or rules do not apply (Eisenberg et al., 2014). Examples of situations where prosocial reasoning occurs are in acts of deciding whether to help another person, showing empathy and concern, or resolving conflicts. Like Piaget and 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, Eisenberg's model shows children moving from 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 et al., 2011). 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 et al., 2010).

Longitudinal research by Eisenberg and colleagues (2014) also provides some support for Gilligan's thoughts about the care-and-concern orientation of girls and women. They found some gender differences in prosocial moral reasoning, leading them to conclude that women tended to use more sophisticated prosocial reasoning than men during the course of the study. 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, Albert 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 or self-sanction their behaviour through feelings of guilt or acknowledging that their behaviour is wrong. However, Bandura is particularly interested in why people choose to *ignore* known moral standards and engage in moral behaviours that do not 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 deactivate their own self-sanctions and disengage their personal moral 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.

moral agency
Individual capacity for self-regulation of the link between moral reasoning and subsequent behaviours

moral disengagement
Selective disengagement from one's own moral standards and self-sanctions

FIGURE 4.9 Moral disengagement has recently been used to examine human behaviours such as bullying and aggression

Shutterstock.com/Daisy Daisy

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 et al., 2010), organisational unethical behaviour or corruption (Moore et al., 2012) and cyberbullying (Bussey et al., 2014) (**FIGURE 4.9**). Moral disengagement is emerging as a novel way to view the disjuncture between moral reasoning and moral behaviour.

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 about 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.

In the past decade, Australia has strongly promoted values education at a curriculum level. For example, in 2010 the state of New South Wales introduced a secular ethics curriculum for students, 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.

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. Philosopher Nel Noddings (2010) has implored educators to return to an overall ethic of caring in schools and believes caring and the development of a sense of ethics are closely linked. She suggests that adults (e.g. teachers) have a special responsibility because when a child experiences a positive relationship with a caring adult this has a very powerful effect; however, the unconscious effect of an uncaring adult may be enormous. Through these caring relationships Noddings suggests that teachers can engage in *dialogue* with young people about weighty ethical issues, and can engage in *practice* and modelling where they model an ethics of care

and give children the opportunity to practise the skills of empathy and sympathy. Similarly, through *confirmation*, teachers can confirm when children have acted in ways that demonstrate the ethics of care; they can also engage in a dialogue and confirm when children have engaged in acts that might be harmful to others. Here we also encourage you to look at the strong evidence of the importance of positive and caring teacher–student relationships in **CHAPTER 14**. Some strategies to guide your practice are outlined in **IMPLICATIONS FOR EDUCATORS 4.2**.

IMPLICATIONS FOR EDUCATORS 4.2

Moral development and values

The theories and philosophies we have discussed so far suggest several approaches we might take in the classroom to foster moral development and values:

- Morals, values and ethics arise from the social and cultural context. This means teachers have a special responsibility to establish a climate that supports moral development.
- There may be variation in reasoning and cognitive skills of children so teachers must ensure that all children have the opportunity to learn and consider the ethical aspects of their behaviours, such as infringing the rights of others.
- Child and adult moral reasoning may be challenged by situations that test their self-interest or involve some sort of personal cost.
- Engage children in dialogue and support children to practise and explore these moral and ethical ideas through dilemmas or real-life situations where these morals and ethics have been tested.
- Every subject – even disciplines such as mathematics – can find examples of situations or contexts where moral or ethical concerns have been raised. These offer opportunities for helping students develop their skill in moral reasoning.

Emotional development

You may have noticed that each of the topics we have discussed so far contains some references to the emotional states or consequences that people experience 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 (Pekrun & Stephens, 2012). 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. Emotional development plays a central role in our capacity to express and control our emotions and understand emotions in others.

emotion
A mental or physiological state associated with thoughts, feelings and behaviours

Perspectives of emotional development

Recent theories of emotional development can be organised around functionalist and social constructivist perspectives. The **functionalist perspective** maintains that emotions are a central force that directs, shapes and organises our behaviour. This perspective includes the study of emotion in relation to the functional use of emotions in everyday life and how these emotions help us survive as a species and function socially (Fischer & Manstead, 2018). In taking a functional perspective we might ask the question 'but what is it for?' in relation to any number of emotional states, such as moods or feelings (Lench et al., 2013). So, let us next explore what function these types of emotions serve.

functionalist perspective
An approach that views emotions as shaping and organising thoughts and behaviours

If we consider an everyday emotional feeling that many of us may have experienced, such as boredom, you might ask what function can boredom possibly serve? Functionalist perspectives suggest even boredom has a function – it can lead us to redirect our goals and sometimes pursue new goals (Bench & Lench, 2013). Similarly, 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**).

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

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 et al., 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 4.3** outlines the key skills of emotional competence described by Saarni.

TABLE 4.3 Skills of emotional competence

Skill	Understanding required
1 Awareness of one's 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; capable of achieving a balance in our emotional state

Adapted from Saarni, 2000, pp. 77–78.

Development of emotional competence

basic emotions
The emotions that babies are born with, such as happiness, sadness, anger and fear

It is widely accepted that humans are born with a biological capacity for expressing and experiencing a range of **basic emotions** (Feldman Barrett et al., 2016), and that emotions are also shaped by interaction with the social environment, including cultural and social factors (Fischer & Manstead, 2018). An infant expresses joy when being fed or even anger and displeasure when hungry or tired. It is believed that these basic displays of emotion may be universal or common in youngsters all over the world.

Emotions do not develop in isolation but are critically linked to the social environment of the infant and young person. For example, by three months of age, infants and their mothers have developed a complex array of signals to convey and respond to emotion (see **FIGURE 4.10**), including the ability to convey 'stranger danger' and fear, along with warmth and security

(Boccia & Campos, 1989). These forms of display and recognition of emotion may not be so universal; rather they may be influenced by contextual or cultural factors, such as parenting or temperament of the child (see Crivelli et al., 2016; Kayyal et al., 2015).

FIGURE 4.10 Infants are capable of displaying a range of facial expressions. Can you identify these emotions?

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Awareness of our emotional state

This ability to express and understand basic emotions so early in life supports the development of the first of Saarni's (1999) emotional competencies – *awareness of one's emotional state*. After the development of basic emotions, the young child develops awareness of more complex emotional states known as **self-conscious emotions** (Feldman Barrett et al., 2016; Saarni et al., 1998). These emotions first appear between 18 and 24 months, when babies are capable of experiencing pride, shame and embarrassment. Later children are able to experience emotions of envy and guilt (Feldman Barrett et al., 2016). A child might hang their head or avert their gaze when they feel guilty and these are all signs of self-awareness of their emotional state.

self-conscious emotions
Emotions (e.g. pride and shame) that require advanced understanding of the self

By the school years, self-conscious emotions like embarrassment and shame are linked with academic learning and achievement outcomes; for example, students may experience shame and embarrassment associated with failing a math test (Bidjerano, 2010). For some students, these emotions might provide drive and motivation; for others, these emotions may be difficult to manage and lead to self-incrimination and loss of motivation (see **CHAPTER 8**).

Research indicates that personal and cultural factors seem to explain the experience of these negative self-conscious emotions. Researchers compared the emotions of two groups of Bulgarian and US Year 4 students after failing a math test. Students who had a tendency toward a negative

emotional state (a personality trait) experienced stronger negative self-conscious emotions. Parental feedback also influenced their experience of self-conscious emotions and this effect was even stronger for the Bulgarian students who experienced more intense negative emotions (Bidjerano, 2010). This research illustrates the interaction of personal and cultural factors in shaping the emotions we experience in everyday life.

Understanding the emotions of others

Being aware of our own emotional state is necessary to be able to understand or *discern the emotions of others.* Young children often take cues from the facial expressions of parents or caregivers to interpret situations. Relying on the emotional signals and cues of others in this way is called **social referencing**. The ability to understand more complex emotions progresses more slowly. Children gradually use the correct labels for happy, angry and sad expressions but are less likely to label surprise, scared or disgust accurately (Widen, 2013). It seems the positive facial expressions are easiest to interpret whereas negative facial expressions, such as anger and sadness, are harder for young children to differentiate. Expressions like disgust and shock are known as more ambiguous expressions and are more difficult to understand. Children aged four to nine years are likely to label a face showing 'disgust' as 'angry' in comparison to adults who were able to identify and label the disgust facial expression (Widen & Russell, 2010).

social referencing
Taking cues from another person's emotional reaction to interpret a situation

The ability to recognise and discern the emotions of others is closely linked to behavioural and social competence (Trentacosta & Fine, 2010). Children with higher levels of accurate emotion recognition are more likely to experience peer acceptance and have higher friendship quality (Wang et al., 2019). In contrast, young children in Years 1 to 3 who had difficulty recognising emotions were more likely to exhibit behavioural problems in the classroom (Castro et al., 2018).

Vocabulary of emotion

These early forms of understanding emotions are linked to the development of a *vocabulary of emotion*. Children gradually learn the labels or names of various emotional expressions and can label and describe their own emotional state. Between the ages of four and 11 years, understanding of terms related to emotion seems to double every two years but levels off between 12 and 16 years of age (Baron-Cohen et al., 2010). The development of this comprehension means we can accurately describe and understand our own emotional states and also describe and understand the states of others. As we saw in the accounts of young people at the beginning of this chapter, Caleb's ability to understand and label his own state of anxiety could be very helpful in seeking help and support from others in order to manage his emotional state.

Capacity for empathy and sympathy

emotional empathy
Affective feelings in response to another person' s emotions

cognitive empathy
Ability to correctly identify and understand another person's emotions

theory of mind (ToM)
Ability to attribute mental states to the self and other people

perspective taking
The ability to imagine the self in another's position and to understand others' feelings

Our capacity to be empathic and sympathetic is also linked to these early developments. 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 et al., 1998; Zahn-Waxler & Radke-Yarrow, 1990). It is recognised that empathy typically occurs in two forms: *emotional empathy* and *cognitive empathy* (McDonald & Messinger, 2011). **Emotional empathy** is displayed very early in life when infants show signs of distress when responding to signs of parent or peer distress (Davidov et al., 2013; Liddle et al., 2015). **Cognitive empathy**, on the other hand may emerge a little later and is reflected in the development of children's **theory of mind (ToM)** and capacity for **perspective taking**.

Theory of mind refers to the early stages of perspective taking when a young child first recognises that other people experience their own internal mental states. This includes the ability to understand that the other person may have their own thought processes, memories and emotions. For example, a child's understanding that two people can have different desires or interests in the same object or that a person can feel an emotion but display another type of emotion (Wellman & Lui, 2004). This understanding has been assessed with tests that reveal gradual acquisition of more complex perspective-taking beliefs (see **RESEARCH LINKS 4.3**).

The core task of perspective taking across the lifespan is the ability to coordinate multiple points of view, but also a *willingness* to engage with another person's point of view (Selman & Shultz, 1990). These perspective-taking skills are related to our capacity for empathy and **prosocial behaviour** – a tendency to think about the wellbeing and rights of others and to voluntarily behave in ways that benefit others (Eisenberg et al., 2010).

prosocial behaviour Positive social behaviours, such as helpfulness, intended to benefit others

Empathy develops progressively through childhood with somewhat predictable age and gender-related findings. Children gradually increase their capacity for empathic concern for others, while there are some reported gender differences indicating that girls may show higher levels of empathic concern compared to boys (Van der Graaff et al., 2014). Learn more about Selman's five-stage model and perspective taking ability in the online materials, in appendix 4.4.

GO FURTHER
Appendix 4.4 Selman's five-stage model and perspective-taking ability

RESEARCH LINKS 4.3

Assessing theory of mind

One way to assess ToM is known as the false beliefs task. In this task the child must be able to distinguish their own knowledge of what is inside a Band-Aid box from the knowledge of another peer who does not know what is inside the Band-Aid box (see **FIGURE 4.11**). Researchers assessed this ToM concept in two- to six-year-olds with the following method:

1 The child is presented with a Band-Aid box with a plastic toy pig inside it. The researcher says, 'Here's a Band-Aid box. What do you think is inside the Band-Aid box?'
2 The Band-Aid box is then opened: The researcher says, 'Let's see ... it's really a pig inside!'
3 The Band-Aid box is closed: The researcher says 'OK, what is in the Band-Aid box?'
4 The researcher then produces a toy figure of a boy and says, 'Peter has never ever seen inside this Band-Aid box. Now here comes Peter. So, what does Peter think is in the box? Band-Aids or a pig?' [This is the target question.] To be correct the child with a developed ToM would correctly answer the target question with 'Band-Aids'. The child with a less developed ToM might say, 'A pig'.
5 The researcher then asks, 'Did Peter see inside this box?' [This is a memory question.] To answer the memory question correctly the child must say 'No'.

The researchers found that this false beliefs task was reasonably difficult for the young children in the study, who often answered the questions incorrectly. The accuracy of answers increased with the age of the participants. You might like to try this task with a young child you know.

Adapted from Wellman & Lui, 2004.

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FIGURE 4.11 Examples of items that may be used in this false belief task

FIGURE 4.12 Children gradually learn emotional displays rules

Alamy Stock Photo/Ihor Bulyhin

You may have noticed that one of the ToM understandings was the knowledge that a person can feel an emotion but display another type of emotion. Saarni (2000) refers to this as the understanding that inner emotional feelings need not match outer displays of emotion. Do you remember as a child learning to hide your feeling of disappointment if you received a birthday present that you did not like? Or the first time you tried to keep a 'cool' facial expression while your teacher was telling you off for misbehaving (**FIGURE 4.12**)? These are all forms of recognising that we can hide or mask our own emotions. This understanding is referred to as our understanding of *emotional display rules* – the idea that it is socially and culturally appropriate or inappropriate to display (or hide/mask) emotions in particular circumstances.

This emotional skill tends to reflect communicative goals and motivations of the individual in particular circumstances, such as the examples just discussed. Children as young as three years of age do appear to recognise that it is possible for a person to have an expression on their face but also another feeling inside (Banerjee, 1997). Between the ages of four and seven children are clearly able to reconcile the fact people could hold two different emotions or may be expressing an emotion they may not feel. Increasingly, young people recognise that emotional display rules can shape and apply to everyday situations and can match emotional displays to the perceived emotional state of the receiving person (Wu & Schulz, 2020). Between seven and 10 years of age the child can understand that telling a 'white lie' is sometimes appropriate for politeness or social harmony and can reconcile the social–moral motivation for telling a little white lie sometimes (Xu et al., 2010).

Awareness that relationships are partly defined by immediate and honest emotional expressions

Despite the fact that we do learn to hide emotions and tell 'little white lies', honesty and truth about how we are feeling is often expected in our close relationships with others. As we will see in the next section, friendship is often based on an expectation that close friends will engage in honesty by sharing and disclosing personal thoughts and feelings with one another. These disclosures can buffer or protect the person from the harmful feelings arising from negative experiences (Smith & Medvin, 2016). Such emotional disclosure is seen as a protective factor or a coping mechanism and is associated with the development of reciprocal friendship in adolescence. In contrast, research has shown that adolescents who do not engage in this form of adaptive coping experienced fewer reciprocated friendships (von Salisch, 2018).

Paradoxically, the tendency to disclose negative emotional states in online social media posts has been associated with mental health concerns, such as depressive symptoms (Michikyan, 2019). The phenomena culturally and derogatorily described as 'sadfishing', an accusation that a person has sought sympathy through posting about negative experiences in social media, has been associated with negative repercussions for young people. A survey of 50000 11- to 16-year-old students in UK schools found that even genuine seeking of emotional support online can lead to accusations of 'sadfishing', harsh comments and loss of self-esteem for the young person (Head Masters and Mistresses Conference, 2019).

As such, these contradictory reports of benefits and harms arising from emotional self-disclosure seem to indicate the social context of emotional expression and disclosure is very relevant. The research evidence in support of emotional honesty and disclosures in the context of very close relationships is generally positive; these disclosures develop intimacy and strengthen bonds in friendship. In contrast, the receivers of such emotional disclosures in social media sites may not be close friends. Further it must be considered that social media disclosures may be helpful in identifying people who have mental health concerns or need emotional support; people can also seek treatment through online services for emotional and mental health support.

Self-regulation and coping with unpleasant emotions

The ability to disclose or seek support is related to our capacity for **emotional self-regulation**. This is defined as our ability to control and influence the *type* of emotion we feel and the *intensity* and *duration* of these emotional experiences. This may depend on how we cognitively appraise the emotional experience or whether we choose to suppress the expression of negative emotional feelings (Gross & Thompson, 2007).

emotional self-regulation
Awareness of and ability to control or alter our emotional state as necessary

Emotional regulation is particularly associated with our management of strong emotional feelings and the subsequent behaviours those feelings may elicit; for example, we all may experience the feeling of anger from time to time. However, we learn in childhood to control or self-regulate the emotional intensity we may be feeling; subsequently, we learn to modify or regulate our 'angry' behaviour. This competence prevents the outbursts and strong responses typically seen in young angry children (and sometimes adults) who have not mastered these emotion regulation skills. See more about self-regulation in **CHAPTER 3**.

In addition to public speaking tasks, school poses many challenges to children's abilities to regulate and control their emotions, 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 and ultimately our resilience in the face of adversity and challenges (Masten, 2010).

Emotional self-efficacy

The final competency listed by Saarni (2000) refers to emotional self-efficacy. Like the general concept of self-efficacy we discussed earlier in this chapter, emotional self-efficacy is multifaceted. It reflects our 'can do' belief that we can understand our emotional states, that we can cope with these emotional states, and we can interact effectively with others by using our emotional understanding and expressions effectively. Caleb, who we were introduced to at the beginning of this chapter, was still learning how to cope with and regulate his anxiety. We saw, however, his teachers implemented an intervention to address his public speaking anxiety by improving his public speaking self-efficacy (see **CLASSROOM LINKS 4.1**). You may now understand that this intervention also addressed Caleb's emotional self-efficacy as he said 'I can do this. I've got this!', demonstrating his 'can do' sense of managing the butterflies in his stomach.

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?

4.3 Understanding relations with others

social development
The development of skills and understanding necessary for forming relationships and participating in the social context

The developing sense of self, and awareness of the thoughts and feelings of others, unfolds in parallel with our understanding of human relationships. 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 diverse. Rather, a number of theorists and researchers have developed a broad range of ideas and knowledge about how we develop in the social world.

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 interpersonal effectiveness. 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 (Ashton, 2018; Rose-Krasnor, 1997).

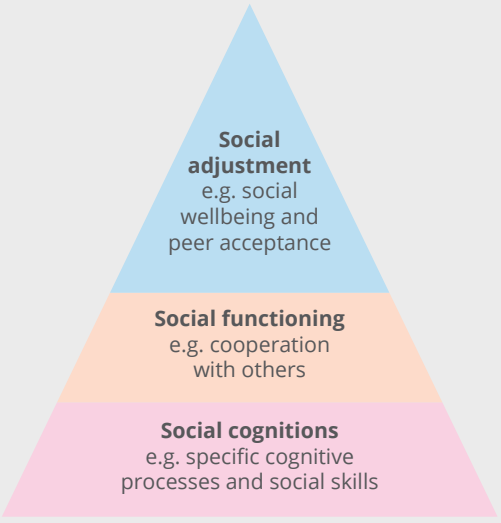

FIGURE 4.13 Hierarchical view of social competence

Adapted from Ashton, 2018.

One approach to explaining social competence is to use a hierarchical model to show different levels of competence and skills that make up this multifaceted concept (see **FIGURE 4.13**). Ashton (2018) created this model of social competence to support the assessment of an individual child or adolescent for whom there may be concern. The model starts at the apex with consideration of the young person's social adjustment and wellbeing. This is often assessed via their peer acceptance in the group, but there are also other measures of adjustment and functioning that a psychologist might use. If a social adjustment concern for a child is raised, we can then turn to look at the child's social functioning. This could include functioning in the peer group, such as their cooperative behaviours, communication (e.g. expressing their needs in the peer group), or their ability to regulate their behaviour and emotions. If the social function level of the model suggests a concern, we must then turn to finer-grained analysis of the child's social cognitive skills. This refers to their executive functions and information-processing skills (see **CHAPTER 3**). These cognitive abilities support the enactment of a wide range of social skills and social behaviours; hence they are referred to as *social cognition*. Models of social competence such as this help us understand the complex nature of social competence, and also support comprehensive assessment of a child or young person who may need support.

Social skills

Social skills are the highly specific behaviours that are also the most observable behavioural features of social competence (Schneider, 2016). These social skills arise from the social cognitions at the base of the model shown in **FIGURE 4.13**. Social skills are any social task or

behaviour that help us perform competently in a social situation. This can include skills such as greeting another person, standing up for oneself or coping with teasing (Asher & McDonald, 2009). 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). The Collaborative for Academic, Social and Emotional Learning (CASEL) has gathered together these various ideas of social competencies and skills and classified them into five broad areas relevant to social and emotional learning (SEL) in school contexts (see **FIGURE 4.14**).

The development of these 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, *self-management* (or self-regulation) might include the skill of following basic rules in the classroom, while in high school this might include controlling one's emotions and coping with teasing. *Social awareness* includes the moral and empathic awareness of the young person, such as their ability to engage in prosocial behaviours or consider the thoughts and feelings of others.

FIGURE 4.14 CASEL domains of social and emotional learning in school contexts

Adapted from Source: ©2020 CASEL. All Rights Reserved. https://casel.org/sel-framework

THINK ABOUT

Choose another competence area of the CASEL social and emotional learning diagram. Can you think of the specific social and emotional skills needed in this area of competence? Compare your answers with a peer or colleague and see if your ideas are similar or vary. There is a chance that you may think of different skills for younger or older students or skills for different school contexts.

Social and emotional learning programs

Social and emotional learning (SEL) programs aim to develop social and emotional competence. The state of Victoria in Australia has a comprehensive SEL program aimed at building the resilience and capacity of children and adolescents to engage in respectful relationships (Victorian Department of Education and Early Childhood Development, 2018). The learning modules include themes such as emotional literacy, understanding the self, positive coping skills, problem-solving skills and self-management skills, which are all related to social skills and emotional competence.

It is important to note that the most effective SEL interventions for groups of students are likely to be those that are delivered in classroom contexts, by classroom teachers, such as the Victorian SEL curriculum (Durlak et al., 2011). Longitudinal follow-up studies show these programs have remarkable social and economic benefits later in life (Belfield et al., 2015). Children followed from Kindergarten to age 25 had higher levels of education, higher chance of full-time employment and reduced criminality (Jones et al., 2015). Teachers are also very important role models of social and emotional behaviours in the classroom. Teachers and adults can model appropriate social behaviours, explicitly discuss appropriate social behaviours in different contexts and intervene to address social behaviours of concern.

Play and development

Play is one of the earliest contexts in which children have the opportunity to practise and develop their social and emotional skills. For young children, play is a context in which to explore their

world with freedom, express a sense of their self, and is often fondly remembered as a time of fun. However, Lifter et al. (2011) have argued for a view of play that acknowledges it as an intentional state for children where they are aware and know what they doing. This play can be spontaneous, naturally occurring and involve objects that hold the attention and interest of children. Play may or may not involve other children, does not require adults to be present and may or may not include emotional display or pretence. According to this view, play serves an important interpretive function in which children learn about their world and extend their cognitive development.

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. In these stages children were said to be able to engage only in 'solitary' individual play activities at a young age before being capable of 'parallel' play alongside other peers, and finally being able to engage in 'cooperative' play at older ages. Like all stage-based theories, this rigid view of play has been contested by researchers who have concluded that children are not bound to a strict developmental sequence in which one form of play replaces the other (Howes & Matheson, 1992). Young children may be able to engage in cooperative play at younger ages than previously thought (Hughes, 2010). If you engage in observation of children and young people at play, it is clear they choose to engage in multiple forms of play, including solitary activities that can occur with more cooperative play as they grow older, as outlined in **TABLE 4.4**.

TABLE 4.4 Types of play

Types of play	Examples
Solitary play: children play alone	Playing with blocks, cars, dolls, water and sand, puzzles, computer and video games for one person. Children may not 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 may show more interest in the child playing beside them but may not engage with the other child
Cooperative play: children play in pairs or groups	Playing soccer, hide and seek, building a tree house. Children take roles and recognise the advantages of playing with peers
Pretend, imaginary and 'sociodramatic' play	Children play with imaginary objects or people; may assume roles such as 'mummies', 'daddies', 'teachers' and 'students' or may dress up and assume fantasy roles and identities
Solitary pretend play: imaginary play alone	Feeding dolls or teddy bears; pushing toy trains around a track while saying 'chuff'

Over the years, researchers have used many terms to describe different types of play, including indiscriminate forms of early play where the child grabs, holds and mouths indiscriminate objects. Have you ever seen an infant grab mum or dad's sunglasses, keys or even their hair and place it in their mouth? This is known as 'mouthing' and one of the reasons we must keep small objects like Lego blocks, coins and small batteries away from infants and young children.

Play becomes more relational as children learn objects can be stacked, fitted together and linked to one another. These manipulative forms of play lead to symbolic forms of play where children engage in pretence and make believe and enjoy dressing up in costumes, grown-up clothes and even using small tools, just like mum and dad's big tools (see Lifter et al., 2011). These early activities support the development of sophisticated forms of social play, such as 'rough-and-tumble play', which includes young children wrestling, chasing and mock fighting; and formal games, which are often games and sports with designated rules and can include skipping games, handball and even online games.

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' (Australian Department of Education, Employment and Workplace Relations, 2012). Similarly in New Zealand the Te Whāriki: Early Childhood Curriculum (New Zealand Ministry of Education, 2017) acknowledges the role of play in early childhood development and encourages use of a play-based curriculum.

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. As we learnt in **CHAPTER 2**, the critical periods of brain development in infancy and early childhood are 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).

Sophisticated play and developing social skills

As children develop through the school years, and their cognitive and motor skills develop (see **CHAPTERS 2** and **3**), their play becomes increasingly group based and cooperative. Waiting one's turn in a game as well as everyday games that children play, such as 'Simon says ...', 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 (see **FIGURE 4.15**).

FIGURE 4.15 Card games, such as Snap, Memory or other matching games, assist in the development of cognitive and social skills

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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, supporting positive mental health and lowered levels of stress (Jewett et al., 2014). 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 that games and physical behaviours are mutual and enjoyed by all 'players', as indicated by reciprocated gestures and smiles.

Developing relationships with peers

Memories of play will no doubt feature strongly in your memories of peers and friends. Do you remember your best friends at school? What about the peer group at school? Why were some children rejected and disliked? Why were some bullies and more aggressive than others? The stories of Lia and Caleb clearly indicate that relationships with peers are very important in the lives of young people. This section will explain why peer relationships are a critical part of our lives from early childhood.

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 et al., 1998). **TABLE 4.5** 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 4.5 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 • Involves stronger ties and emotions than an interaction • Shared cultural and behavioural expectations
Group	• Groups tend to be cohesive and united around common interests and activities • May be hierarchical with leaders and dominant members • Characterised by observable commonalities between members including behaviours, attitudes and strong group norms and expectations

Adapted from Rubin et al., 1998, pp. 633–644.

Peer acceptance

peer acceptance
The likeability and acceptance of a person by their peer group

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 (McDonald & Asher, 2018). 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.

sociometric assessment
The measurement of social networks and connections between people by assessing people's ratings of one another

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 **RESEARCH LINKS 4.4**). 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 some children are more or less accepted, and the outcomes of peer acceptance and rejection (see **TABLE 4.6**).

RESEARCH LINKS 4.4

Sociometric assessment

Sociometric assessments have been used and refined for a number of years in the fields of developmental psychology, anthropology and sociology (Cillessen & Bukowski, 2018). 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/highly likeable, '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 4.6**).

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 aggressive behaviour. Not all rejected children are aggressive, in the same manner it is known that not all 'popular' children always play nicely. Children who are classified as sociometrically 'popular' are highly liked by the peer group and hence their positive ratings in sociometric assessments. But there is another group of children known as *peer-perceived popular* children who are described by peers as the most popular children in the peer group, but are not always the same children who were rated as most likeable in sociometric assessments. Unlike the children who receive the highest liking ratings in sociometric assessments, these children may have high levels of aggressive and power driven or dominating behaviour (Prinstein et al., 2018). They use aggression and manipulation as a means to maintain social dominance or group standing (Cillessen & Rose, 2005). It is important to distinguish between the types of measurement and definitions of rejection and popularity when reading studies in this field.

Source: Adapted from Newcomb et al. 1993; Parker & Asher, 1987; Wentzel, 1991; Wentzel & Asher, 1995.

TABLE 4.6 Characteristics of sociometrically defined peer status groups

Status	Positive nominations	Negative nominations	Aggression	Prosocial skills	Academic skills
Popular/likeable	High	None or few	Low	High	Positive
Rejected					
– Aggressive	None or few	High	High*	Low	Poor*
– Withdrawn	None or few	High	Low	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.

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 ethical concerns do you think might arise from asking children to participate in this form of assessment?

As shown in **TABLE 4.6**, children in these peer status classifications 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. Currently, the evidence about this social classification is equivocal and poorly understood (Kulawiak et al., 2020). In contrast, children classified as 'rejected' experience many more adjustment difficulties.

Peer rejection

The reality of the peer ratings shows that children who are classified as 'rejected' receive no 'liking' ratings from their peers. While aggressive behaviours may explain the rejection of some of these students, there are others who are withdrawn from the peer group, which then exacerbates their vulnerability to peer hostilities and rejection (Rubin et al., 2013). However, other correlates of peer rejection mean that some children are simply disliked and rejected through 'no fault of their own' (Hymel et al., 1990). These non-behavioural reasons for peer rejection include:

- *physical appearance* – children hold different behavioural expectations of 'attractive' and 'unattractive' peers leading them to favour attractive peers over less attractive peers
- *obesity, illness and physical disability* – these conditions 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
- *reputational bias* – peers can hold long-term reputational biases and negative attitudes about other peers based on their prior behaviours or events. These strong cognitive beliefs can be very difficult to change and interventions with peers may be needed (see **CLASSROOM LINKS 4.2**).

Consequences of rejection

For several decades, researchers have been interested in the consequences and longer-term outcomes of peer rejection, or the experience of being ostracised and excluded from the group. These consequences include poor health, depression, aggressive behaviour and academic difficulties, including truancy (Hymel et al., 2011). One of the most serious of the psychological consequences is referred to as **loneliness**. Loneliness is a cognitive and affective mental state arising from a loss of 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 peer rejection report higher feelings of loneliness and these effects are still seen up to three years after the rejected status has been assessed (Prinstein et al., 2018). 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 who experience peer rejection are similarly at risk of suicidal ideation (Prinstein et al., 2018). 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. This reinforces the importance of classroom interventions, such as that detailed in **CLASSROOM LINKS 4.2**.

loneliness
A cognitive and affective state of feeling disconnected and lacking in supportive relationships

CLASSROOM LINKS 4.2

Reducing peer rejection in the classroom: the MOSAIC approach

Researchers Mikami and colleagues (2013) tested a theory about improving the peer acceptance of children with ADHD. Rather than simply using traditional social-skills training of the individual rejected child (a common intervention strategy), the researchers targeted the *whole* group of peers. Why? They argue that peers can hold biases about rejected students that mean no matter how much social skills training they receive, the peer will still be rejected by the group. Further, teacher behaviours, such as signs of anger or frustration directed toward a child, can give peers the impression that the child is devalued and therefore should be rejected.

The intervention

Students enrolled in a specially designed Summer School program were trained to engage in socially inclusive behaviours, known as the MOSAIC program – Making Socially Accepting Inclusive Classrooms:

- Teachers were encouraged to model positive relationships with the children, including providing public positive feedback and private behavioural corrections.
- Teachers were trained to design collaborative activities and assigned students to work in teams. They encouraged positive social inclusion behaviours and students lost points for exclusionary behaviours.
- Teachers gave daily awards recognising children's genuine strengths, regardless of how many behavioural points they had won or lost. They were asked to concentrate on ensuring children with ADHD also received these awards.

These strategies were designed to reduce the negative bias peers might hold about their peers with ADHD and improve their skills of socially inclusive behaviours.

Method

Participants were 24 students with ADHD and 113 peers and their teachers. The children were aged between seven and 10 years of age. One group of students with ADHD completed a social skills training intervention and another group completed the MOSAIC training along with their classroom peers. Students completed several measures before and after the intervention, these included a sociometric assessment of peer acceptance and nominations of friendships; the researchers also measured the teacher's use of inclusive practices and students' engagement in problem behaviours.

Findings

Teachers in the MOSAIC intervention group used more inclusive teaching strategies compared to the control group. Students with ADHD in the MOSAIC intervention received fewer negative peer nominations and more friendship nominations compared to students in the control group. Overall, children with ADHD received significantly more positive peer acceptance ratings compared to children in the control group. There were no differences between the groups for teacher reports of problem behaviours.

Conclusions

The researchers concluded that taking steps to improve teacher classroom inclusiveness can have an important 'ripple effect' on student behaviours and attitudes and may result in less rejection and greater peer inclusion of students with ADHD. This may have a long-lasting effect on the inclusion and attitudes towards peers with ADHD in future classrooms of these students.

Adapted from Mikami et al., 2013.

THINK ABOUT

- Why do you think the researchers addressed the teacher behaviours in this intervention?
- What was the importance of the collaborative, teamwork approach?
- What should teachers in these classrooms do to follow up or maintain these results?

Rejection and cognitive processes

There is evidence that many rejected 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 differences are apparent in the way in which these

social cognition
A cognitive capacity to think about and process social information

children process information about social events (Crick & Dodge, 1994). This means that children may make incorrect judgements about peers due to the way they interpret or process social information, such as facial expressions and emotional signals. They may have internal cognitive scripts or schemes that lead them to react with hostility. They may also believe that aggression is the only viable response and may also believe they are more likely to be effective if they use aggression (Rubin et al., 2013). For example, if these children are accidentally bumped in the lunch line at school they are much more likely to make an incorrect assumption that a peer deliberately bumped them. This assumption is known as a *hostile attribution bias*, in which hostile intent is assumed in an ambiguous situation. As a consequence, the aggressive rejected child typically responds with aggression, which in turn further alienates the child or makes peers react with aggression.

cyberball
A virtual ball-tossing game where virtual 'players' include or exclude the experimental participant from the game, thus simulating social inclusion or ostracism in social psychological experiments

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

However, we cannot be certain in all cases about the direction of relationships between rejection and cognitive biases. This means it is hard to work out what comes first – the cognitive biases or the rejection experience. For example, neurological research, such as the famous **cyberball** studies, indicates that the experience of rejection causes the brain to respond with a sensation of pain and feelings of discomfort similar to physical pain (Hartgerink et al., 2015). Further research has shown that by adolescence, young people playing this game show heightened neural responses to the rejection experiences if they had previously experienced rejection as a child (Will et al., 2016). This means they have developed rejection sensitivity, or greater awareness of rejection or sense of hostility directed toward them (Masten et al., 2010).

Fortunately, other research has shown that the experience of friendships in adolescence can reduce this feeling of rejection sensitivity when experienced later as an adult (Masten et al., 2010). These studies indicate that the experience of rejection can change or alter the social cognitive beliefs of the rejected person, but positive factors such as friendship can be protective. Clearly, inclusive classroom interventions that increase reciprocated friendship nominations could ultimately reduce rejection and be protective should future rejection occur.

FIGURE 4.16 A reciprocated friendship in children is indicated by physical and psychological closeness or intimacy

Alamy Stock Photo/Thomas Cockrem

Friendship

The most positive form of peer relationship experienced by children is friendship. **Friendship** is a **dyadic** relationship that exists between two people; it is a *reciprocal* relationship, meaning that the two people mutually agree that the relationship is unique and very special (Bagwell & Bukowski, 2018). Unlike sociometric forms of peer acceptance, friendship is not defined according to 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. This occurs when two children nominate each other as a best friend (see **FIGURE 4.16**). 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 young people (Bagwell & Bukowski, 2018; Bukowski et al., 2014) (see **TABLE 4.7**).

TABLE 4.7 The features and benefits of friendship

Feature	Benefit
Validation of the self	A powerful source of self-esteem, as friends regard each other with equal respect and provide the trust to share each other's thoughts and feelings
Protection from family risks factors	A powerful protector against stress and harsh family environments
Protection from victimisation	A powerful protector against victimisation and bullying in the peer group
Friendship as morality	Friends contribute to each other's moral development (in positive and negative ways) by challenging ideas and providing a context for positive or troublesome behaviours.

Friendship is regarded by developmental researchers as a unique developmental context that is also protective. This occurs because friendship has a level of *intimacy* that is not seen in other peer interactions. *Intimacy* is a term used to describe a particular form of physical and psychological closeness between people. In young children you can see this in close physical proximities, such as hugging, sitting in close groups; while in older children and adults, trust and self-disclosure become more salient where people feel safe to share secrets and personal aspects of themselves. Such disclosure enables social support to be provided and thus friendship makes a unique contribution to protecting children from stress and can buffer children from the stress hormone cortisol in the face of negative experiences (Adams et al., 2011).

Development of friendships

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. For example, several early researchers like Damon (1983), Selman (1981) and Bigelow and La Gaipa (1975) 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. Damon (1977, 1983) proposed and found evidence for three developmental 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 +).

Across these studies, descriptions of friends by young children are related to the tangible and practical qualities of the relationships (Level 1 friendship). Damon described this friendship as a 'handy playmate' and Selman as 'momentary friendships'. These relationships are governed

by the proximity and availability of friends, such as being nearby or in the same preschool class. While both researchers neglected to investigate the perceptions of friendship of very young children, this does not mean that friendships are less important to very young children or their parents (Yu et al., 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 were not achieved. By adolescence, Damon's stages show a more abstract notion of friendship, characterised by intimacy (e.g. the sharing of emotions) and loyalty.

Regardless of child age or gender, friendships are important. **IMPLICATIONS FOR EDUCATORS 4.3** provides some suggestions for developing awareness of peer interactions. 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.

IMPLICATIONS FOR EDUCATORS 4.3

Strategies for developing an awareness of peer interactions

- Be observant and aware of children or adolescents who have no friends or who are rejected by peers.
- Look for the reasons behind poor behaviour or inattention in class. 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.
- Seek help and advice if you become concerned about the psychological or emotional wellbeing of any student. Poor peer relationships are associated with wider mental health and adjustment problems, such as loneliness, depression and withdrawal.
- Look for opportunities to develop and practise social skills in everyday classroom and playground activities. 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
Repeated verbal and/or non-verbal aggression by individuals or groups and directed towards particular victims who find it difficult to defend themselves

aggression
A behaviour intended to harm another person who is motivated to avoid that behaviour

Bullying and harassment

If friendship represents the most positive form of peer relationship in childhood, then **bullying** represents the most negative. Bullying is a specific type of **aggression** that is characterised by repeated or systematic acts of aggression with a power imbalance between the aggressor/s and the victim (Salmivalli & Peets, 2018). Here it is important to understand the definition of aggression in social psychology as any *behaviour* that is *an intentional act of harm* toward another person who is *motivated to avoid the act of harm* (Allen & Anderson, 2017). The abuse of power can be said to reflect the perpetrators' willingness and capacity to hurt or punish another person and this can include the differential we see between individuals

in their psychological or physical capacities or peer status in a group (Salmivalli & Peets, 2018). The repetition of the behaviour over time, or repeated episodes, distinguishes bullying from other one-off or singular acts of aggression. This is a distinctive feature of the definition of bullying and is also a debated and shifting feature of bullying. For example, in online bullying the act of aggression may begin with a singular act of aggression, such as posting an insulting message or picture, but then may be viewed, tagged, 'liked' and reposted by hundreds. As such, the 'bully' in this case is indistinct and may not be known, the motivation or intent of the original poster of the picture may or may not be known. As such repetition *and* the intensity of the aggression may need to be taken into account in such cases (Salmivalli & Peets, 2018). To summarise, bullying is most frequently defined as: (1) the intent to harm, (2) behaviour that is repeated over time, and (3) a power differential between the aggressor and the targeted person.

Bullying 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. The ethos of the school culture may contribute to bullying in some schools. **CHAPTER 14** discusses this further and also provides an extended discussion of how to manage and respond to bullying and harassment in schools.

The prevalence of bullying

The prevalence of bullying in Australia has remained relatively stable for a number of years. The Australian Covert Bullying Prevalence Study (Cross et al., 2009), the largest study on bullying in Australia found that one in four children aged eight to 14 years reported bullying in the previous month. Similarly, the Mission Australia 2019 Youth Survey (Carlisle et al., 2019) of 15- to 19-year-olds found one in five reported bullying in the past year. And finally, the Longitudinal Study of Australian Children (LSAC) Statistical report 2017 (Gray et al., 2017) found that one in five of the 14- to 15-year-olds of sampled had experienced bullying in the last month. In New Zealand, the statistical data is less commonly reported in such large-scale surveys, but the 2015 report of the PISA data indicates a rate similar to Australia of one in four students bullied on a regular basis. Both Australia and New Zealand have been shocked by these PISA findings that indicate students in both countries report higher rates of bullying than other countries in the report (Organisation for Economic Cooperation and Development, 2015).

Types of bullying

The types of behaviours classified as bullying are diverse and include direct and indirect or overt and covert forms of aggression, such as verbal abuse, emotional and psychological abuse (e.g. implied threats, blackmail or anonymous messages), relational aggression (e.g. deliberate social exclusion, spreading rumours or asking other students to hurt the person), physical assaults, and online bullying (i.e. cyberbullying). In Australia and New Zealand the most common form of bullying is verbal bullying, with Australian children reporting that hurtful teasing and lies about the person were the most frequent form of bullying experienced. A relatively high number of children report being bullied in covert ways (16%), such as spreading rumours, blackmail, threats or any behaviours teachers cannot see (Cross et al., 2009).

You may be surprised to learn that direct verbal aggression is the most common experience of bullying. Widespread media and social reports of online bullying or 'cyberbullying' seem to suggest this is the most common form of bullying. None of the large-scale studies reported above confirm that this is the case. The recent Mission Australia survey of older youth found that 80 per cent of bullying was experienced at school and only 34 per cent experienced bullying

online (Carlisle et al., 2019). Estimates of online bullying vary dramatically and might depend on the question we ask in surveys and the way we interpret reports. Note there is a difference between the overall reported *prevalence* of bullying *type*s and these reports of the *site or location of the bullying experience*, which also show that fewer individuals experience bullying in online sites.

All types of bullying are equally serious and harmful to the child. It is incorrect to assume, for example, that physical aggression is more harmful than relational aggression. However, this is a common misbelief of both teachers and parents. This leads some teachers and parents to ignore some types of aggressive behaviours, to dismiss some types of bullying as a 'normal' part of growing up or, worse, to blame the victim for not being assertive enough to 'stand up' to the aggressor (for a review see Troop-Gordon, 2015). The psychological effects and repercussions of bullying can be far reaching, but the psychological effects of teacher and parent responses can also be very significant, as will be discussed in the following.

New understandings of bullying

In the last two decades there has been a proliferation of interest in the construct of bullying. Bullying researchers Swearer, Espelage and Napolitano (2009) have devoted their work to dispelling a number of 'myths' about bullying. These include the myth that student bullying occurs between 'bullies' and 'victims'. They are critical of this bully–victim dichotomy as it ignores the reality that these behaviours fall on a bully–victim continuum; some students fall into classic bully or victim roles, but other students are 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. A smaller number of students on this continuum are described as 'bully/victims'; these are children who engage in bullying behaviour but are also victims. In other words, bullying is not so much a dyadic problem (between a bully and a victim) but in many cases is best described as a group phenomenon and a behaviour in which students may adopt different roles at different times.

Researcher Catherine Bradshaw and the organisation Stop Bullying in the US have also compiled a list of five 'misdirections' in bullying that are presented in training resources for teachers and a video you can view, listed in the 'Recommended weblinks' at the end of this chapter. In this video Bradshaw explains five misdirections in beliefs and responses to bullying, as outlined in **FIGURE 4.17**.

As we can see above there are a number of myths and possible misdirections we can take in developing an effective understanding and responses to bullying. You may notice, for example, that use of the term 'zero tolerance' has found widespread use in New Zealand and Australia as the media, parents and schools become angrier and more concerned about ineffective responses to bullying. You can read more about responses to bullying, including those listed above, in **CHAPTER 14**.

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?

Zero tolerance	A notorious and failed approach to bullying in the US that uses exclusion or expulsion for bullying offences Severe punishments can prevent bullying reporting, can affect large numbers of minority students and lead to adverse outcomes for other students
Conflict resolution and peer mediation	Bullying is not a 'conflict' 'Restoring' relationships may not be possible in power-imbalanced relationships The procedure can cause further trauma to the victim and can lead to insincere responses from perpetrators
Group therapeutic interventions	May be counterproductive because group members with similar problems can 'lead each other astray' as poor role models and reinforcers of one another's behaviours
Misunderstanding the link between bullying and suicide	Media reports can sensationalise the tragic event Oversimplifies the complex causes of suicide May create a false belief that suicide is a natural or normative response to being bullied
Simple, short-term solutions	Using short-term, piecemeal and one-off training approaches are often ineffective

FIGURE 4.17 Five misdirections in beliefs and responses to bullying

Source: Adapted from Bullying Prevention and Response Training and Continuing Education Online Program, stopbulling.gov.au.

Developmental trends in bullying behaviours

In this section we will examine several developmental trends that have been observed in the phenomena of bullying behaviours. These include notable developmental trends in both the use of aggressive behaviours and bullying behaviours specifically. For example, in Australia the highest rates of bullying are reported by Year 5 students (32%) and Year 8 students (29%). Less than one in 10 (9%) Australian children admit to being frequent bullies, with boys reporting at 11 per cent and girls 7 per cent (Cross et al., 2009).

Age and bullying

Age is one factor strongly associated with reported incidents of bullying. One important age-related trend to be aware of relates to the development of aggressive behaviour. It may surprise you to learn that physical aggression emerges at a very young age. 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. This may be because children gradually learn they will be punished for physical aggression while the development of language and vocabulary also facilitates the use of some verbal and more covert forms of behaviour (e.g. rumour spreading or whispered threats). 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 that the highest rates were found in the 3- to 5-year-old children studied (Swit & McMaugh, 2011). Note too other Australian research has found hurtful teasing and spreading lies were the most common forms of bullying in 8 to 14 years (Cross et al., 2009).

relational aggression A form of harm that intentionally seeks to damage a person's social relationships or reputation

Gender and bullying

The role of gender in some types of bullying behaviours seems to be clear, but also ambiguous in other types of bullying behaviours. It is very clear from numerous studies, across countries and age groups, that boys are more physically aggressive than girls (Juvonen & Graham, 2014). Boys 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 are more involved in relational or social forms of aggression, the evidence for this is equivocal. This means there are no consistent or clear research findings. Some studies have found that girls are more likely to use and experience indirect or psychological forms of aggression (Björkqvist et al., 1992; Björkqvist & Osterman, 1999; Owens & McMullin, 1995), and that girls are more likely to use relational bullying (e.g. Crick & Grotpeter, 1995). However, other studies report only weak or inconsistent links to gender (Swearer, 2008). In fact, Swearer and colleagues (2008) have shown that boys also experience group exclusion and relational aggression, and it is just as psychologically damaging 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 (boys use more physical forms of aggression), there is no difference between boys' and girls' *likelihood* of using relational aggression or peer exclusion 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 for all young people and are likely to be replaced by relational forms of aggression for both boys and girls. Australian studies have supported these conclusions. In an early study Hayward and Fletcher (2003) found no gender differences in relationally aggressive behaviours in adolescent populations; and Swit and McMaugh (2011) found no gender differences in early childhood populations. The recent LSAC statistical report (Gray et al., 2017) reported that 14- to 15-year-old Australian boys and girls were equally likely to use social exclusion (i.e. relational aggression). Some researchers have suggested that the equivocal data has arisen because of an over-reliance on parent or teacher reports. These reports can reflect biased reporting because there is a stereotyped expectation that girls should be more involved in such behaviours (Ostrov et al., 2005). The Australian data above, reported by children and young people, does not show significant gender differences in the likelihood of using relationally aggressive behaviours.

The effects of bullying

When looking at the effects of bullying, it is clear that bullying is harmful. Bullying and being subject to peer attacks is now considered to be one of the most traumatic events that can occur in childhood in the peer context (Salmivall & Peets, 2018). The experience of bullying, whether as a perpetrator or a victim, or even as a bystander or witness, has a host of negative academic, social and emotional outcomes. Students involved in bullying are at increased risk of lower academic grades, depression, anxiety and suicidal ideation (Green et al., 2019). These effects are associated with adjustment problems and mental health concerns in adulthood (Salmivalli & Peets, 2018). It is important to remember that these links between mental health and bullying are not causal and the factors that lead to mental health concerns are very complex.

The effects of bullying on school engagement and performance are both immediate and long-term. Ladd and colleagues (2017) reported on a longitudinal study that tracked students from Kindergarten to Year 12 in the US. This tracking allowed the researchers to monitor the links between victimisation and engagement at school. They found that chronic victimisation at school was linked to liking school less and school avoidance (e.g. absenteeism and truantism). High and moderate levels of victimisation were associated with long-term differences in school engagement by Year 12.

Bullying and physical health

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 et al., 2011). The group of children classified as bully/victims seem to experience worse mental health and showed signs of greater distress (Reijntjes et al., 2010). However, it is important to note that not all children react to victimisation in the same way. Rigby and Slee (1999) reported that some students do not feel particularly worried by bullying, but their worry increases the more they are victimised. Boys in this Australian study were more likely to report that bullying made them angry, while girls reported that it tended to make them sad.

Victimisation

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 (Juvonen & Graham, 2014). However, it is also becoming increasingly clear that there is a reciprocal interaction between such personal characteristics and bullying, this means that pre-existing internal factors, such as depression and anxiety, are associated with increased likelihood of being bullied. It is also true that being bullied is associated with the development of these internal conditions (e.g. depression and anxiety) in a child who *did not* have these conditions previously. A large meta-analysis has shown that these conditions can be both an antecedent or a consequence of victimisation – internal problems are just as likely to arise from victimisation as to exist before victimisation in some children (see Juvonen & Graham, 2014). More about the impact of bullying on victims can be found in the online materials, in appendix 4.5.

GO FURTHER

Appendix 4.5
More about the impact of bullying

Protective factors – friendship and social skills

As previously discussed, friendship acts as a protective factor against victimisation in the peer group (**TABLE 4.7**). It is clear that children who are befriended are much less likely to be victimised. It is also true that school climate factors, such as classroom encouragement of inclusion and peer acceptance, reduces rejection (see **IMPLICATIONS FOR EDUCATORS 4.3**). 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 cope with or respond to bullying; for example, conflict-resolution skills seem to be important in the child's ability to manage bullying.

In **CHAPTER 14** we will continue to explore strategies for addressing bullying in schools. While it is clear that bullying is a well-recognised international problem, it is also clear that we are still trying to understand how to address this form of aggression in schools.

Explanations for bullying

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 of bullies and social cognitive biases (Juvonen & Graham, 2014). There is clear evidence that some bullies have a cold and calculating desire to prove their social dominance and may have a high level of social intelligence, hence their ability to manipulate the peer group and turn others against particular children (Juvonen &

Graham, 2014; Salmivalli & Peets, 2018). 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. They may have an overall *positive view of aggression*, *feel confident in using aggression* and be *reinforced in these beliefs* by receiving positive social feedback from peers who laugh at or encourage bullying behaviours (Salmivalli, 2010; Salmivalli & Peets, 2018).

In a similar way some have suggested bullies have low self-esteem but in fact this is another myth about bullying. Many studies have in fact shown that bullies can hold inflated self-views (Cunningham et al., 2010; Johnson & Lewis, 1999). Personality factors, such as callous-unemotional traits, narcissism and sense of grandiosity, have also been associated with bullying (Salmivalli & Peets, 2018). Those seeking power or social dominance tend to feel powerful and effective, and those with maladaptive hostile schemes feel buoyed when aggression works.

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. As discussed in **CHAPTER 14**, school climate and 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 than others.

4.4 Concluding comments

This chapter has illustrated important connections between how young people like Jamie, Lia and Caleb 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, social 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 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.

STUDY TOOLS

Chapter review

4.1 Understanding our self

- 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 and Marcia's theories of identity propose that our sense of self develops over time and is connected to cognitive development.

4.2 Understanding others

- Moral development explains how we reason and make ethical choices and decisions in our lives, and is also related to our cognitive development.
- Kohlberg used a moral dilemma (the Heinz dilemma) to posit a complex six-stage sequence of moral development taking place within three broad levels.

4.3 Understanding relations with others

- Social development refers to our gradual understanding of and ability to maintain relationships with others.
- Positive peer experiences are central to self-understanding and understanding others, and are protective factors in children's lives. These include peer acceptance and friendships.
- Negative peer experiences may bring about low self-perception and mental health and social problems. These include loneliness, peer rejection and bullying.

Putting it together

Making links between 'social, emotional and moral development' and material in other chapters

CHAPTER 4 Social, emotional and moral development

LINKAGES

Complete the following table with milestones of development occurring in each developmental period.

Compare development across the physical, cognitive, social and emotional domains. What changes happen together? How does development in one domain affect development in another?

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

	Physical (Chapter 2)	Language (Chapter 2)	Cognitive (Chapter 3)	Social/emotional (Chapter 4)
Early childhood				
Middle childhood				
Adolescence				

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 and Marcia'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.

Further research

Go further

GO FURTHER

The online appendices contain additional material that you should refer to when reading this chapter. The appendices available for this chapter are:

- Appendix 4.1 Measuring self-concept
- Appendix 4.2 Big-fish-little-pond effect
- Appendix 4.3 Defining Issues Test
- Appendix 4.4 Selman's five-stage model and perspective-taking ability
- Appendix 4.5 More about the impact of bullying.

Recommended websites

Bullying information for teachers in Australia: https://bullyingnoway.gov.au

Bullying information for teachers in New Zealand: https://www.bullyingfree.nz

Bullying Prevention Training Center: https://www.stopbullying.gov/resources/training-center

Resilience and bullying support for children: https://dinglefoundation.org.nz/kiwi-can

Respectful Relationships curriculum: https://www.education.vic.gov.au/school/teachers/teachingresources/discipline/capabilities/personal/Pages/respectfulrel.aspx

Recommended reading

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Putting it together

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 have seen throughout the module. Return to the module text to trace 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?

Stage	Physical and brain development	Language development	Cognitive development	
Infancy	Crawls and learns to walk Rapid growth of the brain and neuron proliferation Creation of more synapses than needed	Prelinguistic communication First words emerge	Object permanence emerges Children's thinking dominated by sensory and motor experiences Thinking is mostly regulated by others, such as caregivers, or co-regulated with them Infants start to demonstrate early executive functions	
Early childhood	Development of gross and fine motor skills 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 vocabulary, such as overgeneralisation, over extension and under extension, 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 Cognition starts to be self-directed; children start to plan, using language to control their responses and actions Inhibitory control emerges and working memory capacity increases	
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; operate logically on their surroundings; and represent events mentally Children use cognitive strategies to control behaviour; have more control of thinking and behaviour that is underpinned by improvement in metacognition Increases in executive function, especially cognitive flexibility	

	Social development	Emotional development	Moral development
	Infant self-concept tied to primary caregiver Separate sense of self emerges followed by an ability to coordinate behaviour with that of a partner Erikson's trust vs mistrust stage	Reliant on caregiver to regulate emotion Can interpret emotional cues from caregiver Self-conscious emotions may start to emerge	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

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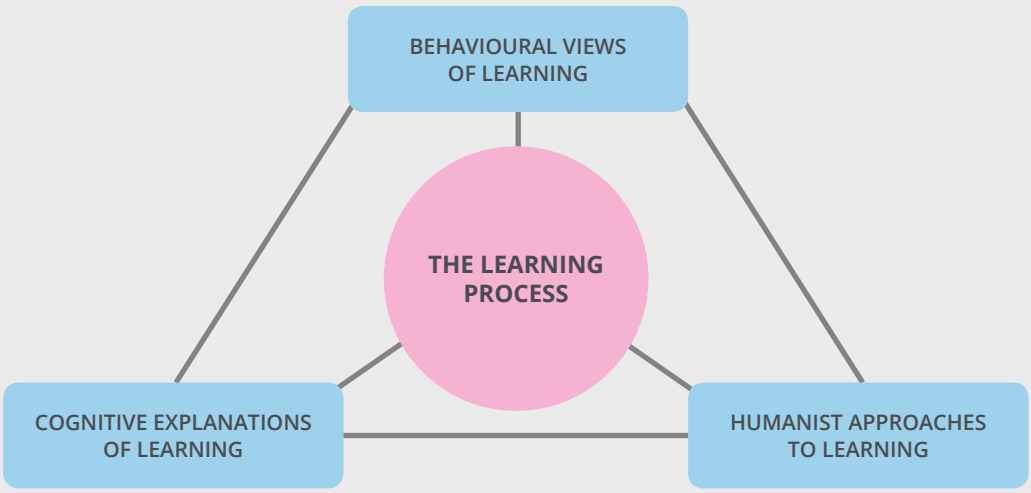
Stage	Physical and brain development	Language development	Cognitive development	
Adolescence	Coordination of movement; more complex linking networks in the brain Rapid increases in height and weight; development of sex organs Brain development continues into mid adulthood and critical periods of growth 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 Can form and think about hypothetical situations; reason about the logic of statements; control and monitor their own thinking Can plan, solve problems, and manage their thinking and emotions independently Peers and strong emotions can affect self-regulation Continued increases in executive functions and metacognitive capacity	

	Social development	Emotional development	Moral development
	Abstract, 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	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



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 knowledge, skills, beliefs, attitudes, habits and feelings. Such changes are enduring. They can result from instruction or be an unintended outcome of experience.

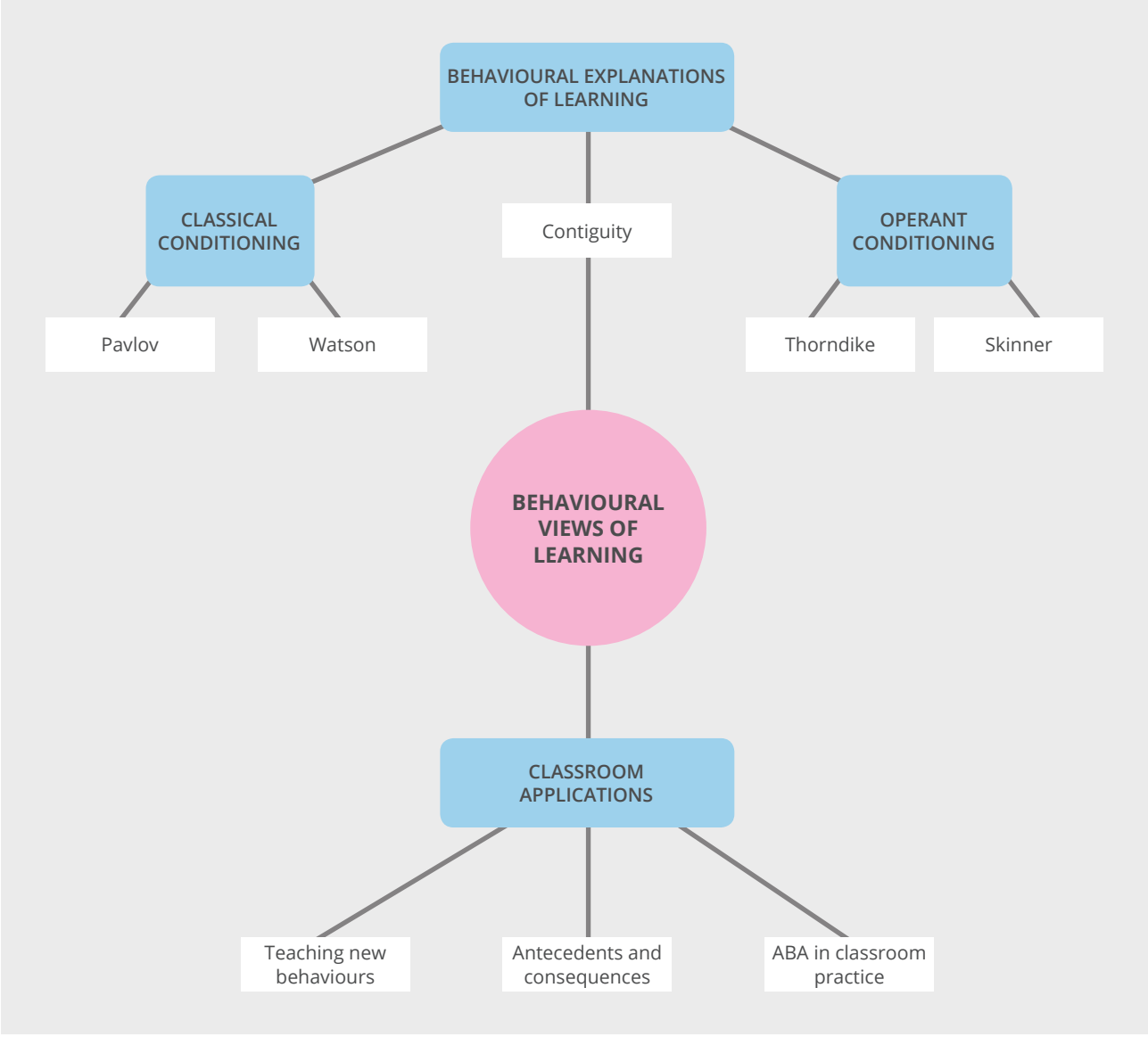
This module focuses on different ways of understanding the learning process. It explores different theoretical explanations of how we learn, and the implications these explanations have for teachers in how they view their role, relate to learners, arrange their classrooms, deliver content and assess students' work.

Chapter 5 presents behavioural explanations of learning, which are concerned with learners' observable behaviours, and where 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 they can teach you about the roles of the learner and the teacher in the classroom and in learning. We also ask you to think critically about these theories of learning and thus we offer suggestions as to the strengths and limitations of each theory. Teachers sometimes assume that they can enhance their effectiveness by adopting certain approaches or theories, but this assumption must be based on sound knowledge of the implications of those theories and approaches for the students and classrooms in which we teach. Many teachers are quite eclectic in their philosophical or theoretical approach – that is, they recognise that one single theory or approach may not suit all learners or all learning contexts; rather, by adopting an eclectic approach they might use 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



Chapter 5 concept map

KEY QUESTIONS

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

- What is the behaviourist definition of learning? How does this differ from a cognitive explanation of learning?
- 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?
- How can a teacher apply the principles of antecedent–behaviour–consequence (A–B–C) to understand and manage behaviour?

KAI AND JOE

Two students have been working on the same project in class but gain different marks. The teacher also uses a prominent chart on the wall to display each student's record of achievement. Joe does reasonably well and is rewarded with an extra 'merit' sticker on the achievement chart. Kai also did reasonably well on the task, considering the diagnosis of a learning disability and significant concerns at home. Kai plays a large role caring for a younger brother and sister. Because the project was submitted a day late, Kai does not receive any merit sticker or special comment from the teacher. The teacher in this classroom also takes merit stickers off the chart for breaking a classroom rule, not completing homework or any perceived misbehaviour, and Kai has lost quite a few stickers. Joe feels pretty pleased and talks about how long the line of stickers is. Kai feels pretty ambivalent and couldn't really care less about the stickers 'I never get any anyway!'

Introduction

Teachers can reward students with 'merits', stickers or points for academic achievement or good deeds, but teachers can also punish students (sometimes with the removal of merits, 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, yet 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 like Joe and Kai anything about improving the quality of their assignments? Do students learn to change their behaviours? Some students, such as Kai, simply give up or try not to get noticed. How might students like Joe and Kai respond to future classroom experiences if they are constantly rewarded or punished in these ways?

5.1 Behavioural explanations of learning

behaviour
Actions that are observable and measurable

behaviourism
Explanations of learning concerned with the effect of external events on behaviour

learning
The behaviourist view sees learning as permanent or relatively permanent changes in individuals that result from instruction or experience

The strategy of rewarding students for good **behaviour** or removing something from them for misbehaviour is a classic behavioural approach to managing student behaviour, as well as 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 Joe 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.

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 measurable 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 et al., 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 (e.g. 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 that have resulted from this research have provided educators with powerful but questionable tools to use as part of instruction. These approaches are explored in the second part of this chapter, along with a considered critique and discussion of the need for well informed and ethical use of behavioural strategies in the classroom setting.

Contiguity

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

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 as a **stimulus (S)** (i.e. something that affects the senses) and effect as a **response (R)** (i.e. a reaction to a stimulus). At the most basic level, this stimulus–response mechanism 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. At a more complex level stimulus can include other learnt associations. For example, learning to recite the alphabet or to count to 10 involves building associations: singing 'a, b, c, d' or saying '1, 2, 3, 4' triggers even quite young children to continuing singing or reciting 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. It is a simple theoretical principle that can be used to help learners develop associations between specific stimuli (i.e. objects, events or 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 (e.g. *i* before *e* except after *c*) or number facts (e.g. 5 × 5 = 25). The principles of contiguity are also used to help children to remember the details of their name, address and telephone number.

5.2 Classical conditioning

classical conditioning
The association of an automatic response with a new stimulus

An early contribution to our understanding of stimulus–response processes in learning was made by the Russian physiologist Ivan Petrovich Pavlov (see **FIGURE 5.1**). His work identified a process known as **classical conditioning**, discovered during his study of digestion in dogs. Another researcher, John B. Watson, also contributed to understanding stimulus–response via experiments conducted with children and infants. As you will learn, each of these research approaches would be questioned today in terms of the ethical treatment of humans and animals in research. Such limitations are discussed at the end of this section.

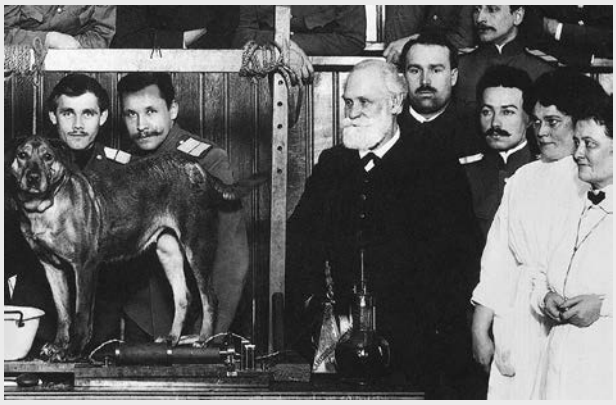


FIGURE 5.1 Pavlov (standing to the right of the dog) contributed to our understanding of classical conditioning through his studies of salivation and digestion in dogs

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Pavlov's approach

Pavlov's (1928) 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).

For the purposes of his study of digestion, Pavlov used his surgical skills on a 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 5.2**).

Pavlov's (1928) study of the dogs' salivation was disrupted when he encountered a strange development in his laboratory. Pavlov noticed that the dog began to salivate when it was about to be fed, before it had seen or smelt the food. He then discovered something unexpected had occurred in his experimental protocol.

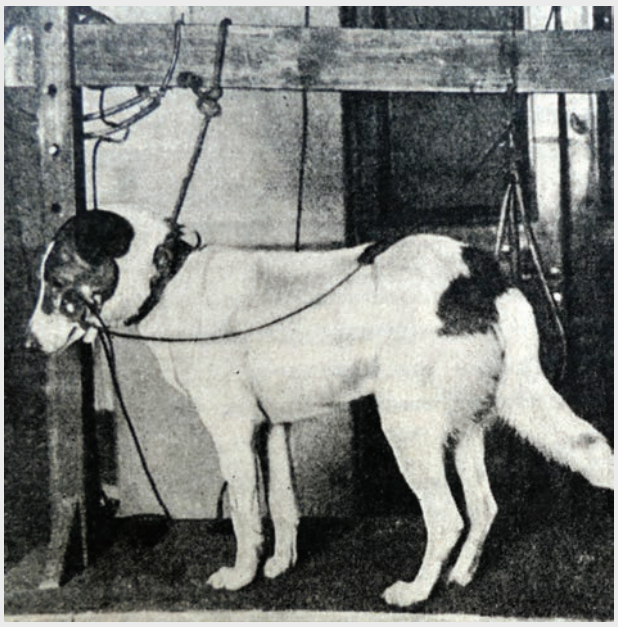

FIGURE 5.2 Pavlov's procedure for the study of salivary conditioning

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neutral stimulus (NS)
An event or happening that has no effect on an organism

unconditioned stimulus (UCS)
An object, event or happening in the physical environment that causes spontaneous activity in an organism

unconditioned response (UCR)
An action triggered spontaneously by a stimulus

conditioning
The establishment of a new association between a stimulus and a response

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

The dog also began to salivate whenever the laboratory 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).

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 procedures and terms outlined in the following to describe the stimulus–response process.

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 (UCS)** 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 (UCR)**; that is, no prior training or **conditioning** was needed to elicit salivation from the dog in response to food. Read about unconditioned responses in early behavioural research in the online materials, in appendix 5.1.

GO FURTHER
Appendix 5.1 Unconditioned responses

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 – gave a learnt or **conditioned response (CR)** – to the sound of the tuning fork (see **FIGURE 5.3**).

FIGURE 5.3 Steps in conditioning a dog to salivate at the sound of a bell

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 CS (the sound of the tuning fork) *without* producing the food. Here, the learnt or CR (salivation) gradually disappeared as the association between the two events (sound and food) weakened and disappeared.

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 a framework and terminology that was then employed in future behaviourist research into human learning and behaviour.

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 American psychology. Like Pavlov, Watson worked with animals but later shifted his focus to work with infants, as you will see below. He believed that behaviour could be explained not in terms of instincts and other inherited mental characteristics, but rather in terms of stimulus–response 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.

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 stimulus–response 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 and colleague Rosalie Rayner conducted an experiment using Pavlov's classical conditioning principles to induce fear in 'Little Albert', who was a healthy infant about 9 months old (Watson & Rayner, 1920).

Fear was induced by first showing Albert a white rat. Albert then reached out to touch the rat, which is a normal and typical reaction. At this stage, the rat was an NS because it did not invoke the fear response. In the next step, as Albert again tried to touch the rat, Watson and Rayner made a loud sound (UCS) behind Albert's head by striking a hammer on a steel bar. As expected, Albert began to cry (UCR). 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 (now a CS) caused poor Albert to cry (CR). Albert had been conditioned (or had learnt) to fear the rat. Subsequently, the researchers demonstrated that Albert's fear had 'generalised' or extended spontaneously to objects that resembled the rat, such as a white rabbit, cotton wool and a Santa Claus mask.

A few years later, researchers used classical conditioning 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.

After decades of speculation about what became of Little Albert with his terrible fear of fluffy creatures and objects, it has been reported that he died at the age of 6 years from an acquired infection of the brain (Beck et al., 2009). Thus it is not known if Little Albert's conditioned fears were extinguished or remained with him after the experiment. Because Albert left the experiment after a short period of time there is some chance his conditioned fear may have remained in the few years of his short life.

Strengths and limitations of classical conditioning

All research and theory in educational psychology can be subject to critique and further refinement in later years. This can help us identify the strengths and limitations of any given approach. This is particularly relevant in the case of behaviourism and behaviourist views of learning.

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 repeated number of experiments to explore one topic with great precision.

At a more practical level, therapists 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 anxiety or panic. For example, consider the rather 'old-fashioned' notion that throwing a child who cannot swim into deep water will make the child learn to swim. Is more likely to result in the child developing a fear of water. Can you work out what is the previously neutral stimulus in this scenario? What became the conditioned stimuli? Therapists often use procedures derived from classical conditioning to help us overcome conditioned or learnt fears, phobias or other behaviours (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. However, not all behaviours are like these automated responses; 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 these more controlled actions in the way Pavlov triggered salivation in his dog.

Due to these limitations, 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 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

IMPLICATIONS FOR EDUCATORS 5.1

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 a UCS 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. Instances of classical conditioning in schools and classrooms include, for example, feelings of embarrassment or anxiety that can be associated with classes taught by teachers who use shaming or ridicule to make students conform.

Children's natural or existing behaviours can be used 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 the sound of a school bell or teacher using a whistle or clap of the hands. Teachers could also use their knowledge of classical conditioning to deliberately reduce or extinguish some known conditioned stimuli, such as creating a calm and positive classroom feeling around stimuli or events that cause anxiety, such as tests or delivering a presentation.

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?

response to be extinguished, and one would only be able to hope that the treatment would be successful. This level of risk to the participant would be considered unacceptable today.

The implications of classical conditioning for teaching practice are explored in **IMPLICATIONS FOR EDUCATORS 5.1**.

5.3 Operant conditioning

Answers to some of the problems identified in the use of classical conditioning (e.g. the need to find an automatic response as a starting point for instruction) were provided when 'operant conditioning' was discovered. This form of conditioning is not concerned with unintentional or automatic responses to stimuli, but with behaviour that is conscious, intentional or voluntary.

Examples of such conscious, intentional or voluntary behaviours are typical human behaviours and the types of behaviours we use every day. For example, a toddler will choose to 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 deliberately wait in a certain spot where it knows plenty of lizards are available to catch. These behavioural scenarios and examples of learning are quite different to the classical conditioning scenarios studied by Pavlov and Watson; for example, all of these behaviours are initially spontaneous, driven by basic needs, such as hunger, and initiated by the child or animal; they are not in response to an external stimulus.

operant conditioning
The use of positive and negative consequences to strengthen or weaken voluntary behaviour

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 (1904–1990). 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 (see **FIGURE 5.4**).

FIGURE 5.4 This young driver responds to the sound of a beeping alarm that reminds her to put on her seatbelt. What type of reinforcement is being applied here?

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Thorndike, trial-and-error learning and the law of effect

associationism
An explanation of learning as the formation of connections between stimuli and responses

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**.

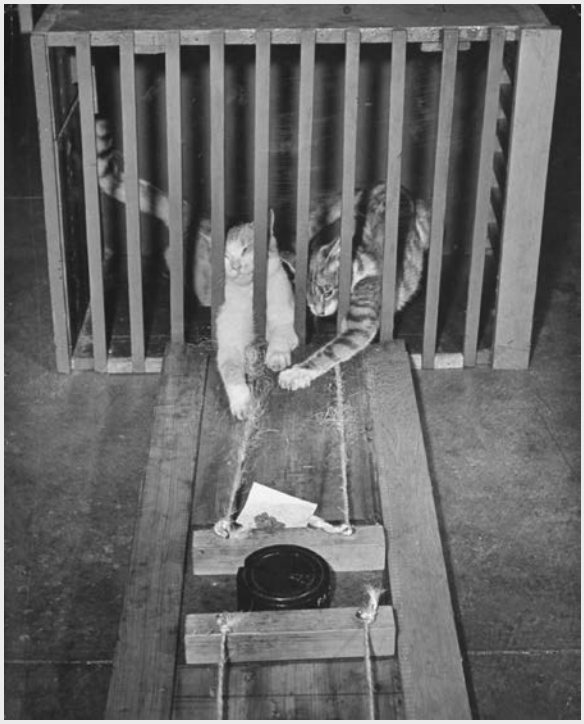

FIGURE 5.5 The cat has to find a way to escape from the puzzle box in order to reach the food

Shutterstock.com/The LIFE Picture Collection/Nina Leen

Cats and the puzzle box

In a series of 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 5.5**). 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 could accidentally trigger the door to open and was immediately rewarded with the food. If the cat were 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.

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 (e.g. 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**.

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

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?

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.

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.

operant
Voluntary action, usually goal-directed

respondents
Elicited or reflex reactions to a specific stimulus

The early research of Skinner 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 5.6**). These boxes became known as 'Skinner boxes'. 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.

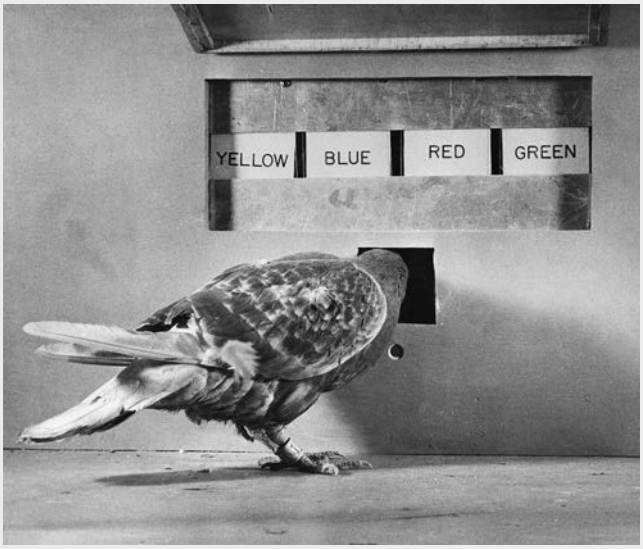

FIGURE 5.6 A typical Skinner experiment. The pecking of a key by a pigeon in the 'Skinner box' is reinforced by a flashing light

Getty Images/Bettmann

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 5.6**). 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. See more about trial-and-error learning in the online materials, in appendix 5.2.

GO FURTHER
Appendix 5.2 Trial-and-error learning

reinforcement
Increasing or strengthening the likelihood of a behaviour recurring through use of contingent feedback

Strengths of operant conditioning

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 of operant conditioning

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 raccoons, showed that these animals had such strong, instinctual and innate behaviours that they could not be as effectively conditioned as Skinner proposed (e.g. 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.

5.4 Classroom applications of behaviourist views

The application of the principles of operant conditioning to instructional contexts has been quite extensive and well researched but has also led to debate and controversy (Arthur-Kelly et al., 2006). 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.

applied behaviour analysis (ABA)
The use of behavioural principles to change 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 (e.g. academic, communicative, social, motor, vocational and self-help behaviour) and quantifiable. The goal is to change behaviour that is socially important (i.e. not trivial) (Baer et al., 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 behaviours can be difficult to treat. Applied behaviour analysis is characterised by:

- 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, and tailoring the teaching program to the student's specific learning needs
- a reward system for the learner that is developed by carefully structuring a reinforcement schedule
- continual monitoring of progress, measurement of change and adjustment to the program if necessary.

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 an applied behaviour analysis approach in any learning condition. Learn about the key steps of applied behaviour analysis in the online materials, in appendix 5.3.

GO FURTHER
Appendix 5.3 Key steps of applied behaviour analysis

Antecedents and consequences of behaviour

One of the 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 Joe and Kai, 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 Joe and Kai's behaviours are embedded in a complex array of ongoing events. Their actions or behaviour may involve other people (e.g. their teacher or peers) or the classroom setting (e.g. desk, chair, books and pencils). These may also involve all of the learner's previous experiences that we may not be able to observe (e.g. Joe had a good breakfast at home or Kai was hassled by peers on the school bus on the way to school). In addition, these events may involve internal processes such as expectations and emotions, but we may not be able to observe these internal processes; instead, the behaviourist observer or researcher would concentrate on outward and visible emotional displays, behaviours or gestures. For example, does Joe show more 'on task' behaviour after being rewarded with the sticker? Will Kai react after being bullied by peers in the classroom or playground? It is impossible to isolate a single behaviour or action of Joe and Kai from all the events and influences that have preceded it and behaviours that will follow it. So, for any single action (e.g. a rat pressing a lever or Kai failing to bring homework to school), it is important to take account of what precedes this action (i.e. antecedents) and what follows it (i.e. consequences).

Behaviourists believe that all voluntary (i.e. 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)**. The use of A–B–C charts or documentation 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

antecedent
An event that precedes a behaviour

When peers make fun of or insult Kai, who reacts by making a rude gesture, it is the initial actions of the peers giving the insults that trigger the behaviour of Kai. These triggers are called the **antecedents** of the behaviour, and are the conditions that precede particular actions,

consequence
An event that follows a behaviour

and contribute to the action's occurrence. **Consequences** are the 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 shoes. 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 **CLASSROOM LINKS 5.1** for an example of an A–B–C record of a disruptive classroom situation.)

Applying the A–B–C method

The A–B–C method of observation is often applied to study the behaviour of a student whom teachers are concerned about. A teacher may be uncertain of the conditions that trigger behavioural changes. To find the antecedents of behaviours the teacher needs to observe what is happening before these behaviours occur (see **CLASSROOM LINKS 5.1**). The teacher also needs to understand the consequences that immediately follow these behaviours and the effect of these consequences on subsequent behaviours. This will help the teacher to learn how to decrease undesirable behaviour and will also help the teacher develop strategies or interventions

CLASSROOM LINKS 5.1

An A–B–C situation

The classroom teacher has prepared a recording sheet to monitor the classroom behaviour of Kai (noted as 'K'). The teacher wants to pinpoint specific behaviours in Kai that need to be changed, as well as any classroom events that may be contributing to the problem. A teacher's assistant has observed the student and made the following recordings on the recording sheet:

Time	Antecedents	Behaviour (target STUDENT 'K')	Consequences
9:16	1 Teacher: 'Get out your workbooks and get ready to write answers to these problems please'	'K' does not listen to teacher. Continues to talk to another student at the table	Teacher repeats the instruction to 'K'
	2	'K' walks over to the bag storage area, bumps another student's desk – knocking books of the desk	Student shoves 'K' and says 'idiot!'
	3	'K' pushes this other student and uses inappropriate language	Teacher: 'Stop that 'K', or you'll have a merit sticker removed'
	4	'K' and student continue shoving	Teacher: 'Stop that now or I will remove a merit sticker'
9:20	6	'K' stops fighting and continues walking to the bag storage area	Teacher: 'Hurry up, I'm just waiting for 'K' now'
9:22	7 Teacher: 'Are you ready yet?'	'K': 'No, I can't find my workbook'	Teacher: 'Ok, I am removing a sticker now'

Adapted from Martin, 1987, p. 164.

ACTIVITIES

1. Can you identify further antecedents of Kai's behaviour?
2. What other information do we have that might explain Kai's behaviour, apart from these A–B–Cs?
3. What changes could the teacher make to reduce these inappropriate behaviours?

to assist the student. Often these interventions aim to reduce inappropriate behaviour and increase more appropriate behaviour. Initially, it may be difficult to predict when the behaviour may occur, therefore the A–B–C method may require multiple observations at different times to capture examples of the target behaviour. The behaviourist concern for careful measurement of behaviour also indicates the use of repeated observations that provide evidence and confirm the pattern of the A–B–C sequence. The information that the teacher needs from observation of classroom behaviour includes:

- *Antecedents* – When and where does the behaviour occur? What happens immediately before? What is the student doing? Who is with the student?
- *Behaviour* – What does the student do? When does the student do it? What is usually happening when the behaviour occurs? The behaviour is described in these 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? What are the outcomes (positive and negative) for the student?

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* (i.e. frequency of occurrence), *duration* (i.e. how long the behaviour lasts) and *latency* (i.e. length of time delay between antecedent event and occurrence of behaviour).

baseline
Level of a specific behaviour prior to intervention

A management program is then planned and implemented. This will involve consideration of:

- *Antecedents* – What should be changed in the classroom environment? For example, a curriculum that is more interesting and at the student's developmental level; consistent application of classroom rules that include consequences for both appropriate and inappropriate behaviour.
- *Behaviour* – What behaviours can the student learn that replace a problem behaviour?
- *Consequences* – What can be done to block the reinforcing consequences of a problem behaviour and encourage (or reinforce) appropriate behaviour?

Additional factors to consider

Other factors that the 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 a student's learning difficulty, a student's previous reactions to learning or behavioural interventions, or other risk factors that can exacerbate behavioural concerns, such as illness or wellbeing concerns. A management program can include communication with parents and help in managing situations in the classroom or playground that might contribute to problems at school, responding to learning difficulties and attending to any other problems the student 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 either to reinforce the behaviour or to stop or decrease it. In the case of the A–B–C chart, the consequences were the events that followed the student's behaviours. Some of these consequences occurred spontaneously, such as the other student's reaction to Kai that reinforced the aggressive response and led to more fighting. Similarly, you may remember a child from your school classroom 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 contexts, 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 (e.g. Zimbardo, 1987). Typically, such segments show a rat turning a wheel or pressing a bar, or a pigeon pecking a disc or pulling a string in order to receive a reward of food pellets. The behaviour of these animals was deliberately manipulated by the use of the food pellet **reinforcer** (i.e. reward) that ensured the actions would be repeated. However, in some studies, an **aversive** (i.e. undesirable consequence), such as a loud noise, was given that was intended to have 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. A game player successfully completes a level on a computer game and receives bonus points and access to the next level. The student, the swimmer and the gamer have been 'reinforced' for their efforts, and this will (in theory) motivate them to try harder next time or continue playing the game. A reinforcer is any consequence that maintains a specific behaviour or increases the rate at which the behaviour occurs and the probability that it will occur again. Whether it be a spontaneous reinforcer, such as a cheer from a crowd, or a deliberate reinforcer, such as the awarding of bonus points in a game, 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 *immediately after* the particular identified *behaviour occurs*, such as good marks on a test or the fastest time in a race. Reinforcement should occur *immediately* and 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 or completing a level in a game, is immediately followed by the delivery of a desirable consequence, such as a smile from the teacher, an achievement sticker or bonus points, then **positive reinforcement** has occurred. Theoretically, reinforcement has the effect of *increasing* the frequency of the behaviour it follows, and some reinforcement delivered by teachers (and computer games) is positive, in that it involves contingent presentation of a rewarding object or activity immediately following the target behaviour. Examples of common reinforcers that may have a positive effect on behaviour include praise, showing happiness or delight, and monetary rewards. See more about the use of reinforcement in **CHAPTER 8**.

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', or if in a computer game a barrier is removed when you achieve a certain state or meet certain conditions. Here, the individual is rewarded for desirable behaviour by being allowed to escape from an unwanted experience or progress with a task. This process is called **negative reinforcement**.

negative reinforcement
Increasing the likelihood of a behaviour being repeated by contingently removing an aversive object or activity

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.

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 those who do not want 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. 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 (see **FIGURE 5.7**).

FIGURE 5.7 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

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' (i.e. unlearnt) stimuli that are innately rewarding for the individual. They are usually associated with the satisfaction of basic needs; for example, food, drink and a 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 means that primary reinforcers lose their effectiveness quite quickly and 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, especially when training animals, it is not advisable to use primary reinforcers, such as food in classrooms for obvious health and safety reasons.

primary reinforcer
An unconditioned (unlearnt) stimulus that is innately rewarding

satiation
The point at which a stimulus that originally functioned as a reinforcer no longer functions as a reinforcer

Secondary reinforcers are 'conditioned' (i.e. 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 be *contiguous* or close in timing with the behaviour to be reinforced, and an association or *contingency* between the stimulus and the behaviour must also be learnt, with frequent pairing of the two. Computer games exploit the principles of reinforcement very well with reward points, sounds and visual imagery often used to signal the reward.

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 **Premack principle** suggests 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. This 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
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

reinforcement schedule
The frequency with which reinforcement is delivered

One of the decisions that must be made when planning a behavioural program concerns the selection of a **reinforcement schedule** (see **TABLE 5.1**). 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.

TABLE 5.1 Reinforcement schedules

Type	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	• An award 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, which may employ several types of reinforcement schedules, in holding the attention of some punters. Such reinforcement can create a very alluring and deceptive climate for the player and can be 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, with punishment as a last resort.

Extinction

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 (see **FIGURE 5.8**). 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.

extinction
Reduction and cessation of a response following the withdrawal of reinforcement

FIGURE 5.8 A parenting strategy, such as planned ignoring, allows a teacher or parent to avoid positively or negatively reinforcing the behaviour

Alamy Stock Photo/PhotoAlto.

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 of 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 a 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 was sceptical, 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).

Forms of punishment

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 (e.g. the loss of a driving licence if a person is caught speeding repeatedly). Punishers also parallel reinforcers, in that they are either primary (i.e. unconditioned – unlearnt or innate) or secondary (i.e. 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.

Aversive modes of punishment

As mentioned, the use of punishment in which a 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 (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.

Modifying unwanted behaviour with response cost punishment

If a teacher is seeking to change unwanted behaviours they may choose to use a type of punishment that involves **response cost**, or the removal of privileges. This was demonstrated in the teacher's response in the A–B–C scenario. In this sort of punishment, some type of previous reinforcement or earned reward is removed; for example, the withdrawal of some earned free time if the student misbehaves in class or fails to complete work. 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. This is viewed as a more preferable approach when punishment is deemed necessary (Landrum & Kauffman, 2006). 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. In **RESEARCH LINKS 5.1**, we review an example of a classroom intervention that combines several principles of reinforcement and punishment. Read more about the use of token rewards in **CHAPTER 8**.

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

Concerns about reinforcement, punishment and token economies

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 rewards like token economies. A chief concern relates to the idea that the use of tokens and reinforcement weakens the intrinsic desire of the student to learn, and increases dependency on an outside agent to foster learning (read more about the use of token reinforcement and motivation in **CHAPTER 8**). 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. As noted above, punishment and aversive treatments have historically raised a concern that they may not change the actual behaviour, and may lead to resentment, hostility or worse behaviours (Roache & Lewis, 2011). 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.

RESEARCH LINKS 5.1

Using a mystery motivator

Researchers designed an intervention to reduce the problematic classroom behaviour of three Year 9 students. They were also interested in the effects of the intervention on classmates in the same classrooms. The typical problematic behaviours of concern were off-task behaviours, out-of-seat behaviours, and inappropriate vocalisations, such as talking to peers and making other inappropriate sounds.

The intervention involved a strategy known as a *group contingency* in which the behaviour of the whole group of students in a classroom is targeted. This creates a type of *interdependency* among the students, who must all work together towards the classroom behaviour management goals in order to obtain the reward known as a 'mystery motivator'.

First, baseline data about the target student behaviours and the whole class behaviour were collected in a series of classroom observations. The target students were observed to exhibit higher rates of the problematic behaviours than their peers.

Next, the teacher was trained to deliver the intervention. In the first step, students in the classroom were asked to nominate the type of rewards they would like to receive for a mystery motivator. The teacher wrote these rewards on slips of paper and placed these in an envelope labelled as *reward*. Another envelope was also filled with slips and labelled as *chance*. If the students achieved the daily classroom criterion for behaviour, a student was randomly chosen to draw a paper slip from the *chance* envelope. If the paper slip contained an *X*-symbol the students were congratulated on their performance and told they had the opportunity to earn an item or an activity the next school day. If the paper slip contained an *M*, the students were immediately rewarded with the item in the *reward* envelope. In the first week, the researchers deliberately made sure four of the five daily *chance* slips were *M*s. Gradually more *X*s were included in the *chance* envelope.

Overall, the intervention was successful in reducing the problematic behaviours of the targeted students by 40 per cent. The randomly selected classroom peers also decreased their problematic behaviours by 50 per cent. The group contingency effect was seen when one of the targeted students began monitoring his classmates' behaviours and reminding them to follow the rules so they had the chance to play the game. The researchers concluded that this small study shows preliminary support for the use of the Mystery Motivator intervention with secondary school students.

Adapted from Schanding & Sterling-Turner, 2010.

ACTIVITIES

1. Why do you think the researchers gradually added more Xs into the chance envelope? What principle of behaviourist learning was being applied here?
2. Have a discussion with your peers. Do you think this type of intervention is generally appropriate to use in high school classrooms? Is it ethical to use group contingencies in this way? How would you avoid identifying and potentially ostracising the targeted students? Can you think of other approaches to try?
3. Do some searches using terms such as 'group contingency' and 'intervention', and see if you can learn more about these types of classroom interventions.

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 5.2** gives some examples of positive and negative reinforcement, and punishment being used to increase or decrease behaviour.

TABLE 5.2 Types of reinforcement and punishment

	Reinforcement (i.e. to increase behaviour)	Punishment (i.e. to decrease behaviour)
Give something	Positive reinforcement; e.g. 'You've finished all your class work, now you can have some computer time!'	Punishment; e.g. 'You haven't stopped talking all class, so I'm giving you one demerit point.'
Take something away	Negative reinforcement; e.g. 'If you finish your homework, you don't have to wash the dishes.'	Punishment; e.g. '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:

Reinforcement

- 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 the 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 in his study of dogs salivating and Watson in his study of 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.

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 father responds to a baby's 'da-dah' by saying 'Daddy' with a smile on his face, he is shaping what he sees as the baby's first attempts to communicate with the 'da' 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
When one action functions both as a reinforcer for the previous action and as a stimulus for the next

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

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 (i.e. backward chaining), or working forwards to the completion of the task (i.e. forward chaining).

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 student 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 student in discriminating the relevant features of the stimulus; for example, a teacher can prompt the student'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 student 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 student 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 learner can learn to exhibit appropriate social behaviours without the need for cueing or prompting.

Task analysis

task analysis
Breaking a task into a series of manageable steps to assist learning

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.

Scope-and-sequence charts associated with curriculum areas (e.g. 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.

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, can be very useful but may often suffer from problems of maintenance and generalisation of the new social skills.

maintenance
The continued performance of a learnt action after instruction has ceased

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.

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), 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, specific programming must address both maintenance of behaviours and the ability of the learner to generalise or transfer the learning (Kazdin, 2013). 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 (i.e. generalised to) different settings and with different people, and ensuring skills can be maintained after prompts or reinforcements have been faded.

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 school and classroom practice

The principles of operant conditioning have found wide application in the use of ABA in practices usually directed at shaping student behaviour. Very specific applications include the use of ABA principles in interventions involving small numbers of children with challenging behaviour, intellectual disability, autism spectrum disorder or ADHD (for further examples see Coelho et al., 2015; Durand et al., 2013). More general applications of the principles of ABA can be seen today in school and classroom practices known as *Direct Instruction* and behaviour management strategies known as *Positive Behaviour Support*.

Direct Instruction

Direct Instruction (DI) is based on a theoretical assumption that all children can learn if the instruction is well designed. McMullen and Madelaine (2014) explain that the founder of the DI program method, Dr Siegfried Engelmann, advocated that instruction should be based on *what* is being taught rather than *who* is being taught (p. 138), reflecting Engelmann's view that instruction should be designed *independently* of learner characteristics.

To this end, DI is a teaching method that employs explicit teaching and testing of skills considered essential for mastery in a subject area. Scope and sequencing of the entire curriculum is a key feature of DI that distinguishes DI from other routine teaching practices that simply use direct teacher instructions to explain or deliver discrete classroom concepts (McMullen & Madelaine, 2014). Learning objectives are defined and carefully sequenced, with the teacher actively controlling each lesson in a highly organised and prescribed manner. The teacher follows a precisely scripted routine and focuses on the sequential development of specific skills across a sequenced curriculum. There is opportunity for plenty of practice (often described as 'drill and practice') and frequent use of positive reinforcement.

There is considerable evidence that supports the effectiveness of DI for teaching specific types of skills (Martens et al., 2011). A recent meta-analysis pointed out that much of this effectiveness has been demonstrated in the area of reading and literacy instruction (Stockard et al., 2018). As shown in **CHAPTER 1**, DI does have a moderate positive effect size, which also suggests the effectiveness of these interventions (Hattie, 2009; Stockard et al., 2018). However, there is also debate about whether teacher-led and controlled instruction is always necessary or sufficient.

The limitations of DI

In analysing the criticism and 'rancour' directed toward DI, McMullen and Madelaine (2014) point out a disparity between the evidence base about DI and take up in the classroom. They cite a mismatch between the approach of the DI method and the student-centred and inquiry-led philosophies of many classroom teachers today. This difference in philosophies means that some teachers are concerned that DI is too teacher-directed, resulting in passive students. Other concerns reflect the focus of DI on teaching of very specific skills and use of rote-learning or 'drill and practice' approaches (McMullen & Madelaine, 2014). Still others have raised significant epistemological concerns about DI, suggesting that *what* is taught and *who* it is taught to are both important questions in teaching. In particular, Kuhn (2007) argues that skills of inquiry and argumentation are also important and student motivation should also be considered as we cannot easily assume the readiness of all learners in the classroom at any one time.

In summary, DI is considered an evidence-based teaching practice with moderate and positive effect sizes in intervention studies. The debate continues about whether or not this is an appropriate teaching strategy in our classrooms and this often reflects the very strong differences in views and theories of learning.

Positive Behaviour Support

Positive Behaviour Support (PBS)
A behaviourist intervention designed to improve student behaviour

Positive Behaviour Support (PBS) emerged from ethical concerns about the application of behavioural approaches and particularly the use of aversive methods to manage behaviour of people with disabilities (Hieneman, 2015). PBS, and the school-based application known as school-wide PBS (SWPBS), were developed with the goal of maintaining the principles of ABA while also using approaches that were more positive and acceptable to the community (De Nobile et al., 2017; Hieneman, 2015; Sugai et al., 2000).

De Nobile et al. (2017) describe four key features of PBS approaches:

1. They are informed by scientific approaches including behavioural sciences, developmental sciences and understanding of social and environmental factors that contribute to behaviour.
2. They focus on the use of specific and targeted interventions to change behaviour that are based on solid data collection and evidence from the school environment. ABA principles, such as explicit and DI, and the use of positive reinforcement are applied (see **CLASSROOM LINKS 5.2**).
3. The interventions must be committed to positive, holistic lifestyle changes for the targeted individuals or students including better academic, emotional and social outcomes. Humiliating and physically punitive strategies must not be used.
4. A system-wide approach must be used. In school, for example, all staff and community must be supportive and involved, including the leadership team, teachers, parents and any other stakeholders.

CLASSROOM LINKS 5.2

A three-tier approach to supporting behaviour

The teaching and intervention pyramid presents a three-tier approach to supporting behaviour (see **FIGURE 5.9**). This concept originated in health prevention models. The approach describes a need for primary, secondary and tertiary levels of prevention and intervention in order to address all support needs.

Tier 1 – primary tier

At Tier 1, the *primary* prevention level of support, behaviour support is *universal* or applies to all students in the school community. It is estimated that around 80 per cent of students can be adequately supported with interventions at this level. This would include

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school-wide identification of expected behaviours; school-wide teaching, modelling, practice and reinforcement of those behaviours; and school-wide data collection to monitor success of those interventions. An example of a primary tier of behaviour support is if Joe and Kai's school decides to implement a school-wide bullying prevention program that teaches positive bystander behaviour.

Tier 2 – Secondary tier

Tier 2 is known as the *secondary* tier of behaviour support. This is targeted at a smaller number of students who may need a more intensive level of support. This could be for a small group of students like Kai who might be taught some coping strategies for how to deal with bullies on the school bus; it might also include a counselling or behaviour-monitoring approach for a group of bullies (see more in **CHAPTERS 4** and **14** about approaches to bullying).

Tier 3 – Tertiary tier

At Tier 3, the *tertiary* tier, a much smaller proportion of students may need a more individualised and highly targeted approach to supporting their behaviour. These approaches would holistically consider the systems surrounding the child. Kai, for example, may not have responded well to the Tier 2 intervention, and his aggressive responses may be increasing; similarly, the bullies may also become more covert and aggressive. At this level, an individualised behaviour support plan will usually be developed and the student may be referred for counselling and will receive an individualised intervention. Punitive strategies like school suspension are always avoided and alternative strategies are used to support the student within the school in a positive environment.

In PBS models all students continue to receive the Tier 1 universal supports, regardless of what level they are at. School participation is maintained and continues as usual in the most normative and positive environment possible. Constant data collection informs the school about whether the strategies are working and all interventions are evidence-based and implemented with high fidelity.

Adapted from Sugai & Horner, 2006.

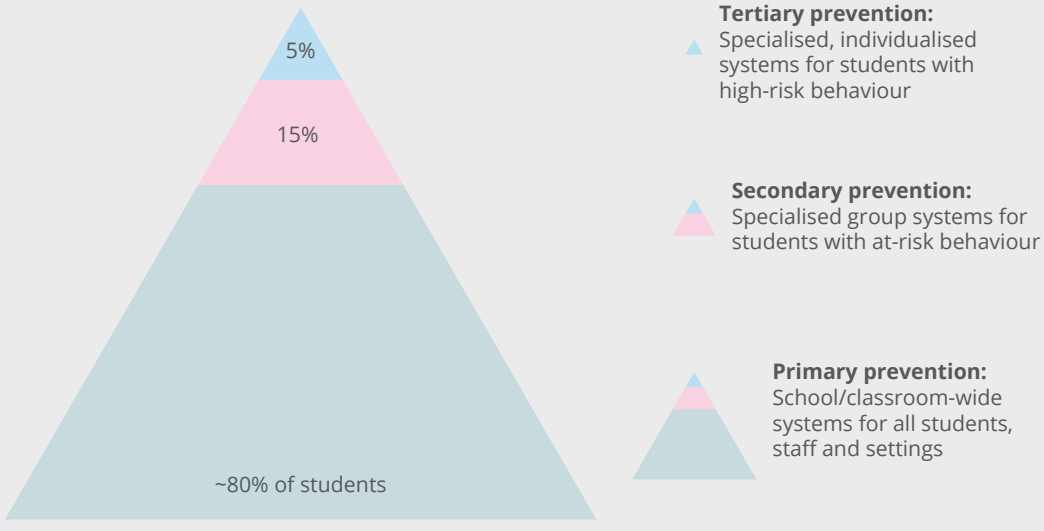

FIGURE 5.9 The three-tiered intervention pyramid

Adapted from Sugai, G. & Horner, R.R. (2006) A promising approach for expanding and sustaining school-wide positive behavior support, School Psychology Review, 35 (2) 245–259.

ACTIVITIES

1 Can you think of other examples of common primary or secondary interventions used in schools today?

2 What sort of data would the school need to collect to assess if bullying prevention interventions at each of the levels above had actually worked?

Generally, there is extensive research supporting the effectiveness of school-wide PBS but concerns have also been raised. This method of addressing positive behaviour across the school has been used to address a wide range of behavioural support needs, including applications to bullying and aggressive behaviours, with positive results (Dunlap et al., 2010). However, research has also analysed school data, resulting in the identification of cases of inequitable disparities in office referrals for poor behaviour. For example, research has noted higher rates of referrals for certain types of students, including those with disabilities and certain racial groups (McIntosh et al., 2017). This raises a concern that could be applied to any intervention methods used in schools today – the intervention method must be carefully monitored and evaluated so that any implementation maintains the highest standards of quality and ethical treatment of students being supported with the intervention.

When considering behavioural approaches to learning and intervention, Alberto and Troutman (2013) caution there is a strong need for teachers to consider the ethical grounds of any teaching or behavioural support intervention, before embarking on the intervention. This includes school-wide intervention programs, such as PBS. 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 (e.g. token rewards and sticker charts), and as a result cheapen and weaken the effectiveness of reinforcement. Similarly, the effectiveness of programs like PBS can be undermined if schools simplistically choose only to apply behaviour monitoring procedures (e.g. merit and demerit systems) rather than a holistic, systematic model of support. This is a problem we saw in Joe and Kai's classroom, where the merit and demerit system was used quite indiscriminately in the case of Kai, who clearly needed more support 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.

FIGURE 5.10 A typical use of behavioural approaches may include teaching specific skills with individualised reinforcement strategies

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Strengths of behavioural approaches to learning

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 (see **FIGURE 5.10**), 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 of behavioural approaches to learning

A major criticism of behavioural approaches is that they neglect the contribution of cognition, cognitive skills and motivation 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 effect 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).

5.5 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, some features of behavioural approaches have found widespread use in classrooms today. This is probably because techniques of reinforcement are relatively easy to use and can be implemented with a variety of learners in a range of contexts. Indeed, behavioural principles are used in everyday settings by people who may be unaware of the underlying learning principles. For example, how many teachers are using constant extrinsic reinforcement in the form of sticker charts and merit and demerit systems, without ever fading these reinforcers or checking if the behaviour can be maintained or generalised? Kai and Joe 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.

STUDY TOOLS

Chapter review

5.1 Behavioural explanations of learning

- 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.

5.2 Classical conditioning

- Classical conditioning (Pavlov) is concerned with learning that is produced when involuntary or automatic responses are triggered by specific stimuli in the environment.

5.3 Operant conditioning

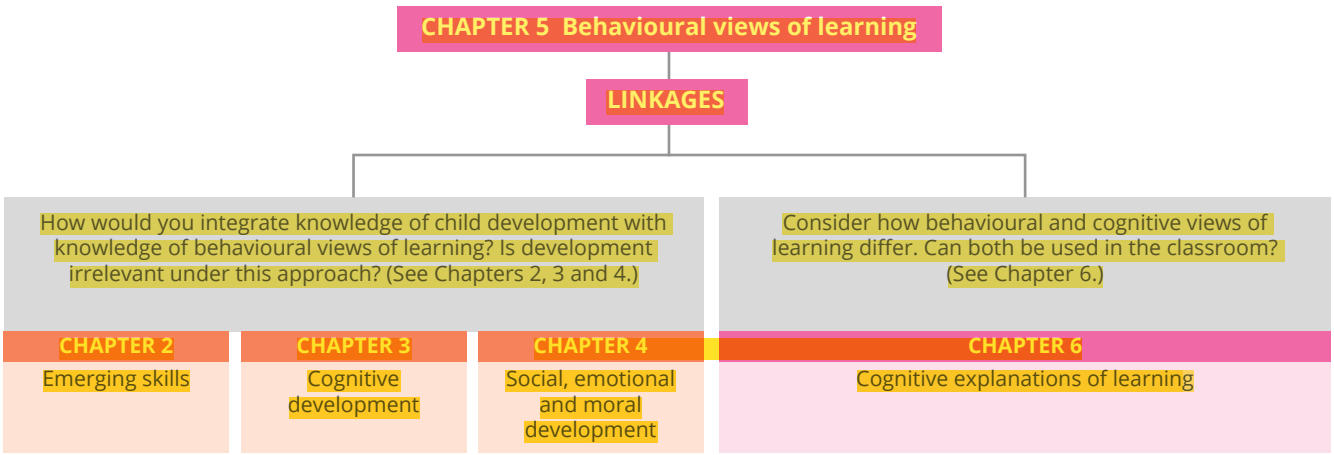
- Operant conditioning is concerned with actions that an organism initiates, and includes trial-and-error learning, the law of effect and the law of practice (Thorndike), and the learning that occurs when behaviours are rewarded or reinforced (Skinner).

5.4 Classroom applications of behaviourist views

- 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.

Putting it together

Making links between 'behavioural views of learning' and material in other chapters



Questions and activities for self-assessment and discussion

1 How does a behaviourist definition of learning differ from a cognitive explanation of learning?

2 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 examples of learning.

3 Can you think of any examples of behavioural change that benefit from the use of reinforcers? Can you think of examples where we probably should not use external reinforcers?

4 What are the main characteristics that distinguish classical conditioning from operant conditioning?
5 Give an example from your own experience of learning that occurs as a result of operant conditioning.
6 Explain the different aims of the primary, secondary and tertiary levels of the intervention and prevention pyramid.
7 Think about your personal philosophy of teaching. Does it contain elements that you would describe as a 'behaviourist' philosophy? If so, what are the ethical implications that arise from these philosophical principles?

Further research

Go further

The online appendices contain additional material that you should refer to when reading this chapter. The appendices available for this chapter are:

- Appendix 5.1 Unconditioned responses
- Appendix 5.2 Trial-and-error learning
- Appendix 5.3 Key steps of applied behaviour analysis.

Recommended websites

Association for Behavior Analysis International: https://www.abainternational.org/welcome.aspx

Council for Children with Behavioral Disorders: https://debh.exceptionalchildren.org/

Positive Behaviour for Learning: https://pb4l.tki.org.nz

Positive Behavioral Support: https://www.pbis.org

Recommended reading

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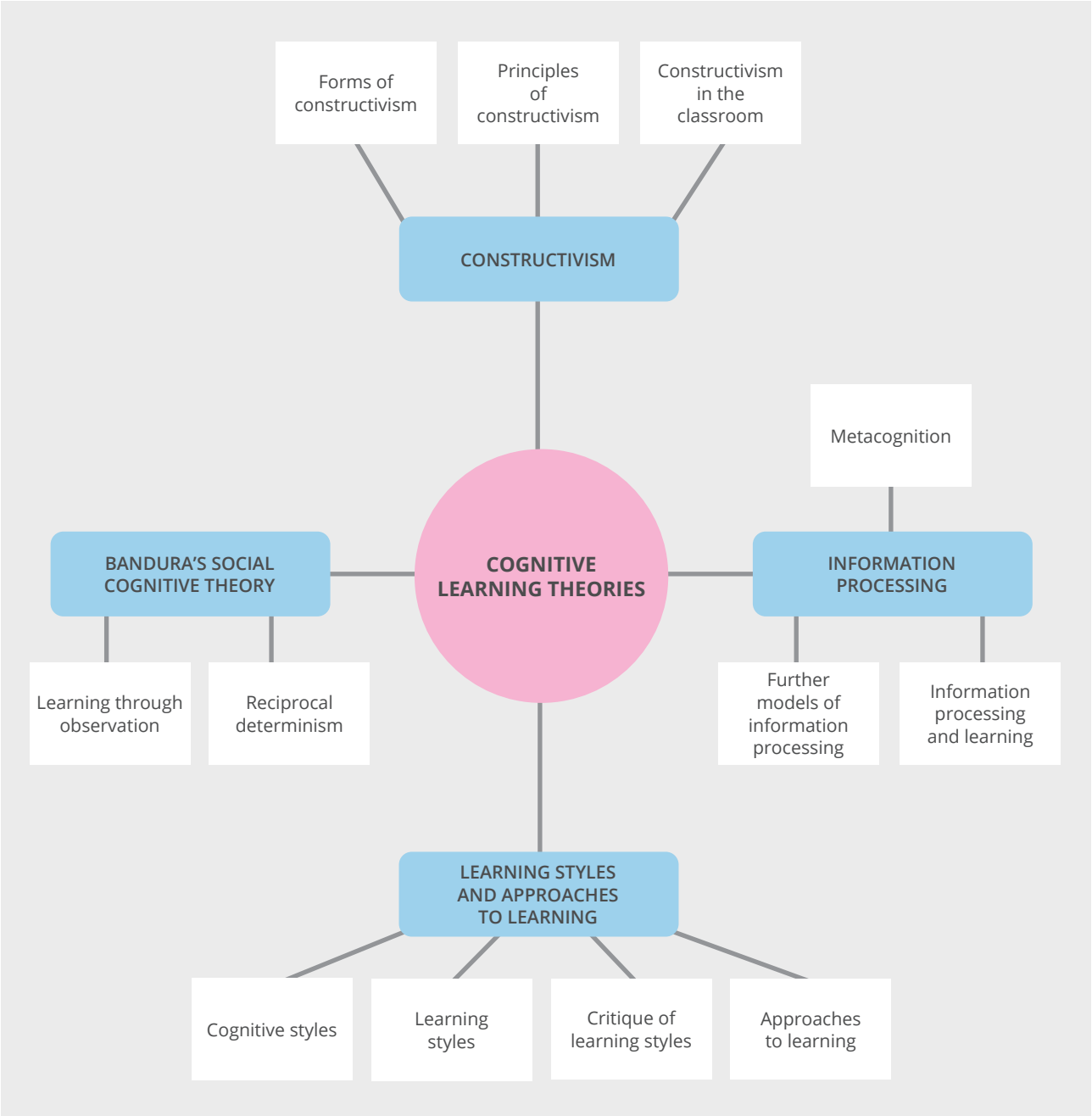
CHAPTER 6

Cognitive explanations of learning



Chapter 6 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following key 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?

MARIAM

Mariam is a science teacher who is in her third year of teaching. Reflecting on her first two years of teaching, Mariam recognised that she relied heavily on Direct Instruction as a teaching approach, because she found lesson planning and delivery easiest this way. While some of her students seemed to be learning well, she had also noticed that others were disengaged and bored in her classes. Now that Mariam felt confident in her ability to teach scientific concepts, she decided to try a more student-centred approach in her classes to try and engage more of her students.

Mariam attended a professional development workshop that focused on inquiry-based learning, a student-centred teaching approach that originated in science disciplines. Mariam saw the benefit of implementing inquiry-based learning in her classes, and started to plan lessons in which students would take the lead in posing questions, gathering and analysing data, and using this to draw evidence-based conclusions. In her lesson plans, she made sure that she included strategies for assessing what students already knew and what they understood as a result of their inquiry.

After conducting her inquiry-based lessons, Mariam reflected on what had worked well and what had been challenging. Her students were definitely more engaged in her classes and she could see that some of the students were developing the ability to plan and monitor their own learning. There were several challenges that Mariam had to work through as well. Initially, her students had struggled when Mariam would not tell them all of the information that they needed to know. She decided to run short lecture-style sessions that covered foundational knowledge, or concepts that were particularly difficult to understand. Mariam also found that she needed to provide a lot of scaffolding so that students would stay on the right track when they were conducting research and investigations. Regular assessment and feedback were important to ensure that students did not develop misconceptions as well. Despite the additional planning time, Mariam could see the value of using inquiry-based learning in her classes; especially when she combined this with direct instruction when students needed it.

Introduction

This chapter focuses on cognitive explanations of learning, which focus on internal mental processes and tend to view learners as active constructors of their own learning. The emphasis is on how learners make meaning and remember what they learn. This view of learning is quite different to the behavioural view of learning that we studied in **CHAPTER 5**, which focused 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.

6.1 Cognitive learning theories

cognitive learning theories
Theories concerned with internal mental processes and how learners manipulate information during learning

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. However, 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 with the use of external reinforcement) were not the only or necessary conditions of learning. Bandura demonstrated that children could learn vicariously simply by observing and modelling the actions of others. Importantly, Bandura demonstrated that children could in fact choose to follow these behaviours and regulate their own behaviours in accordance with what they had learnt. 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 the same era, another group of psychologists and researchers developed a cognitive view of learning that was, like Bandura's, based on the idea that humans have greater control over their own learning and could process information in meaningful ways. Broadly, this view of learning came to be called constructivism, but actually reflected several different schools of thought about how learning occurred. Some were particularly interested in how individuals constructed their own knowledge and how these cognitive structures changed and developed. Others likened the act of building these cognitive structures to a series of mental computations through which we process information. As discussed in **CHAPTER 3**, the now common view is that we take in information through our senses, then encode it, store it in memory and later retrieve it for use. This view of learning can be considered the dominant cognitive view of learning today, with a rapidly expanding body of research.

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* approach, which focuses on mental processing of information; and the *social-cognitive* approach, 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.

6.2 Constructivism

Like all cognitive approaches, constructivism is fundamentally underpinned by the idea that meaning is constructed by the learner. Constructivists believe that the learner is both mentally and physically active in the construction of knowledge, and therefore capable of self-regulating the learning process. Constructivists also hold a developmental perspective of learning, arguing that young children learn by developing increasingly complex cognitive structures, or schemas, and that they add new information to progressively build these schema (Byrnes, 1996; Yager & Lutz, 1994). Some forms of constructivism also propose that the sociocultural context in which knowledge construction occurs provides the thinker with invaluable resources, support and direction (O'Donnell, 2012). In particular, an important part of the constructivist philosophy is that learning is supported by social interaction with peers and adults as the learner develops. As learners interact with their environment, they link new information from current experiences to previous knowledge, and so construct new understandings and knowledge.

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 forms are 'psychological constructivism' and 'social constructivism' (McPhail, 2016). 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 6.1**).

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FIGURE 6.1 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.

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

psychological constructivism
Focuses on individual learners and how they construct their own knowledge, beliefs and identity

social constructivism
Emphasises the role of social and cultural factors in shaping learning

development and is an essential component of the learning process (Cobb & Yackel, 1996; Prawat, 1996). Social constructivists are interested in how peer-to-peer learning appears to extend the knowledge of peers and in the role of the teacher in structuring the learning environment to support and enable this form of learning through social interaction.

The merits of distinguishing between psychological and social constructivism and the various ways of applying it are open to debate (e.g. Phillips, 1997). In real classrooms, 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. Traditional theorists (Piaget and Vygotsky) and contemporary cognitive development theories (e.g. developmental systems theory) acknowledge the role of social interaction with peers and significant others (e.g. 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. 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

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.

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. As Mariam recognised during her lesson planning, 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 teacher can also motivate students through acknowledging their interests, or simply acknowledging the child's desire to explore their own environment.

Inquiry-based learning

Inquiry-based learning is a group of learner-centred practices that reflect a constructivist approach to learning. Inquiry-based learning originated in science disciplines (Melville, 2015), in which emphasis is placed on the scientific processes of posing questions, gathering and analysing data, and coming to evidence-based conclusions. Inquiry-based approaches are now used in a range of learning areas, such as mathematics and humanities and social sciences (e.g. history, geography, civics and citizenship).

inquiry-based learning
Students learn content and discipline-specific thinking and practical skills by collaboratively investigating and solving a problem

Students are encouraged to frame questions, think in new ways about them, organise their thinking in effective ways, and collaborate with others. Through these processes, inquiry-based learning aims to allow students to develop content knowledge and other key skills, such as self-regulation, executive functions and metacognition (Darling-Hammond et al., 2020).

There are a range of different approaches to inquiry-based learning task and curriculum design, including discovery learning, problem-based learning and project-based learning (discussed in the following sections). Inquiry-based learning activities and approaches also vary in the extent to which the teacher or student drive the inquiry process. As shown in **FIGURE 6.2**, all learning tasks can be placed on a continuum from entirely teacher-led (also known as explicit or direct instruction) to entirely student-led (i.e. discovery learning). Several meta-analyses (Alfieri et al., 2011; Furtak et al., 2012; Lazonder & Harmsen, 2016) have found that inquiry-based approaches are most successful when teachers provide guidance to students throughout the inquiry process, although the type and extent of this guidance should be matched with the needs of the learners.

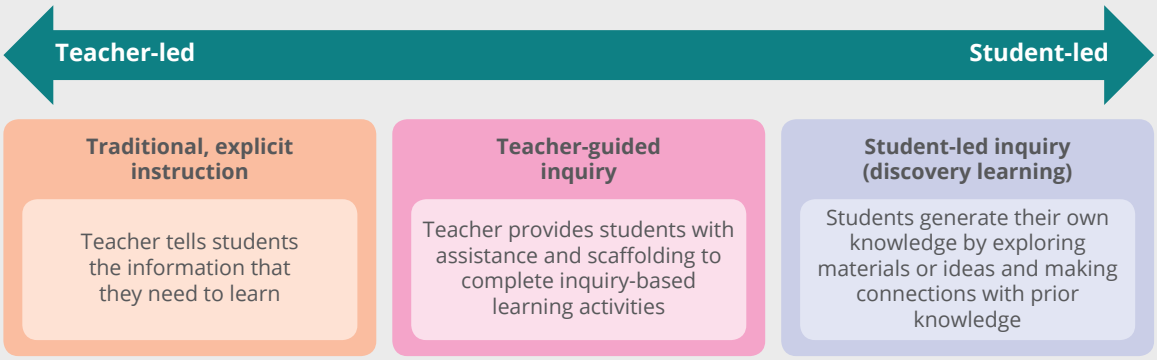

FIGURE 6.2 Inquiry-based learning continuum

De Jong and Lazonder (2014) identified a range of different ways in which teachers can provide guidance during inquiry-based learning, listed in order of the least to most specific guidance provided:

1 *Status overviews* – feedback on how much task progress has been made by students and how well students have completed the task.
2 *Prompts* – reminders or cues to students to remind them to perform an action or task.
3 *Heuristics* – reminders to perform a task, along with suggestions about how to perform the task.

4 *Scaffolds* – explanations about how to complete a task that are gradually removed as students become more capable of completing the task independently.
5 *Explanations* – direct instruction about content or a process that supports students to understand an aspect of the inquiry-based task.

An important skill for teachers to develop is the ability to determine the amount of guidance required to assist students to experience success during inquiry-based tasks without providing so much guidance that the task loses its student-centred focus. Factors such as student experience with inquiry-based learning, students' prior knowledge and individual student needs may be considered when determining the type of guidance that is most appropriate (Lazonder & Harmsen, 2016).

There is also a longstanding debate between proponents of inquiry-based approaches and direct instruction. Kirschner and colleagues (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 and colleagues (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-based learning is not 'minimally guided' approaches but employs a number of instructional approaches, including direct instruction of knowledge as well as carefully scaffolded and guided instruction when students need support. Kuhn (2007) and Schmidt and colleagues (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.

discovery learning
The learner actively manipulates materials or ideas in the learning environment and discovers connections between them

Inquiry-based learning can be implemented as individual lessons, lesson components, longer-term projects, or as a lens for curriculum design. In the following sections, we examine three inquiry-based approaches that are used in educational settings.

Discovery learning

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 (see **FIGURE 6.3**). He called this **discovery learning**. In fact 'discovery learning' also occurs quite naturally when children pull a toy apart 'to see how it works' and show a natural tendency to explore the environment. These experiences seem 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 being active participants in the problem-solving, learners are more likely to remember what they have learnt. It is also often assumed that learners will have increased motivation to continue learning, and will be able to apply their learning to solve new problems in new learning contexts.

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

Matthew Duchesne, © Milk and Honey Photography, 2010.

In practice, however, 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. This approach 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 being less effective than more directed approaches (Mayer, 2004).

Problem- and project-based learning

Problem-based learning (PBL) and **project-based learning (PjBL)** are separate but related inquiry-based approaches in which learning takes place through the process of determining solutions to problems, tasks or questions. PBL emerged from medical-education contexts (Hmelo-Silver et al., 2007) and emphasises hypothetical–deductive reasoning skills as might be required for medical-education students studying the diagnosis of disease, for example. Characteristics of PBL in school settings include:

problem-based learning (PBL)
Students learn content, strategies and learning skills through collaboratively solving problems

project-based learning (PjBL)
Students learn content, strategies and learning skills through the design and construction of a product

- problems that are complex and open-ended in nature, meaning that there is more than one potential answer
- problems that are authentic and relevant to the real world
- students are required to collaborate with one another
- students are active and autonomous in their learning (Ertmer & Glazewski, 2015).

In PjBL, students construct knowledge and develop skills by completing a project. As students work towards completing the project, they are required to design and conduct investigations, solve problems, collaborate with others and present their findings (Kokotsaki et al., 2016). In comparison to PBL, PjBL is more focused on the end product. Students usually construct a product for a particular audience, and will often present their work to a public audience at the conclusion of the project.

Both PBL and PjBL are similar in that they focus on students directing their learning, asking questions, collecting and analysing data, and applying their understanding to new situations. Both approaches also place a heavy emphasis on the cognitive activity involved in sense making. For students to learn successfully via PBL or PjBL, they need to have the skills to reflect on their understanding, seek help when required and maintain their focus on the task (English & Kitsantas, 2013). This means that students need support to develop self-regulated learning skills, which we explore later in this chapter. While some schools may use PBL and PjBL as their main approach to curriculum design, it is also possible to combine these inquiry-based approaches with traditional pedagogic approaches (Killen, 2013).

Provide opportunities for learners to work together

Constructivist approaches have included both an emphasis on individual cognitive processes and shared cognitive processes when learners work together to solve problems. Social constructivist approaches in particular emphasise the idea 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 (Darling-Hammond et al., 2020).

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

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-based learning 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**).

In cooperative learning approaches, tasks are divided between students and later combined to complete the task. This can be distinguished from collaborative learning, in which students work together towards a joint goal or task. Jeong and Hmelo-Silver (2016) argue that it can be difficult to separate cooperative and collaborative learning in practice, because group work often requires students to work cooperatively and collaboratively. Research has shown that learning in small groups has positive effects on self-concept and time spent on a task, as well as greater gains in achievement than learning individually (Darling-Hammond et al., 2020).

Vygotskian and developmental systems theorists (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, that 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 **CASE STUDY 6.1**). 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 neither absent 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.

CASE STUDY 6.1

Online collaborative learning

In a Year 6 class, students were designing and conducting a survey of students in their school for a mathematics activity. The students were placed into small groups and were given the flexibility to choose the topic that their survey would focus on.

In the brainstorming phase, the teacher directed the students to use Padlet, an online collaboration tool, to share their ideas with the class and teacher. Groups posted their ideas on the class Padlet, and the teacher and their peers used this public space to comment on the ideas. This discussion led to the generation of more ideas and each group was able to determine the focus of their survey.

While designing their survey, students were encouraged to post drafts of their questions. Students were asked to provide feedback on the survey questions of other groups, and the teacher provided a checklist for students to use when evaluating each other's work. The teacher felt that his involvement was important to guide discussion and feedback towards the requirements of the task. He found that there was a need to emphasise the learning outcomes to ensure quality of collaboration. (Initially, there was a tendency for general 'Great job!' style feedback.)

After each group had conducted their survey, their task was to analyse and present their data in a graph. This part of the task required the students to brainstorm appropriate graphs to suit the data they had collected and negotiate how to present their data within their groups. Again, students were encouraged to share their work on the class Padlet, and peers provided feedback by identifying important elements of the graphs and discussing what the findings might mean. As a result of the project, students reported a stronger understanding of how to display and interpret data. Students also enjoyed being encouraged to work together and share work, and felt they benefited from the input of their peers.

ACTIVITIES

1 Design a collaborative learning activity that could be used in your teaching area.

2 What scaffolding might students need to complete this activity successfully? How would you go about providing this scaffolding?

Peer-assisted learning

Peer-assisted learning (PAL) 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. PAL programs are quite widespread and used in many disciplines in higher education, including medical education (Ross & Stenfors-Hayes, 2017). You may have noticed that your university or college uses some form of PAL program. These programs have also been incorporated in formal 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 pairs of students take turns being the 'coach' or 'reader'. Teachers are carefully trained in specific reading strategies, and then teachers train students in specific learning strategies that they can employ in the coaching and reading sessions. Each pair earns points for good coaching or reading. These types of PAL programs are carefully designed and evaluated in intervention studies; for example, Fuchs and colleagues have found that this intervention has evidence-based benefits for students from kindergarten (Fuchs et al., 2002) through to high school (Fuchs et al., 1999). Student pairs can be similar in their ability (i.e. symmetrical peer-assisted learning) or different in their ability (i.e. asymmetrical peer-assisted learning). Research suggests that both pairing types can result in improvements in achievement and engagement (Johnson, 2017).

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

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 (Rogoff, 1990), a form of social constructivism introduced in **CHAPTER 3**, provides a useful metaphor for this. An 'apprentice' (or novice) learner is guided by an expert who provides scaffolding, modelling and practice. Eventually the novice will be able to perform tasks and work through problems autonomously and achieve expertise. 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 describe 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 the '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 (**FIGURE 6.4**). The teacher, or

FIGURE 6.4 Peers can be involved in cognitive apprenticeship through peer-teaching programs

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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

'Reciprocal teaching', a method of teaching reading comprehension developed by Palincsar and Brown, and based on Vygotsky's work (refer to **CHAPTER 3**), is an example of cognitive apprenticeship commonly used in classrooms. 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 **CLASSROOM LINKS 6.1**). 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 both reflective learning and teaching.

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 (Explore constructivist-style questioning in Appendix 6.1 online).

GO FURTHER

Appendix 6.1
Promoting higher-order thinking through constructivist-style questioning

Thinking critically about constructivist approaches

Constructivism has wide support, both from teachers and from research (e.g. De Corte & Verschaffel, 2006), but it has also attracted criticism. For example, Rowe (2007; also Dinham & Rowe, 2008) argued strongly that although constructivism is a well-established theory of learning, it is not a theory of teaching. As we have seen above, several theorists have argued against approaches that leave students to discover or construct knowledge on their own, with minimal instruction, guidance or intervention from the teacher. However, as we have demonstrated in this chapter, there are many forms of constructivism that involve 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.

One way in which constructivism has been effectively integrated into teaching approaches has been through the phases of '*modelled, guided and independent*' practices that are common in reading programs (e.g. 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

CLASSROOM LINKS 6.1

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. Teachers can use the taxonomy 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.

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.

TABLE 6.1 Anderson and Krathwohl's revision of Bloom's taxonomy and example tasks or activities

Cognitive process dimension	Skill descriptions
Remembering	Make a timeline 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.

Adapted from Killen, 2013.

ACTIVITIES

Choose a topic from your teaching area, and write one or two question prompts that would allow students to demonstrate their ability in each level of Anderson–Krathwohl's taxonomy.

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 research in the introduction to this book (see **TABLE 1.3**). 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 of the constructivist approach

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 of the constructivist approach

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 (Akuma & Callaghan, 2019). 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, 2013). 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.

IMPLICATIONS FOR EDUCATORS 6.1 presents a summary of the constructivist approaches that have been discussed throughout this section, as well as some related strategies for classroom use.

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.

IMPLICATIONS FOR EDUCATORS 6.1

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 that 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	**Inquiry-based learning/PBL/PjBL:** The learner poses questions, researches possible answers and solutions; uses active problem-solving **Discovery learning:** The learner works with materials and ideas, discovering connections between them; 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 PAL 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

6.3 The information-processing approach

information-processing model
Likens the human mind to a computer that interprets, stores and retrieves information

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.

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 shown in **FIGURE 6.5**, 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* (believed to be a more accurate term to describe the capacity to work with 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 the working 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.

executive control
Higher-level functions that help with the control of processes and flow of information

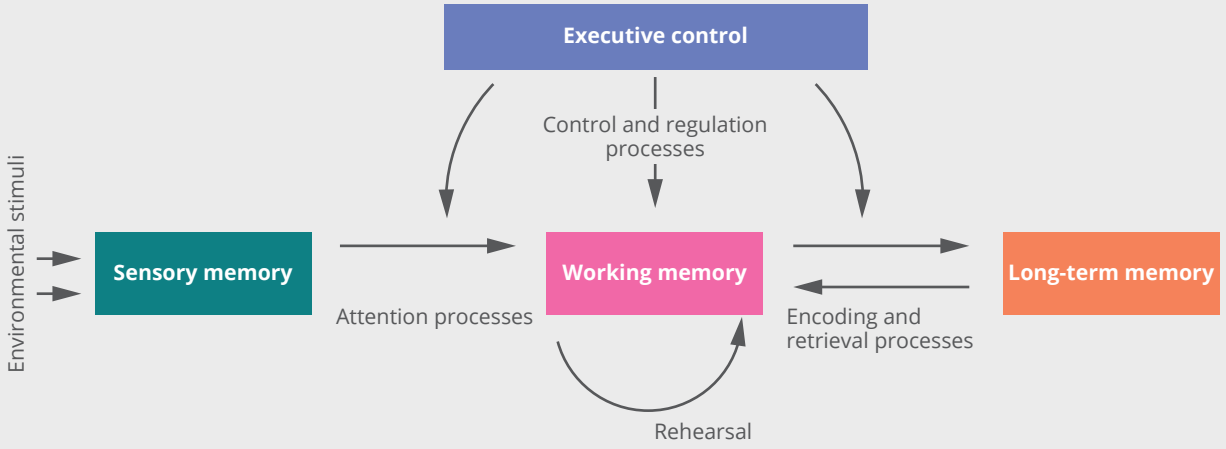


FIGURE 6.5 The multistore model of information processing

Sensory memory and learning

Recall from **CHAPTER 3** that we take in information through our senses and assign meaning to it (i.e. 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**.

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 **CLASSROOM LINKS 6.2**).

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?

Source: © 1998, Dr Graham Cooper, School of Education Studies, The University of New South Wales.

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. Such things as loud noises, bright colours and surprising events command attention without our deliberate planning. The individual learner also plays a role in controlling their attention through the executive control (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. 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 (e.g. the colour of the seats and noise coming from outside). 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 (i.e. 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.

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. However, research suggests that attention generally cannot be shared in this way between unrelated tasks, and the performance of one or both of the tasks will be negatively affected (Carrier et al., 2015). 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 (i.e. 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 rapidly switching 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. **FIGURE 6.7** shows another example of this.

Shopping List A

• vegemite	• nectarines	• toothbrush
• dental floss	• bread	• mangoes
• butter	• soap	• pears

Shopping List B

pears	bread	toothbrush
mangoes	butter	soap
nectarines	vegemite	dental floss

FIGURE 6.7 An example of chunking is that of a typical shopping list. Which of these identical lists of items would you find easier to remember? 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 (Diamond, 2013). Appendix 6.2 provides an example of information processing in action.

GO FURTHER

Appendix 6.2
Example of information processing in action

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 **CLASSROOM LINKS 6.2**).

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?

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 (e.g. information processing perhaps!).

cognitive load
The total demands made on working memory at any one time

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 et al., 2011). A number of effects have been identified by this research and are described in **CLASSROOM LINKS 6.2**.

CLASSROOM LINKS 6.2

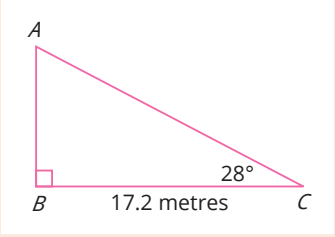
Cognitive load and instructional design

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 et al., 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 et al., 1983). For example, in the following diagram, 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 do not spend time working back and forth between the question and the information given in the diagram.



Source: Cooper, G. (1998).

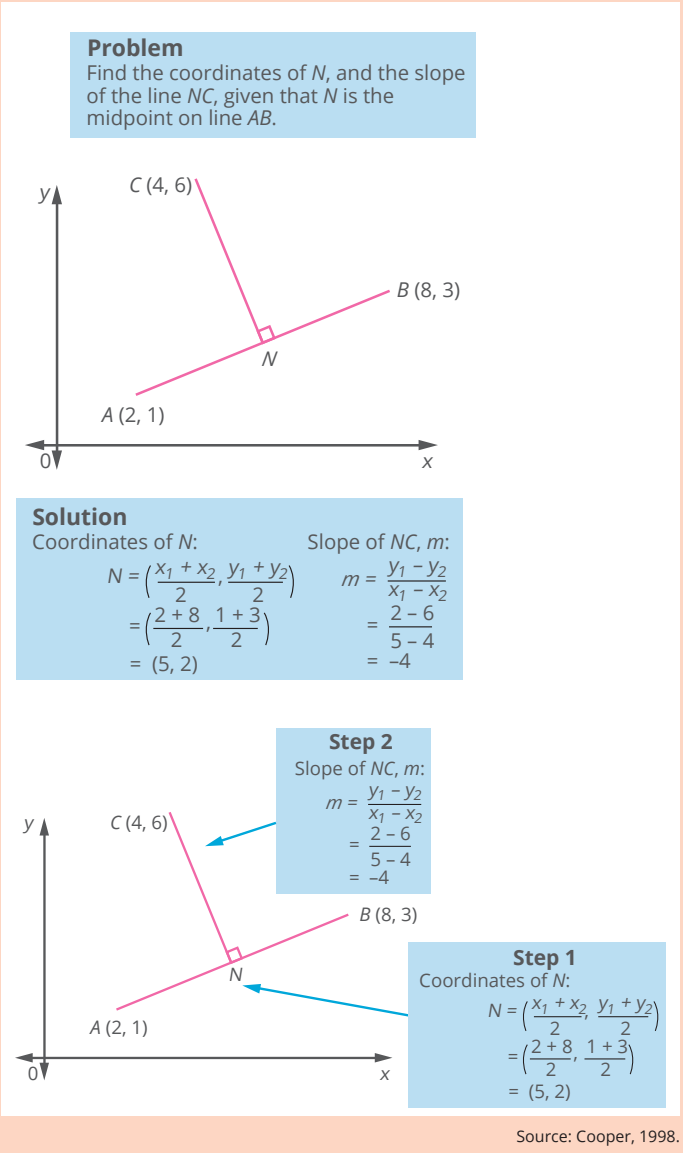
Worked examples

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 another similar 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.

>>



Source: Cooper, 1998.

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 of related information (e.g. visual and auditory), which are both needed to convey meaning to the learner. Presenting the *same* information in visual and auditory forms (e.g. when text on a PowerPoint slide is read out) inhibits learning, as extra resources are spent processing redundant information. You can read more about how cognitive load theory applies to multimedia learning in **CHAPTER 12**.

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 and colleagues (2011) identified research that showed that imagination (i.e. 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 (i.e. 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.

Examples drawn from Sweller et al., 2011; Cooper, 1998.

Long-term memory and learning

The third component of the multistore model shown in **FIGURE 6.5** 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, January and February 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. Consider **FIGURE 6.8**; which types of memory might be involved here?

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.

FIGURE 6.8 The three main types of long-term memory are episodic, procedural and semantic memory. Can you identify which types of memory were drawn on when this mother thought about how much soil was needed for this vegetable garden?

Shutterstock.com/stockphoto mania

As with working memory, a range of intervening processes helps 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).

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. 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

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, and refers to our ability to monitor, control and organise our own mental activities (Cantor et al., 2019). Metacognition can be thought of as a 'higher-order' cognitive process closely linked and implicated in our executive function and self-regulation (Roebers & Feurer, 2016), as discussed in **CHAPTER 3**.

metacognition
Higher-order thinking, which involves knowledge of and control over our own cognitive processes

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, as discussed in **CHAPTER 3**, is concerned with setting goals (planning), controlling thoughts and behaviour, and resisting impulses to direct our attention elsewhere (Howard et al., 2019). Self-regulated learners regulate their actions, cognitions, beliefs and motivations by selecting their own approach to learning and using appropriate learning strategies for different situations (Cantor et al., 2019).

self-monitoring
A metacognitive activity that involves monitoring how well we are understanding and remembering

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 6.9**, metacognition functions as an executive control that oversees our capacity to plan, monitor, regulate, question, reflect on and review our cognitive processes. Learn more about the difference between cognition and metacognition in Appendix 6.3 online.

GO FURTHER
Appendix 6.3
The difference between cognition and metacognition

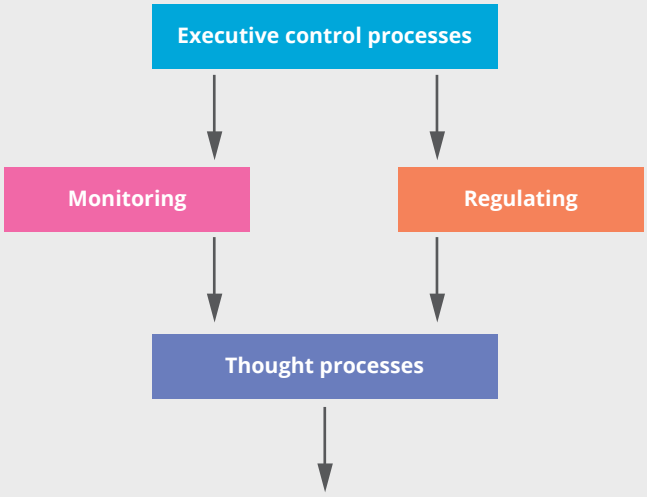


FIGURE 6.9 Metacognition is like a company executive overseeing (monitoring and regulating) the workers (thought processes) of the company

Adapted from Kluwe, R. H., 'Cognitive knowledge and executive control: Metacognition', in D. R. Griffin (Ed.), Animal Mind – Human Mind, 1982, pp. 201–24.

Metacognitive knowledge

Flavell (1979) described three forms of metacognitive knowledge: of person, of task and of strategy. These forms of knowledge can also be described as *declarative*, *procedural* and *conditional* forms of knowledge. 'Person knowledge' (i.e. declarative) 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' (i.e. procedural) is the metacognitive knowledge that different tasks require different procedures and different types of skills (Ellis et al., 2014; 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 hold conditional forms of knowledge that help us understand when to draw on our cognitive forms of knowledge and when to apply specific learning strategies. 'Strategy knowledge' develops over time and there are many types of metacognitive strategies, which can be broadly grouped into three categories: planning, monitoring and evaluating. (Pintrich & DeGroot, 1990; Pintrich & Schunk, 1996; Wittrock, 1991). (See **FIGURE 6.10** for some examples of metacognitive strategies.)

Strategy knowledge (i.e. conditional) involves knowing which metacognitive strategies to use and when, in order to accomplish a set task (de Boer et al., 2018). 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 6.11**). Strategy knowledge helps learners to be efficient and effective by giving them the means to select the most appropriate metacognitive strategies for their purpose.

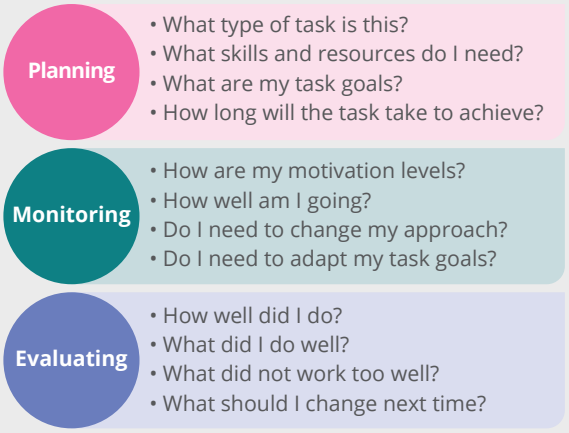


FIGURE 6.10 Metacognitive strategies and some examples of self-questions

Adapted from Pintrich, P. R., & Schunk, D. H. (1996).

FIGURE 6.11 Metacognitive strategy knowledge involves knowing how to use resources efficiently to solve a problem, such as writing an essay

Matthew Duchesne, © Milk and Honey Photography, 2010.

Metacognitive experience

We also have 'metacognitive experiences', which include feelings related to particular cognitive activities (Ohtani & Hisasaka, 2018). Types of metacognitive experiences include:

- *judgement of confidence* – a self-evaluation of performance in a task, compared to the learner's perception of the standard that the task requires
- *interest in the task* – how enjoyable or valuable a learner finds the task
- *feelings of difficulty* – the learner's perception of how difficult a task is, which is influenced by factors such as task complexity, self-efficacy and cognitive load (Dindar et al., 2020; Efklides & Metallidou, 2020).

For example, you may feel anxious when you realise you do not understand something important your lecturer is explaining to the class. This is an example of a metacognitive experience because you are reflecting on how poorly you are processing the information being shared (i.e. judgement of confidence) and you are concerned because you do not understand it (i.e. feeling of difficulty). Metacognitive 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 6.12**, while **CASE STUDY 6.2** presents an example of the role of metacognition in the classroom.

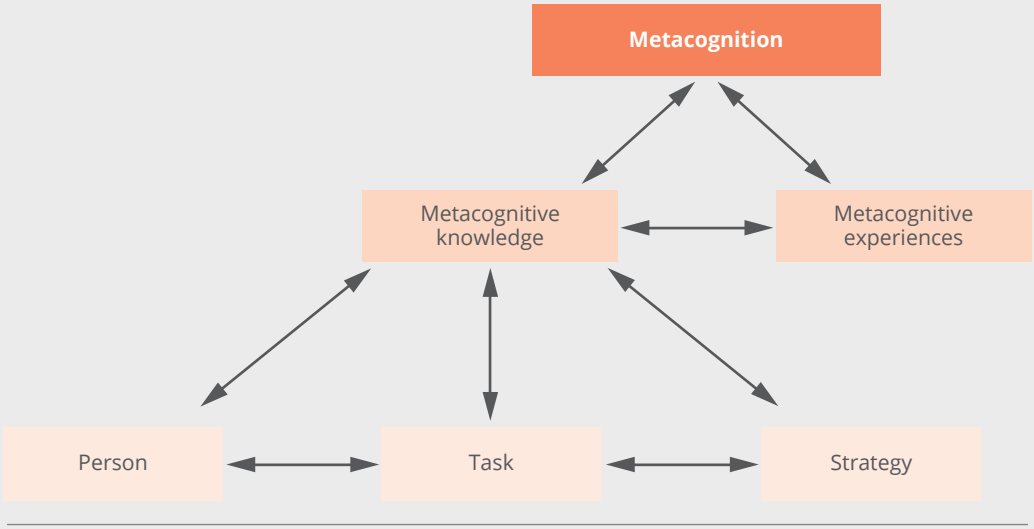


FIGURE 6.12 Dimensions of metacognition

CASE STUDY 6.2

Information processing and metacognitive processes at work

Charlie is completing a sheet of maths problems. She focuses on the tasks by completing one at a time, ignoring distractions in the classroom and the building work outside. There is a mix of harder and easier problems and she switches between different strategies for each one. For more complex problems like 12 × _ = 144, she might have to keep the subtotal in mind very briefly, before doing the next part of the calculation to reach the result. Charlie also needs to monitor how fast she is working; she only has a limited time and must evaluate her progress. She knows her 12 times tables off by heart, and can simply write an answer for this problem. But what if it was not a times table she remembered, such as 14 × 13 = _? She decides to do all the 'easy' ones first and then concentrate on the harder ones. She can do some of these problems 'in her head' and for some she makes notes on the page. She finishes the sheet and goes back over her answers, checking each solution.

Adapted from Roebers & Feurer, 2016, p. 39.

ACTIVITIES

There are several examples of information processing and metacognition in this scenario.

1 Draw up your own information-processing model for Charlie by listing all the different processes and strategies involved at each phase of the model.

2 Can you provide an example of sensory input, attentional processes, working memory or higher-order executive processes?

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 might 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?

Metacognitive strategies and learning

As shown in **FIGURE 6.12**, Flavell's early work also identified the role of strategies in metacognitive monitoring. Strategies are the ordered or systematic processes we use to direct our cognitive processes and ensure that our goals can be met. These are linked to our metacognitive knowledge and are 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. Further examples of metacognitive strategies are provided in Appendix 6.4 online.

GO FURTHER
Appendix 6.4
Teaching metacognitive strategies

Research indicates that students benefit from using metacognitive strategies, with a positive relationship between academic performance and metacognitive awareness (Callan et al., 2016). Importantly, metacognitive awareness and strategies can be effectively taught in classrooms. For example, a study with students in a Year 8 physics class found that explicitly teaching students about metacognitive strategies resulted in improvements in metacognitive strategy use, motivation and conceptual understanding (Zepeda et al., 2015). In another study, Year 6 and 7 students who were struggling with writing skills took part in an intervention in which monitoring and evaluation strategies were taught alongside explicit instruction about the writing process (Torgerson et al., 2014). This study found that students' writing capabilities improved substantially after the intervention. 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.

Taken together, these studies show that educators have a significant role to play in raising students' awareness of their own thinking (Jiang et al., 2016), and in teaching them how to monitor their strategic behaviour and performance (Quigley et al., 2018). Where possible, metacognition should be taught in an applied way, rather than as specific 'metacognition lessons' (Perry et al., 2019). However, an important first step is for teachers to become more self-aware and develop their own metacognitive skills so that they can model these skills to students (Jiang et al., 2016; Wilson & Bai, 2010). **IMPLICATIONS FOR EDUCATORS 6.2** discusses some specific strategies that can be used in the classroom to support metacognition.

IMPLICATIONS FOR EDUCATORS 6.2

Metacognitive strategies in the classroom

Here are some strategies to use with your students:

- Teach and model metacognitive strategies explicitly (Zepeda et al., 2015), particularly in the basic skills of literacy and numeracy (Maqsud, 1997).
- 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 6.3** provides an example of how to foster metacognition through modelling.

>>

TABLE 6.3 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

Further models of information processing

levels-of-processing model
A process-oriented approach that attaches most importance to the type and depth of processing taking place

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.

connectionist model
Views the brain as a complex network of interconnected units of information, with information stored in patterns of connectivity

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 2.9**). 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**.

Computer-based modelling

As explained by Munakata (2006), 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. 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 (2012) 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. For example, how do individuals actively construct or *orchestrate* those cognitive strategies that help make sense of information?

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.

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?

Information processing and learning

How can these views of information processing help a 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). 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. 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 using 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 6.4** gives some examples of strategies known as mnemonic devices that help us to remember information by associating new information with meaningful images or contexts. **CLASSROOM LINKS 6.3** provides some principles of instruction drawn from cognitive learning theory and research.

TABLE 6.4 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 – e.g. 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.

CLASSROOM LINKS 6.3

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, as follows, 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.

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 (e.g. 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). 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 (e.g. 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.

CLASSROOM LINKS 6.4 presents some implications of the information-processing approach for classroom practice.

CLASSROOM LINKS 6.4

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 6.4**).

6.4 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 (1977) developed his 'social learning theory', which recognised the contribution of personal (i.e. 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 the Bobo doll series of experiments (see **RESEARCH LINKS 6.1**), Bandura and colleagues were able to demonstrate that learning could occur vicariously *without* the use of external consequences (i.e. reinforcers), and without the need for repeated trial-and-error learning, contradicting major tenets of behavioural theory (Bandura, 1965).

RESEARCH LINKS 6.1

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 et al., 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 (i.e. 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 as '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.

>>

Albert Bandura in front of a photograph of a child participating in the Bobo doll experiment

Getty Images/Jon Brenneis

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* (i.e. 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 (i.e. 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).

FIGURE 6.13 Self-regulation enables this writer to correct her own writing without needing external reinforcement

iStock.com/Ridofranz

Bandura proposed that human beings were capable of self-regulating (i.e. self-motivating) and determining their own behaviour (see **FIGURE 6.13**); 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 (i.e. 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 that influence learning, such as motivation and self-efficacy beliefs. 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 (i.e. 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, humans have a unique capacity to alter their own environment by choosing actions and behaviours that will shape or respond to it. 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 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 (i.e. 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 6.14**, which demonstrates the reciprocal (i.e. bidirectional) links between these factors.

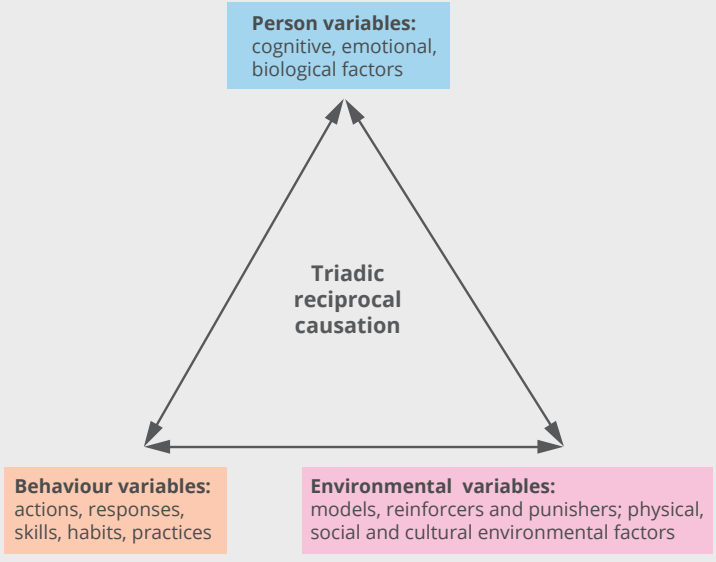


FIGURE 6.14 Bandura's triadic reciprocal causation: behavioural, environmental and personal factors mutually influence one another

For example, consider Jonathon, who is a student in Mariam's Year 8 science class (we introduced Mariam at the start of this chapter). Jonathon is one of the students who was disengaged in Mariam's lessons when she relied heavily on direct instruction. This distracted and disinterested behaviour stemmed from a combination of the learning environment (which Jonathon did not find stimulating) and Jonathon's cognitive processes (Jonathon has difficulties with cognitive self-regulation and has a low self-concept in science). Because Jonathon was often distracted in class, he missed important information. This meant that he was falling further behind in class, further reducing his self-concept. When Mariam switched to a more learner-centred teaching approach, Jonathon's interest in science increased because he could see how the concepts were linked with his interests and everyday experiences. The new learning environment gave Jonathon more control over his learning, and he had more opportunities to work collaboratively with his peers. Over time, Jonathon's scientific understanding and self-concept increased, and he was much more focused on class activities. This example demonstrates how cognitive, behavioural and environmental conditions interact to produce reciprocal determinism.

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 can both support or undermine our self-efficacy. Vicarious experiences (e.g. 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.

Strengths of social cognitive theory

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 that 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 of social cognitive theory

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 (e.g. Bandura et al., 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 exposure to violence in media, and an increase in aggressive behaviour (e.g. fighting, arguing and bullying) and a decrease in prosocial behaviour (see **FIGURE 6.15**; Bender et al., 2018; Coyne et al., 2018).

IMPLICATIONS FOR EDUCATORS 6.3 explores some classroom implications of social cognitive theory.

FIGURE 6.15 Research suggests that exposure to violent videogames and other media can have negative outcomes for children and adolescents

Alamy Stock Photo/PBWPIX

IMPLICATIONS FOR EDUCATORS 6.3

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. Teachers can:

- 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.

6.5 Learning styles and approaches to learning

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' (e.g. 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.

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

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. 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 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 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 6.16**. 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 (i.e. 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 (i.e. field independence), rather than the background scene. The way we perceive the world is an important element of cognitive style.

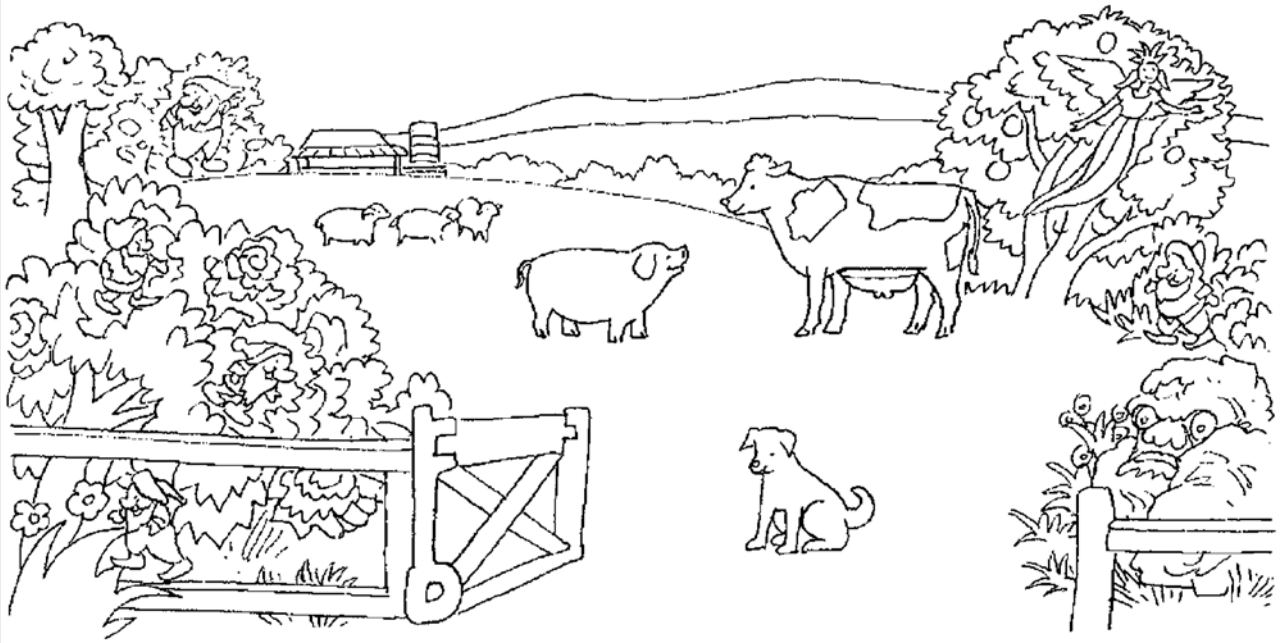


FIGURE 6.16 Can you find a gargoyle, a key, a hat, five dwarves and a fairy?

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.

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')

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. In learning contexts, field-dependent learners may tend to use rehearsal strategies, repeating information mentally, orally or in writing (Jonassen & Grabowski, 2012).

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-independent learners tend to rely more heavily on elaboration strategies (Jonassen & Grabowski, 2012). 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). There is some evidence (e.g. 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 (Jonassen & Grabowski, 2012).

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

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

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** (see **FIGURE 6.17**).

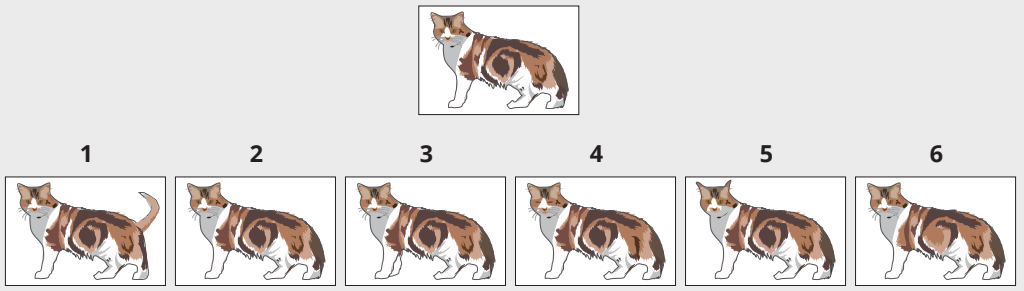


FIGURE 6.17 The speed of response to this kind of task determines impulsivity or reflectivity
Source: Matching Familiar Figures Test (MFFT20), Educational Engineering Lab, University of Zurich. Available at: www.project-hortus.net/mfft-framework/groupfiles/webexperimentlist.html

Various studies have reported on the impact of conceptual tempo on children's learning (for a review of this research, see Jonassen and Grabowski, 2012). In general, reflective children take longer to complete tasks but are often more accurate than their more impulsive peers. They are also often better readers, have better metacognitive skills and tend to excel in student-centred learning tasks. The value of helping impulsive learners to become more reflective has also been demonstrated. For example, Navarro and colleagues (1999) reported success in a training program that aimed to help children in Year 3 solve arithmetic problems by becoming more reflective. Not surprisingly, the intervention program had no impact on the performance of reflective students. More recent research has examined the role of impulsive and reflective cognitive styles on the consumption of fake news and conspiracy theories, and the tendency to use technology (e.g. smartphones) to answer simple questions, with evidence suggesting that reflective thinkers are less likely to engage in these behaviours (Pennycook et al., 2015).

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 (Cantor et al., 2019).

Multiple studies 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 (Kitayama et al., 2019). However, it is important to note that although these differences do exist, they are not fixed, and they are very much influenced by the surrounding cultural context, and hence malleable or changeable (Nisbett & Miyamoto, 2005). Similarly, Biggs (2001) cautions against stereotyping learners from particular cultures, and emphasises the importance of considering cognitive style in a cultural context. 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 (Kirschner, 2017; Newton, 2015). 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 (i.e. visual, auditory, reading, kinaesthetic/tactile) approach to learning styles. Various theories (e.g. Dunn & Griggs, 2003; Dunn et al., 1984; Fleming & Mills, 1992) have espoused a view that learners have a preference for receiving information in a visual form (i.e. looking at pictures, using diagrams to interpret information), an auditory form (i.e. listening, discussing and talking), or a kinaesthetic/tactile form (i.e. 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 and colleagues (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 that use this view of learning styles to present different teaching approaches 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 an 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, 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 UK, and the second is a review conducted by Pashler and colleagues (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 and colleagues (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 et al., 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.

Pashler and colleagues' (2008) more recent review, 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. Since the publication of that review, a range of well-designed, independent studies 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 (e.g. Husmann & O'Loughlin, 2019; Rogowsky et al., 2015). Given the substantial body of evidence that shows no relationship between matching instruction with learning styles and increased learning, learning styles are now referred to as a 'neuromyth' (Nancekivell et al., 2020; Newton, 2015).

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, a student who self-identifies as a 'visual learner' might avoid learning a musical instrument because they view music as primarily suiting an 'auditory learner' (Newton, 2015). 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 (Kirschner, 2017). Nancekivell and colleagues (2020) also discuss the waste of time and resources that occurs when teachers create learning activities to match students' individual learning styles (when research shows that students learn more effectively when they receive information in multiple ways).

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.

Approaches to learning

Another body of research, a little different but similar to the cognitive styles research, considers how learners approach learning tasks or course selection. This research is distinguished from the cognitive style research above because it is more concerned with motivational styles (Dolmans et al., 2016).

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 (Dolmans et al., 2016).

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 (e.g. 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). Unsurprisingly, research with primary-aged students suggests that a surface approach to learning is related to poorer achievement in mathematics (García et al., 2016).

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 and colleagues (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 **RESEARCH LINKS 6.2**).

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 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.

RESEARCH LINKS 6.2

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.

Adapted from Campbell et al., 2001.

ACTIVITIES

1 Search for this research article online or in your university library. The full article contains much more detail, with illustrative examples from participants:
Campbell, J. et al. (2001). Students' perceptions of teaching and learning: The influence of students' approaches to learning and teachers' approaches to teaching. *Teachers and Teaching: Theory and Practice*, *7*(2), 173–87.
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?

6.6 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.

STUDY TOOLS

Chapter review

6.1 Cognitive learning theories

- Cognitive views of learning focus on internal mental processes, and on learners as active constructors of meaning.

6.2 Constructivism

- Constructivist approaches emphasise the role of social interaction and the impact of sociocultural factors on our ability to process information.
- The four key principles of constructivism are:
  - learners are active participants in learning
  - learners are self-regulated
  - social interaction is necessary for effective learning
  - learners' knowledge may be relative, since learners construct their own meaning, which depends on individual factors, such as prior knowledge and sociocultural context.

6.3 The information-processing approach

- 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: sensory memory, working memory and 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.

6.4 Bandura's social cognitive theory

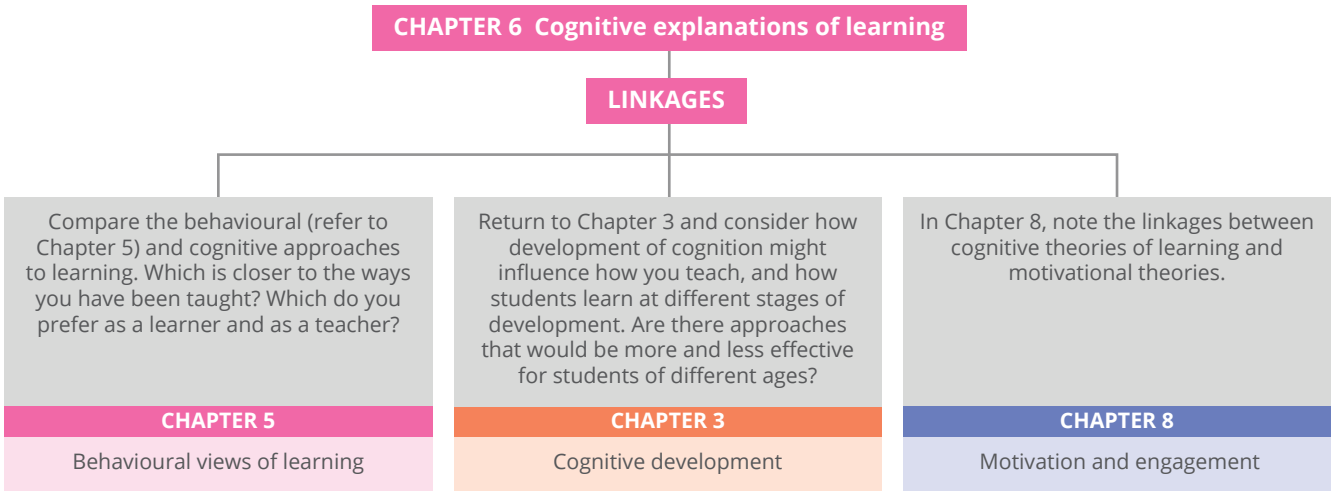
- Cognitive learning theory offers several explanations of why we forget, three of which are that:
  - memory decays over time
  - long-term memories interfere with each other and inhibit remembering
  - we do not always have the necessary cues to retrieve stored information.
- The social cognitive approach 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.

6.5 Learning styles and approaches to learning

- 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 (e.g. deep or surface approaches to learning).

Putting it together

Making links between 'cognitive explanations of learning' and material in other chapters



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 (i.e. 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?

Further research

Go further

GO FURTHER

The online appendices contain additional material that you should refer to when reading this chapter. The appendices available for this chapter are:

- Appendix 6.1 Promoting higher-order thinking through constructivist-style questioning
- Appendix 6.2 Example of information processing in action
- Appendix 6.3 The difference between cognition and metacognition
- Appendix 6.4 Teaching metacognitive strategies.

Recommended websites

Brain information: https://brainconnection.brainhq.com

Buck Institute for Education PBL Works: https://www.pblworks.org

Examples of student-centred learning approaches:

High Tech High: https://www.hightechhigh.org

MindTools memory techniques: https://www.mindtools.com/memory.html

Recommended reading

Corno, L.M., & Anderman, E. (2015). *Handbook of educational psychology* (3rd ed.). Taylor and Francis.

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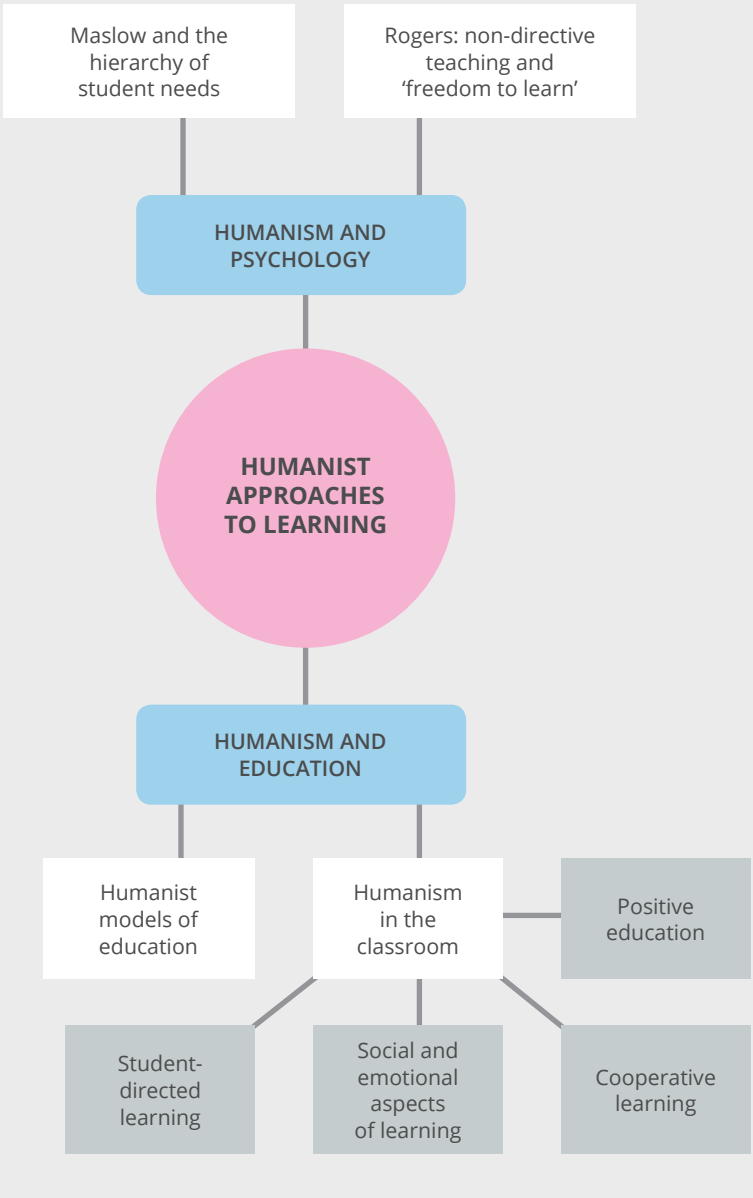
CHAPTER 7

Humanist approaches to learning



Chapter 7 concept map

KEY QUESTIONS

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

- How did 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?

CHARLOTTE AND JUSTIN

In 2021, following the period in which students learnt at home during 'lockdown' procedures aimed at restricting community transmission of COVID-19, teachers at many schools met to plan what teaching would look like when students returned to school. At one school, some teachers advocated careful assessment of students' learning to pick up what might have been missed while students learnt at home. This would then be used to identify what teachers needed to target with their teaching. Others urged for students' wellbeing needs to be prioritised, and particularly their needs for social interaction with their peers, which had been missed during the lockdown, along with needs for physical activity. Charlotte suggested that the students should be consulted about what they thought they had missed, what they felt they needed, and what they wanted to focus on when they returned to school: 'It will ultimately tell us what will support their wellbeing; as well as what they need to learn. They know, they've been doing this work on their own over the past weeks.' Justin also wondered whether it might be possible to find ways to do all of this. 'There must be approaches that target wellbeing at the same time as content learning. In fact, I'm sure we all have social interaction happening to some extent in our classes, don't we? PE lessons have students working in teams, and so do science lab classes. I get my history students discussing various ideas regularly. Are there other ways to be looking after wellbeing while teaching the content?'

Introduction

This chapter is concerned with humanistic approaches to education, which consider the broad needs of students, 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 (i.e. thinking) and affective (i.e. 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 with teaching 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 aim to teach the whole child, and increasingly by all schools as wellbeing becomes an important consideration.

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, but this does not mean that content is necessarily ignored.

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. In the 21st century, humanist approaches to education have included various approaches to democratic and citizenship education drawing on the work of theorists such as Henry Giroux, Paolo Freire and Wim Veugelers (see Sant, 2019 for a review).

THINK ABOUT

- What is school education for? What should its main goal be?

7.1 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 as opposed to the supernatural or divine. 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. 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.

7.2 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 (see **CHAPTER 5**), and psychoanalysis, represented by Sigmund Freud. 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; e.g. sexual desires and aggression) and social expectations and values. Humanist psychology began to emerge in the 1950s as a reaction against the 'over-scientific' 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 (1968) 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. He took notes about successful individuals and the way they behaved, finding it significantly different from the behaviour of the mentally 'ill' people he had been treating. Maslow argued 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. Maslow saw motivation as arising from the desire to satisfy basic needs and growth needs.

Maslow (1968; Maslow & Lowery, 1998) described humans' **basic needs** and **growth needs** originally in terms of five ascending levels, later extending these to eight (see **FIGURE 7.1**) by differentiating the growth needs (Huitt, 2011):

1 *Food, shelter, clothes* – sometimes referred to as physiological needs; these are 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* – feelings of affection, such as those found in a family, a community, a clan, a gang or a friendship.
4 *Respect, esteem, approval, dignity, self-respect* – these involve two sets of needs:
   - *respect from others,* including status, public recognition and acclaim, even fame and, in some instances, dominance
   - *self-respect and feelings about the self,* including a sense of competence, self-confidence, independence and freedom.
5 *Cognitive needs* – such as knowledge, understanding and exploration.
6 *Aesthetic needs* – such as 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, this describes the need to help others find self-fulfilment and achieve one's full potential.

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% of adults) truly reached the Level 7 and 8 of development, identifying historical figures such as Mahatma Gandhi, Albert Einstein, Abraham Lincoln and Eleanor Roosevelt as examples of people who reached this level (Maslow, 1968).

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

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

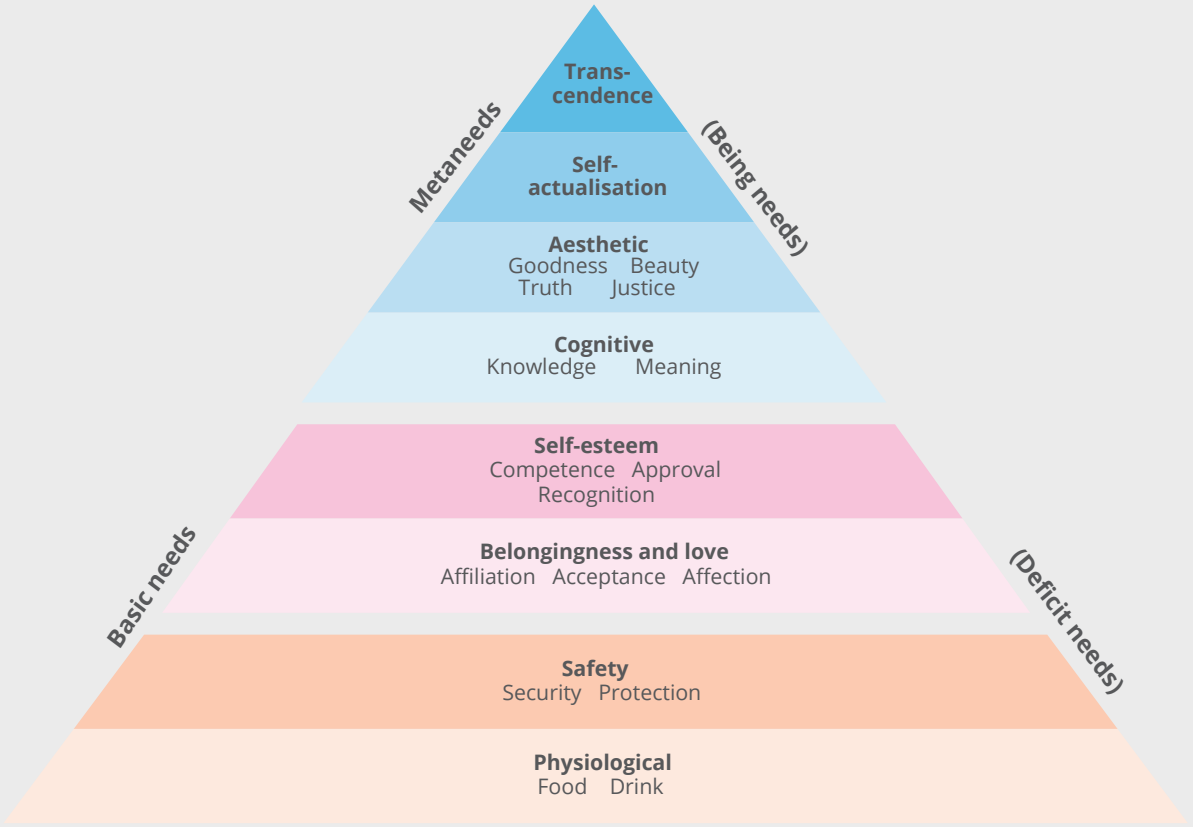


FIGURE 7.1 Maslow's hierarchy of human needs

Source: Adapted from Lefrancois, G. R. (2000). Psychology for teaching (10th ed.). Wadsworth. AND Huitt, W. (2011). Motivation to learn: An overview. Educational Psychology Interactive. Valdosta State University. www.edpsycinteractive.org/topics/motivation/motivate.html

FIGURE 7.2 Maslow's hierarchy of needs reminds us of the importance of considering children's basic needs before their academic needs. These students can focus on learning because their basic needs of safety, shelter, food, love and respect have been met

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According to Maslow, children whose basic material needs are satisfied (see **FIGURE 7.2**), 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.

IMPLICATIONS FOR EDUCATORS 7.1 discusses the implications of applying Maslow's ideas in the classroom.

Strengths and limitations of Maslow's theory

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.

IMPLICATIONS FOR EDUCATORS 7.1

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.
- Note in **FIGURE 7.1** that the cognitive needs that are typically the focus of schools are at the base of the 'being needs' section. According to Maslow's theory, children should also 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

Since Maslow's work, several theorists have expanded on 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 (i.e. feeling, interest, attitudes and values); on fulfilling potential as a whole person, rather than simply in academic learning; 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 (McLeod, 2018). Consider, for example, the case of a firefighter who risks their personal safety for the sake of others. In this situation, the meta need of 'transcendence' motivates action, ignoring the basic need for safety. In his later work, Maslow (1987) agreed that the order of needs can vary for different individuals, or in particular circumstances. He also stated that in any situation, behaviour is likely to be motivated by a combination of needs, rather than one alone. This raises a question about the need for, and validity of the hierarchical model.

Enright (2018) has also argued that fulfilment of the basic needs does not necessarily mean that individuals continue on to seek personal growth. Citing higher rates of divorce and suicide among wealthier people in western countries, whose basic needs are likely to be met, he argues that sometimes lack of challenge or difficulty has potential to stifle growth, while suffering has the potential to prompt human growth; it is our personal response to suffering or challenge that determines how it influences our growth towards fulfilment.

A further question has been raised about whether the hierarchy and set of needs applies universally across cultures. Tay and Diener (2011) examined this question sampling 123 countries to look for links between various needs and people's feelings of wellbeing. They found that the needs are indeed universally linked to wellbeing, although simply having needs satisfied is not enough on its own to predict feelings of wellbeing. Consider this in relation to people you know of: poor people can nonetheless be happy and live fulfilled lives, and (at least according to popular magazines) celebrities, despite having wealth, family and friends, and approval from peers, can nonetheless feel unhappy and unfulfilled. Tay and Diener found that fulfilment of basic needs was largely determined by factors external to the person, whereas fulfilment of growth needs tended to be within individuals' personal control. The order of the needs' fulfilment was mostly in line with Maslow's model.

Other criticisms of Maslow's work concern the vagueness of terms such as 'self-actualisation', and the uncertainty about measuring its achievement (e.g. when can it be said to have been achieved, and under what conditions?). Maslow claimed that only 1–2 per cent of people achieve self-actualisation, which questions the universality of the model. Is this really what we all strive towards?

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 do not 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'

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. Both he and Maslow emphasised the importance of freedom and choice for mental and emotional health. Education contributed to these goals by providing a nurturing environment in which learners could follow their interests. This 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. He encouraged 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).

non-directive teaching Teaching in which the teacher is a facilitator, guiding students and nurturing their learning

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 there were 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).

Unconditional positive regard

The approach of the teacher towards any student is central to Rogers' recommendations for teachers. He considered that all individuals have a need for acceptance and respect, and thus that therapists (and by extension, educators) must communicate regard for their students irrespective of the student's behaviour, so that the student can recognise his or her intrinsic value as a person. This is the foundation of healthy personal growth, and frees the student to choose their own behaviour and pursue socially constructive goals. It does not mean a teacher need accept all students' behaviour, nor that they would never express feelings of annoyance or disappointment – that would not be 'being real' with students, the first of Rogers' principles. Rather, they would look beyond the immediate behaviour, to the individual as a valuable member of the classroom, someone with their own goals and needs that they are seeking to meet. This ability to see the situation through the student's eyes, without judging, is the third of Rogers' principles; for example, consider the implication of this for creating positive classrooms (**CHAPTER 14**). Starting with the core value that all members of the classroom are valuable, students would work with the teacher to develop a set of principles for the classroom that align with that value (e.g. de Nobile et al., 2017, p. 75). Then students' behaviour choices can be discussed with them in terms of the principles and goals they had established for their classroom.

Rogers proposed that when teachers communicate unconditional positive regard for their students, students themselves are freed to grow, develop and relate positively to others. Unconditional positive regard can be communicated to students through warmth, acceptance and sympathetic responses. It is experienced by them as making a difference to the experience of others (Rogers, 1969). One study showed that reflecting on their experiences of unconditional positive regard buffered a group of 11- to 15-year-old students from the effects of a setback in their learning – receiving poor grades in a subject. The students who had reflected on experiences of unconditional positive regard reported fewer negative self-thoughts in this situation than students in a control group (Brummelman et al., 2014).

THINK ABOUT

- A time when you have (or could have) experienced 'unconditional positive regard' from a teacher or other person. What difference did it make, or might it have made to your attitude to the situation?
- Would you use Rogers' principles with your students? Why, or why not?

active listening
Attending purposefully to the meaning and intention of what another person is saying

Active listening

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 **CASE STUDY 7.1**). For Rogers and other humanists, **active listening**, sometimes called 'reflective listening' (de Nobile et al., 2017; Porter, 2014), 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 (see **FIGURE 7.3**). This response strategy encourages the individual to continue talking. It is also an opportunity to release any tensions or emotions, and to

FIGURE 7.3 Actively listening to a child talk about their worries involves attending carefully to what the child says, then giving calm, brief and accurate feedback

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CASE STUDY 7.1

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 that 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. Although the teacher plays the role of forum facilitator, at no point do 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.

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?

clarify aspects of the communication that might have been misunderstood. Active listening helps teachers to build more effective relationships with their students.

Strengths of Rogers' educational ideas

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 encouragement of 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 of Rogers' educational ideas

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 – other than to provide unconditional positive regard for the individual despite their behaviour. The focus is on the relationship, rather than specific behaviour or learning goals. These must come from the student themselves, but what does the teacher do in the meantime, particularly if the student's behaviour is affecting others?

In emphasising a student-centred approach in which the student directs the learning, there is minimal space for teachers' instruction, although Rogers himself was arguably 'explicitly instructing' others in his techniques and approach.

Rogers' approach, particularly in relation to self-directed learning, has been critiqued for its individualist orientation, compared with social constructivist approaches such as Vygotsky's that recognise interactions between people as being central to effective learning (Servant-Miklos & Noordegraaf-Eelens, 2019; see **CHAPTERS 3** and **6** for more on Vygotskian approaches). This also raises a question of how well it guides a teacher to bring together the desires and needs of a diverse group of students in a school or class. How might self-determination work within a cooperative classroom? What about a learning situation with a student with particular language or intellectual difficulties?

IMPLICATIONS FOR EDUCATORS 7.2 discusses some implications of applying Rogers' ideas in the classroom.

IMPLICATIONS FOR EDUCATORS 7.2

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.
>
> 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.

7.3 Some examples of humanist models in schools in Australia and New Zealand

Humanist principles are evident in classroom programs that in the 1960s and 1970s were described as 'open' or 'open-space', referring to classroom or school designs that enabled teachers to work in collaboration, and for students of different age groups and interests to work together. Interestingly, in the current era Lindfield Learning Village in Sydney, North Melbourne Primary School, and a number of other schools in Australia and New Zealand, have returned to this flexible classroom model of classroom design along with its humanist principle of student-directed learning, with Lindfield LV also foregrounding humanist values such as empathy, trust and kindness. A study that examined the relationship between flexible learning designs and teaching, learning and wellbeing outcomes through interviews at 12 schools in NSW, found that principals, teachers and students reported that alongside student-centred pedagogy, the flexible spaces supported self-regulation, collaboration, autonomy and engagement. Changes to pedagogy and outcomes did not just occur as a result of the different learning spaces. Rather, teachers and principals sought out new ideas around designing classrooms that could fit with a shift to more student-centred learning and teaching; changes they felt were needed to more effectively engage and prepare their students. See Kariippanon and colleagues (2019) for details.

THINK ABOUT

- How do values such as empathy, trust and kindness reflect a humanist view?
- Compare these with the values commonly espoused in schools with 'PBL' or 'PBS' – 'Positive behaviour for learning' and 'Positive behaviour for success' programs (based on a behaviourist model); for example, values of respect and responsibility. Do these also reflect humanist views? How are they different?
- How might values – or models of learning and teaching – be linked to design of learning spaces?

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

Also exemplifying humanist principles is the **Reggio Emilia** approach to early education, which was developed in the northern Italian city of Reggio Emilia (see **FIGURE 7.4**). These centres use a constructivist project-based approach with a particular focus on children expressing their ideas in many different language modes (e.g. drawing, sculpture, dramatic play, writing and so on). Listening and relationships are emphasised, together with a view of children as capable and active in learning. Reggio Emilia principles have also been applied in primary and secondary classrooms through Harvard's Project Zero. In doing this, Krechevsky et al. (2013) identified five principles of learning as: purposeful, social, emotional, empowering and representational.

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.

Home schooling, an alternative form of education provided by parents for their children at home, was originally based on a humanistic desire for an education that is sensitive to children's unique talents and needs, although in the US in particular it has been taken up for religious or political reasons as well (Cheng & Donnelly, 2019). 'Unschooling' (Holt, 1977) went a step further, allowing children to direct their learning, and to learn through activities they choose, with their parents and others as facilitators.

FIGURE 7.4 Most early years classrooms embody humanist principles with child-centred approaches that develop the whole child

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Student-centred approaches are widely recognised in Australia, and could be said to draw on humanist principles, with the aim of engaging students at all stages in schooling by focusing on students' needs and giving them direction over what and how they learn. A literature review published by the Australian Institute for Teaching and School Leadership (AITSL; Harris et al., 2013) found that student-centred schools resulted in student engagement in learning, and that the approach was typical of schools that had significant numbers of students in poverty, who nonetheless achieved highly (see **CHAPTER 11** for more on this).

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**).

THINK ABOUT

- How do you plan to balance the goal of teaching content with the goal of meeting students' personal needs in the classroom?
- Can you think of situations when these two goals might be in conflict?

7.4 Humanism and education

In keeping with their concern to educate the whole child, humanist educators have championed content in fields beyond the traditional curriculum areas covered by the Australian or New Zealand curricula. For example, citizenship and democracy (Freire, 1995; Giroux, 1983), morals, values and ethics (Veugelers, 2010), philosophy (Topping & Trickey, 2004), and spirituality (Kessler, 2005; Palmer, 2010) – noting that for humanists, 'spirituality' refers to the human spirit responding to experiences in the here and now – have been argued to be important subjects for schools to explore with students, not just in occasional lessons but on a regular basis. Some of these fields have been taken up within the national curriculum documents; in Australia, for example, in the general capability of ethical understanding, and in the civics and citizenship curriculum (Australian Curriculum, Assessment and Reporting Authority, 2012).

Humanist ideas in the curriculum

Australian and New Zealand educators are guided by humanist ideals in policy documents that influence the curriculum. The Alice Springs (Mparntwe) Education Declaration is built on a vision for 'every student to be the very best that they can be' (p. 2), which aligns with Maslow's concept of 'self-actualisation' as the highest need we all hold. Goal 2, that 'all young Australians become confident and creative individuals' (p. 6), recognises the whole person. It includes aims, not just for this to relate to academic work, but also for students to 'have a sense of self-worth, self-awareness and personal identity that enables them to manage their emotional, mental, cultural, spiritual and physical wellbeing', and to 'develop personal values and attributes such as honesty, empathy, loyalty, responsibility and respect for others' (Council of Australian Governments Education Council, 2019, p. 6). New Zealand's Ministry of Education similarly has a vision that every New Zealander 'has the choice and opportunity to be the best they can be'. The New Zealand curriculum values include equity, community and participation for the common good, and integrity, which involves being honest, responsible, and accountable and acting ethically (NZ Ministry of Education, 2015).

International Baccalaureate

Other curriculum documents taught within Australian and New Zealand schools also have humanist ideals similarly embedded within them. The International Baccalaureate offers programs for primary, middle years and senior secondary education that have been taken up by independent and government schools in Australia and New Zealand, as well as across the globe. The programs can be said to be humanist due to their goals and content, which includes an aim to 'encourage students across the world to become active, compassionate, and lifelong learners who understand that other people, with their differences, can also be right' (International Baccalaureate Organization [IBO], 2017, p. 7). The learner profile includes qualities of empathy, compassion, respect, service, and balance between different parts of the learners' lives alongside knowledge, inquiry and critical thinking (IBO, 2017).

FIGURE 7.5 Dialogue and student direction are important aspects of humanist approaches to learning

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Humanist pedagogy

The content of curriculum is not the only influence of humanism in education today, however; pedagogical approaches have also been shaped by humanism. Indeed, the humanist educators cited in this chapter would argue that the content on its own does not reflect a humanist approach. The involvement of students in dialogue, in autonomously directing their learning, and in bringing their own concerns and thoughts to these topics is vital (see **FIGURE 7.5**). Three main influences of humanism on pedagogy in schools can be observed:

- Students are allowed to direct the goals and means of their learning.
- The whole child is considered, particularly by focusing on the social and emotional aspects of learning.
- The emphasis is on the relational aspects of learning, including dialogue and the use of cooperative group work.

7.5 Humanism in the classroom

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.

Student-directed learning

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-Hammond et al., 2020). 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 learning and 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. Reporting on a survey of the mental health of children and adolescents in Australia, Lawrence et al. (2015) reported that almost 20 per cent of 11- to 17-year-old Australians had experienced high or very high psychological distress in the previous 12 months. In 2019, stress was again reported as the principal concern of young people aged 16 to 19 in a Mission Australia Youth Survey, with mental health as the third-largest concern (Carlisle et al., 2019). In New Zealand, the Ministry of Health reported in 2019 that 14.5 per cent of people aged 15 to 24 reported experiencing psychological distress in the four weeks before the 2018/19 health survey. This prevalence has increased over time (NZ Ministry of Health, 2019). These issues also have consequences for student learning; for example, Suldo and colleagues (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. Social and emotional learning (SEL) has been identified as particularly important for student wellbeing. **IMPLICATIONS FOR EDUCATORS 7.3** outlines approaches to SEL recommended by the Collaborative for Academic, Social, and Emotional Learning (CASEL). Further advice for implementation of SEL is given in Jones and Kahn (2017), and in **CHAPTER 4**.

IMPLICATIONS FOR EDUCATORS 7.3

Approaches to teaching social and emotional learning

The Collaborative for Academic, Social, and Emotional Learning (CASEL) supports educators with knowledge, research, policies, strategies and networks to guide the teaching of social and emotional learning (SEL). It has identified five sets of key competencies that can be taught in classrooms, schools, homes and communities (see **FIGURE 7.6**) Possible approaches include lessons on a particular skill; strategies, such as cooperative learning, that involve SEL; integration of SEL within a curriculum area; and creation of classroom climate or culture supportive of learning via a whole school approach.

Effective SEL approaches are SAFE (Durlak et al., 2011), with:

Sequenced, connected activities

Active learning to support practice and development of skills and attitudes

Focused time on one or a small group of skills

Explicit teaching of specific skills.

Examples include:

- using modelling or coaching to help students to recognise their own or others' feelings
- helping students to make use of a conflict resolution skill with prompting and guidance
- practising group decision-making by setting classroom rules in a class meeting
- learning cooperation or teamwork by participating in team sports and group games
- analysing a current or historical event via a problem-solving sequence of questions
- cross-age mentoring to build self-confidence, belonging and academic skills
- teaching reflective listening using pairwork, in which one partner describes a situation, and the other repeats what they heard.

Adapted from CASEL, 2020.

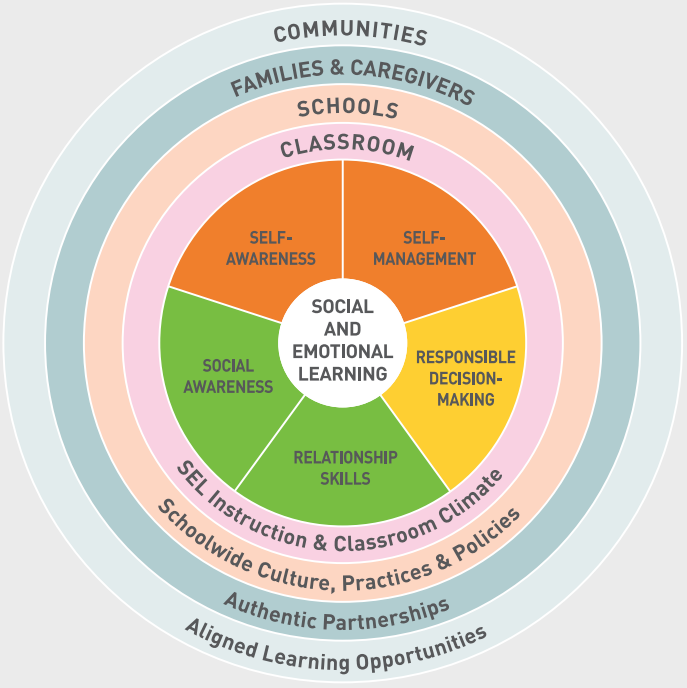


FIGURE 7.6 CASEL framework

ACTIVITIES

1 Think about how the competencies 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 promote students' SEL?

3 Visit https://casel.org to investigate further how you could support your students' SEL and wellbeing.

As we saw in systems theories of development, which were introduced in **CHAPTER 2**, children's development of cognitive, linguistic, physical, social and emotional skills are interconnected, and each influence one another. Research evidence shows that in the same way, social, emotional and cognitive abilities are all involved in learning (Darling-Hammond et al., 2020). When emotions are aroused, information is more likely to be retained in long-term memory; and as we will see later in this chapter, social interaction between learners in cognitive challenges deepens cognitive processing of the information (Jones & Kahn, 2017). Mindsets of belonging, purpose, growth and self-efficacy; attitudes of persistence; and skills of managing emotions, focusing attention, setting goals and working with others are all underpinned by SEL (CASEL, 2016). The importance of teaching the whole child is increasingly supported by developmental research.

Advocates of SEL 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 SEL programs found benefits for students' social and emotional skills, attitudes, behaviour and academic achievement. Longer-term outcomes were seen up to 18 years later in higher levels of wellbeing and academic success; and reduced drug use, emotional distress, and behaviour problems (see **FIGURE 7.7**). These outcomes were linked to increased social and emotional skills as a result of the programs. The effects were consistent across a range of ethnic and socioeconomic groups in the programs, which were held in a number of different countries, and in both rural and urban areas (Taylor et al., 2017).

FIGURE 7.7 Student wellbeing can be addressed by teaching social and emotional learning, with benefits for students' relationships, behaviour, learning and mental health

Source: Alamy Stock Photo/Cathyrose Melloan

Positive education

Positive education combines the principles of positive psychology, developed by Martin Seligman among others, with principles of effective education to enhance wellbeing in schools and classrooms. 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). Character strengths are a particular focus, with Peterson and Seligman (2004) having identified 24 'Values in Action' character strengths under the groupings of wisdom, courage, humanity, justice, temperance and transcendence (see http://www.viacharacter.org for the full list, and further details). While Seligman and Csikszentmihalyi (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. A sixth pillar, health, has been added, acknowledging the importance of sleep, diet and exercise to wellbeing (Norrish & Seligman, 2015). In positive education, teachers teach these skills to students both explicitly and implicitly.

positive education
Applies the principles of positive psychology to education

GO FURTHER
Appendix 7.1
'Positive education'

With growing numbers of schools in Australia and New Zealand taking on a positive education approach, research into its effectiveness is growing, although more is needed (Slemp et al., 2017). Initially adopted primarily by privileged independent schools, such as Geelong Grammar in Australia and King's College in Auckland, positive education has also been applied to working with students from trauma backgrounds, with Berry Street School in Victoria spreading its successful trauma-informed positive educational model to other schools through professional development programs. The Geelong Grammar approach to positive education is described in appendix 7.1 online.

Evaluating positive education programs

An evaluation of Geelong Grammar's positive education program (Vella-Brodrick et al., 2014) showed mixed results. Comparing students in Years 9, 10 and 11 at Geelong Grammar with students from schools with similar socio-demographic backgrounds that were taught 'wellbeing-as-usual' in their school's curriculum, the study found that Geelong Grammar's Year 9 students' mental health and wellbeing showed gains, whereas these improvements were not seen in the control groups, nor in the Geelong Grammar Year 10 or 11 students, with the latter group showing declines in wellbeing. Year 9 students at Geelong experienced the school's year-long residential outdoor education program that combined positive education, outdoor education and academic education. Focus groups with these students suggested that, perhaps because of their outdoor education experiences, they were able to apply the positive strategies they had been taught to their daily life. A later study found that in the following year, when compared with the students in the 'wellbeing as usual' program, students who had participated in the outdoor education/positive education program in Year 9 reported stronger competency, autonomy and relatedness than a control group (Vella-Brodrick et al., 2019). These needs are associated with motivation and wellbeing, according to self-determination theory (see **CHAPTER 8**).

An evaluation of the Berry Street Educational Model (Stokes et al., 2019) has also been conducted. Three mainstream schools in Melbourne adopted the model following professional training with Berry Street School – two primary and one P–9 school. Their implementation of the model and its effects were followed over three years, including interviews, focus groups and surveys of staff, students and leaders each year. The study found that the model, with its trauma-informed positive education strategies and instruction, resulted in positive changes to students' psychosocial functioning and wellbeing, as well as improved attendance at school. Embedding the model across the curriculum was a recommendation from the study, as was adopting it as a whole school approach.

Evaluating positive education

In a review of the literature, Slemp et al. (2017) identified taking a whole school approach to implementation of positive education programs as important, as well as the value of experiential learning, as these evaluation studies attest. They also warned against unrealistic expectations of what positive education can do, as well as the importance of looking towards longer-term versus short-term effects. In another review, Shankland and Rosset (2017) found that brief positive psychology interventions could still have positive effects on students' wellbeing, although frequent revisiting of the activities was necessary to maintain their benefits.

Kristjánsson (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 chapter.

Mindfulness

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 one's experience in the current situation through meditation, breathing and/or yoga. While mindfulness training was originally developed with adults, it has been adapted to work with preschool, primary and secondary students. Mindfulness activities for children can include placing a stuffed toy on their belly and asking the child to rock it to sleep with their breathing, or to focus attention on breath, or using a hula hoop to 'scan' and focus on different parts of their body one by one. Activities have also been developed for adolescents; for example, asking them to imagine riding their emotions as if they were a surfer on a wave (Lyons & DeLange, 2016).

mindfulness
A series of practices supporting deliberate focus on current experience, while suspending judgement

FIGURE 7.8 Mindfulness exercises, such as this breathing exercise where the child focuses on breathing into the bubbles and what happens to them as they float away and pop, can help to build executive function and emotion regulation

iStock.com/wundervisuals

Executive functions were introduced in **CHAPTER 3**, where we discussed their importance for academic success at school. Lyons and DeLange (2016) reviewed work linking mindfulness training and the executive functions of attention, working memory and inhibitory control. While more research is needed with children, initial indications are that mindfulness training can improve these functions, as well as regulation of emotions (as in **FIGURE 7.8**), which is also demonstrated to link to academic achievement (see **CHAPTER 4**).

Broderick and Metz (2016) examined the usefulness of mindfulness training for supporting resilience in the face of potential stresses in adolescence, through emotion regulation (resilience is discussed in **CHAPTERS 2** and **11**). In studies of a mindfulness program, Learning to BREATHE, implemented in a number of secondary schools, they found that mindfulness training in the classroom program improved students' symptoms of depression, anxiety, psychosomatic illness, social connectedness and perceived stress, and resulted in improved emotion regulation. Zoogman and colleagues (2015) conducted a meta-analysis of studies of mindfulness interventions with young people (6–21 years) and found that it showed small but significant effects, with larger effects on psychological symptoms such as anxiety, depression and substance abuse. They suggested from their review of the literature that one of the reasons for mindfulness's influence on these symptoms is its use of decentring, emotion regulation, focused attention, and disruption of rumination (i.e. repeatedly going over a past negative experience) that is related to worrying.

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, as we have seen above (Zenner et al., 2014). Zenner and colleagues (2014) 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. Creswell (2017) reviewed randomised controlled trials of mindfulness interventions, and reported that classroom interventions can reduce stress and aggressive behaviour, and improve cognitive performance in students. An Australian randomised controlled trial of a mindfulness program in schools in Victoria is described in **RESEARCH LINKS 7.1**.

RESEARCH LINKS 7.1

Smiling Mind: mindfulness meditation in Australian schools

The Smiling Mind education program aims to support mindfulness meditation in classrooms, through lesson plans designed for Years 1 to 12. Recordings accessed via a website lead the class through a meditation exercise, and the program can be freely accessed by students and parents via an app and website, so it is available to students whether or not their school is implementing the program. Examples of exercises include focusing on breathing, body scans in which people successively focus on each different part of their body, mirroring movement, and exploring the experience of sounds or tastes or everyday activities such as walking. At the end of each session, teachers are encouraged to facilitate a debriefing session, when students can explore and share their experience, thoughts and feelings relating to the exercise, and access support. A 'take home activity' that can be practised at home is linked to each exercise.

A study of the program conducted in 2016 by Deakin University and Insight SRC, and published on the Smiling Mind website, examined use of the program in 12 primary and secondary schools in Victoria. It found benefits for both teachers and students who participated in Smiling Mind. Compared with control groups at the same schools, students who participated at least three times a week over eight weeks reported improved sleep quality, ability to cope with student misbehaviour, feeling safe at school, and lower classroom disruption and experience of bullying. Those students who reported lower levels of wellbeing at the start of the program also showed improvements in levels of psychological distress, positive wellbeing, ability to manage emotions, concentration, and behaviour. The study authors concluded that mindfulness directly affected students' engagement in learning and positive wellbeing. Support of concentration and management of emotions in turn influenced quality of sleep and reduction in negative wellbeing.

Teachers who participated in the program, using the exercises themselves at least three times a week over five weeks, also benefited, reporting improved sleep quality, less psychological distress and tension, less difficulty concentrating, and improved ability to describe and accept their emotions.

Find the Smiling Mind program and a link to the research study at https://www.smilingmind.com.au/education.

Cooperative learning

In **CHAPTER 6** we discussed the centrality of peer approaches, such as cooperative learning in the constructivist classroom. In addition to its cognitive benefits outlined in **CHAPTER 6**, cooperative learning is a particularly humanist learning approach, in its capacity for student direction and for supporting SEL and student wellbeing. Glasser (1981; 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. Johnson and Johnson (2017) identified three ways in which teachers can organise their lessons and classrooms, each with a different outcome:

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.

Models of group learning

Cooperative groups can operate formally, with students working on a set task or parts of a task during regular class periods (e.g. the Friday mathematics class), or over a brief or an extended period of time (e.g. 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 (2017) 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 & 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 performances within the group is unique to cooperative learning. Slavin also 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 **CLASSROOM LINKS 7.1**). 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 **CLASSROOM LINKS 7.1**, 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. Model 3 is also an example of collaborative learning, which is discussed in **CHAPTER 6**.

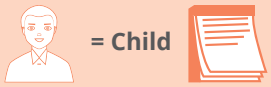
Theories of cooperative learning

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:

1 *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
2 *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

CLASSROOM LINKS 7.1

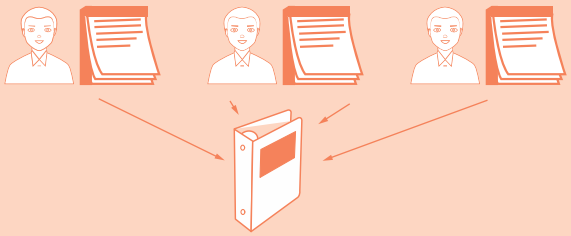
Alternative models of group learning



Model 1: Working individually on identical tasks for individual products

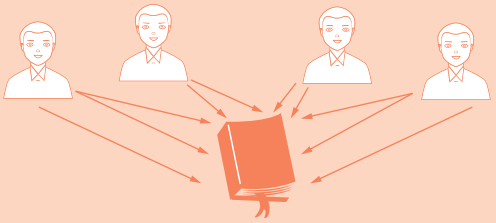
This appears to be a group of students each working independently on a task. However, the students may share ideas and contribute to others' interest and motivation if the teacher builds such elements into the task. Otherwise, the students are simply working individually since the task does not demand 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 because there is only one task. The contribution of each student is important for task completion. This is also known as collaborative learning (see **CHAPTER 6**).

Source: Adapted from Cowie, Smith, Boulton and Laver (1994, pp. 96–8).

3 *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

4 *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).

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?

Many forms of cooperative learning have been described in the literature (e.g. Johnson & Johnson, 2017). 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, 2012; Aronson et al., 1978). Jigsaw is described in **CLASSROOM LINKS 7.2**.

Cooperative learning: building students' social and emotional skills

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.

Group work in classrooms, particularly in primary schools, is commonly seen. However, cooperative learning has particular features that set it apart and are necessary to ensure that the social and emotional benefits it promises are seen (see **FIGURE 7.9**). Johnson and Johnson (2017) listed five key elements of cooperative learning that contribute to, and are necessary for, its success as a strategy for supporting SEL and wellbeing:

1 *Positive interdependence* – learners recognise that everyone's success is necessary for each individual member of the group to succeed in reaching a goal. It can be supported by group rewards, resources being distributed to the various members of a team, team members having complementary roles, and sharing of identity.
2 *Individual accountability* – is important so that each group member plays their part and ensures that others play theirs. This avoids 'loafing' by students in a group, and also helps each team member to see part of their role as facilitating others to contribute. Both the group and the individual team member are responsible for the results achieved by each one.
3 *Promotive interaction* – Johnson and Johnson (2017) argue that learners' mutual support of one another, including providing help, sharing resources, providing effective feedback and encouraging one another, as well as working well together, results from their interdependence. These behaviours also support cooperative learning.

FIGURE 7.9 Interpersonal skills are a key factor in well-functioning cooperative groups

Getty Images/Thomas Barwick

4 *Social skills* – are necessary for learners to effectively participate and work together. Skills such as conflict management, communication, decision-making, leadership and building trust should be taught, alongside active listening, providing constructive feedback, and sharing resources and time in discussions (see **IMPLICATIONS FOR EDUCATORS 7.4**).

5 *Group processing* – members evaluate group processes, such as how well they worked together, what they did to achieve their goals, and how they maximised their own and each other's learning. From this evaluation, they can identify what is contributing to their success and what needs to be changed. In earlier research, Johnson and Johnson (2009) found that group processing contributed to members' group identity, commitment to and respect for one another.

In a review of research, Gillies (2016) reported that teachers play a key role in ensuring these conditions are met, not just in designing tasks, but also in their selection and setting up of groups, and in ongoing interactions with groups and group members.

Benefits of cooperative learning

Johnson and Johnson (2017) summarised benefits of cooperative learning, drawing on a large bank of research evidence that has been generated by more than 1200 studies comparing individual, competitive and cooperative approaches. Cooperative learning was demonstrated

IMPLICATIONS FOR EDUCATORS 7.4

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, as seen in **TABLE 7.1**, 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.

TABLE 7.1 Example chart for monitoring one's own 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 ...

Sources: Gillies, 2007; Johnson et al., 1998.

to be more effective than individual or competitive learning structures for students' learning, showing higher achievement, higher-level reasoning and greater transfer of learning to other tasks.

This influence is linked to peer relations, with peer relations contributing to academic achievement in cooperative situations (Roseth et al., 2008). Johnson and Johnson (2017) report more positive and committed peer relationships being generated by cooperative learning, as is confirmed in Van Ryzin and Roseth's (2019) study that found cooperative learning significantly reduced bullying and victimisation of marginalised students through improved peer relatedness, by increasing students' empathy (see **FIGURE 7.10**). Other studies have shown effects of cooperative learning approaches on reducing prejudice, and peer relations and friendship among students of differing ethnic groups and for students with disability (Roseth et al., 2008). Cooperative learning also contributes to student motivation and engagement, including persistence and willingness to take on more difficult tasks (Johnson & Johnson, 2017).

FIGURE 7.10 Cooperative learning supports positive and committed peer relationships

iStock.com/SDI Productions

Thinking critically about cooperative learning

At the same time, in a number of studies teachers have reported that they infrequently use cooperative learning because of time and curriculum pressures (Baloche & Brody, 2017; Buchs et al., 2017). It can be difficult to get right, requiring teachers to equip and support students with the necessary skills (Gillies, 2016). Both students and teachers can experience problems when cooperative learning strategies are introduced into a classroom (Gillies, 2007). Rivalry and competition between groups can undermine the intended cooperative benefits of such activities, while unhelpful individuals within a group can render the group dysfunctional. There are also opportunities for student misbehaviour with such student-led tasks, and so the teacher's presence, constant attention to what is going on within the groups, and general classroom management skills are important to their success. Gillies (2008) demonstrated that structured cooperation (i.e. 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.

7.6 Thinking critically about humanist approaches

People who advocate teacher-dominated approaches to instruction may 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, 2018). 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. The idea that this is an either-or choice

CLASSROOM LINKS 7.2

Jigsaw: a cooperative-learning approach

Jigsaw
A form of cooperative learning in which each group member works individually on components of the one task

A particular design called **Jigsaw** was developed by Aronson in 1971 to address aggression and hostility between members of different ethnic groups following desegregation of schools in the US (Aronson, 2012). Aronson identified that the competitive practices of the classroom were contributing to the situation, and proposed an approach that involved both cooperation and interdependence, highlighting that simply bringing students together is not sufficient on its own to support peer acceptance. Jigsaw has been demonstrated to reduce prejudice and to enhance social acceptance of students with disabilities, and of students from varying ethnic groups (Walker & Crogan, 1998). Jigsaw involves dividing a task into approximately six even parts, and forming students into Jigsaw groups of six. Each member of the Jigsaw group is assigned to work on one of the six parts of the task. They form a new 'expert group' with the other people assigned to their topic or part of the task, and work together to learn about the content and think about how to present this to their home Jigsaw team. The Jigsaw teams then re-form, and each expert shares their expertise by teaching the others about their part of the task. The group is then quizzed on their knowledge of the content, and the results of all team members contribute to their score.

In an Australian study of cooperative learning, Walker and Crogan (1998) 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 **CLASSROOM LINKS 7.1**, 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 **CLASSROOM LINKS 7.1**, Model 2). They reported that introducing tasks involving simple cooperation in the classroom can exacerbate existing ethnic tensions and **prejudice** among the students; whereas the use of the jigsaw strategy (Aronson, 2012; Hedeen, 2003), involving both cooperation and interdependence, led to improved academic performance and liking of peers, and reductions in racial prejudice.

prejudice
A preconceived, uninformed opinion or feeling

For more on implementing Jigsaw, see the Jigsaw Classroom website, https://www.jigsaw.org.

ACTIVITIES

1. How do the elements of Jigsaw match the requirements for cooperative learning listed on pages 299–300?
2. What difficulties do you anticipate for teachers implementing Jigsaw in their classroom? What benefits balance these difficulties?

for teachers and schools may be false, however. As we have seen, humanist ideas of student-direction, teaching the whole child, and concern for wellbeing have become mainstream concerns in schools in Australia and New Zealand, as well as other western countries. Widely accepted humanist theories of motivation, such as self-determination theory (see **CHAPTER 8**), that consider needs for autonomy and relatedness alongside competence as the basis of motivation, have also contributed to humanist concerns joining cognitive ones in schooling. Cheon and colleagues (2019) showed that teachers can both offer curriculum-directed goals to students and support student autonomy. Student engagement in learning can be supported by approaches meeting student needs for autonomy and relationship, with research showing supporting students' autonomy can benefit their academic achievement (Reeve & Shin, 2020).

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. **IMPLICATIONS FOR EDUCATORS 7.5** details some implications of humanism in the classroom.

IMPLICATIONS FOR EDUCATORS 7.5

Humanism in the classroom

The key elements of humanist education in classroom practice

- concern for student *wellbeing* alongside content and cognitive needs
- 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**)
- support for student *autonomy* through student-directed learning (see also **CHAPTER 6**)
- development of *social and emotional learning*
- 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 different forms of cooperative learning.

Key elements of cooperative approaches to learning

- *positive interdependence* – 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* – 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 (Johnson & Johnson, 2017)
- *individual accountability and personal responsibility* – 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 et al., 1994, p. 31) – with each member of the group contributing a 'fair share' to the task
- *interpersonal and small-group skills* – 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 and colleagues (1994, p. 34) indicates that group review of activities is most effective (i.e. it contributes to higher levels of student achievement) when teacher and students all participate in the review process.

7.7 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.

STUDY TOOLS

Chapter review

7.1 What is humanism

- 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.

7.2 Humanism and psychology

- 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.

7.3 Some examples of humanist models in schools in Australia and New Zealand

- 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 suggests that whole-school, experiential programs are the most successful.
- 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 most early-childhood and lower-primary classrooms in Australasia, and alternative or non-traditional schools.

7.4 Humanism and education today

- Humanist ideas, such as citizenship, democracy, ethics and student wellbeing, have been incorporated into mainstream curricula in Australia and New Zealand.
- Humanist pedagogies, such as students setting goals for their learning, consideration of the whole child, student dialogue and cooperative learning, are also widely evident in schools.

7.5 Humanism in the classroom

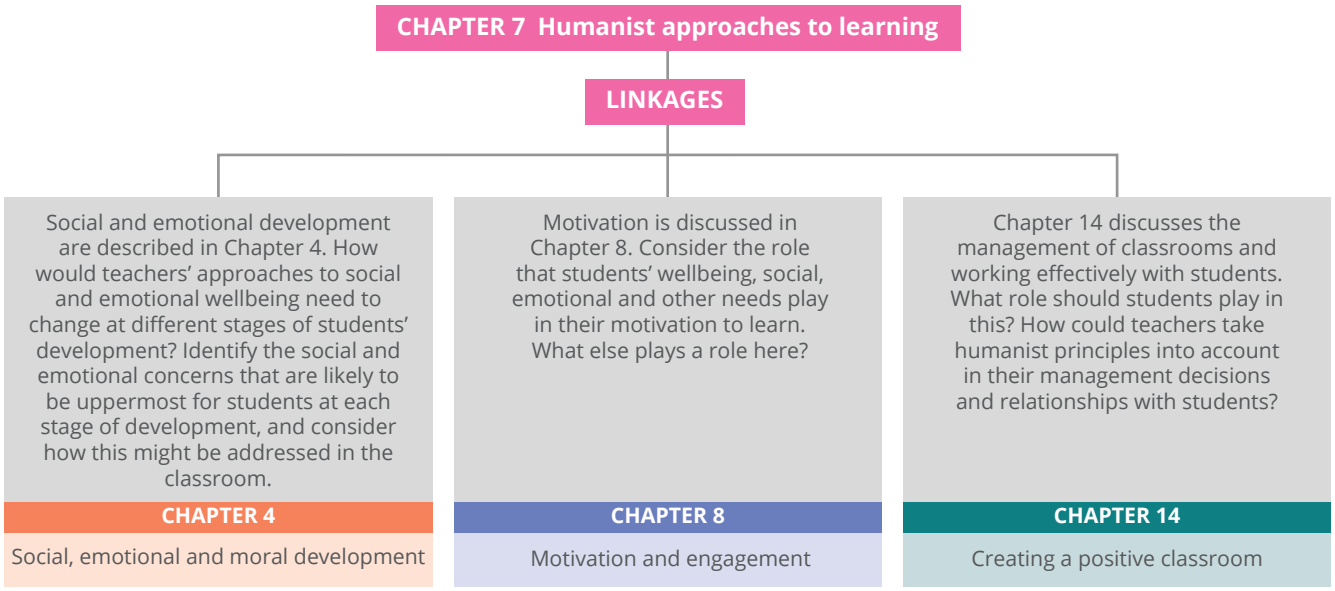
- In humanist classrooms students direct the learning, with the teacher acting as facilitator.
- Concern for teaching the whole child is reflected in Social and Emotional Learning (SEL), which recognises the relationship between social, emotional and cognitive skills in learning.
- In positive education, positive emotion, engagement, relationships, meaning, accomplishment and health are recognised as the six pillars of wellbeing. The skills are taught to students both implicitly and explicitly.
- Cooperative learning involves the humanist principles of student direction, support of social and emotional skills, and student wellbeing. It is distinguished from other forms of group work by use of contingent rewards for the group, which sets up a shared incentive system.
- Cooperative learning has been shown to be effective for academic achievement, higher level reasoning, reduction of prejudice, motivation, engagement and peer relations. It requires careful classroom management, structuring of groups and teaching of group skills for these benefits to result.

7.6 Thinking critically about humanist approaches

- Humanist approaches have been critiqued as lacking the structure needed to ensure that desired learning outcomes are achieved. Humanist concerns for student autonomy and relatedness can be addressed alongside curriculum-directed teaching however.

Putting it together

Making links between 'humanist approaches to learning' and material in other chapters



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 regard to positive education?

6 How might you integrate mindfulness practices in your everyday teaching? What effects might this have on students' behaviour and wellbeing? What difficulties do you anticipate?

7 What experiences have you had of cooperative learning? How could your experience have been improved?

8 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?

Further research

Go further

GO FURTHER

The online appendices contain additional material that you should refer to when reading this chapter. The appendix available for this chapter is:

- Appendix 7.1 Positive education.

Recommended websites

Be You: https://beyou.edu.au

CASEL (Collaborative for Academic, Social, and Emotional Learning): https://casel.org

Jigsaw Classroom: https://www.jigsaw.org

Lindfield Learning Village: https://lindfieldlearningvillage.com.au

Positive Psychology Center: https://ppc.sas.upenn.edu

Recommended reading

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Putting it together

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 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
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; Constructivism: social cognitive theory; information processing	Human experience – thinking, feelings, communication skills, needs, social and emotional learning, and wellbeing 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 construct meaning from experiences; to work collaboratively with teacher and peers; to negotiate activities and assessment; and to be actively involved in the learning process	To direct and be actively involved in learning
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 consider personal, environmental and behavioural contributions to learning; and to help learners to 'construct' knowledge through physical and mental activity in a social context	To increase motivation, self-esteem, empathy and wellbeing; to develop social and emotional skills; 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; supporting needs for autonomy, competence and relatedness (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**)

MODULE 11

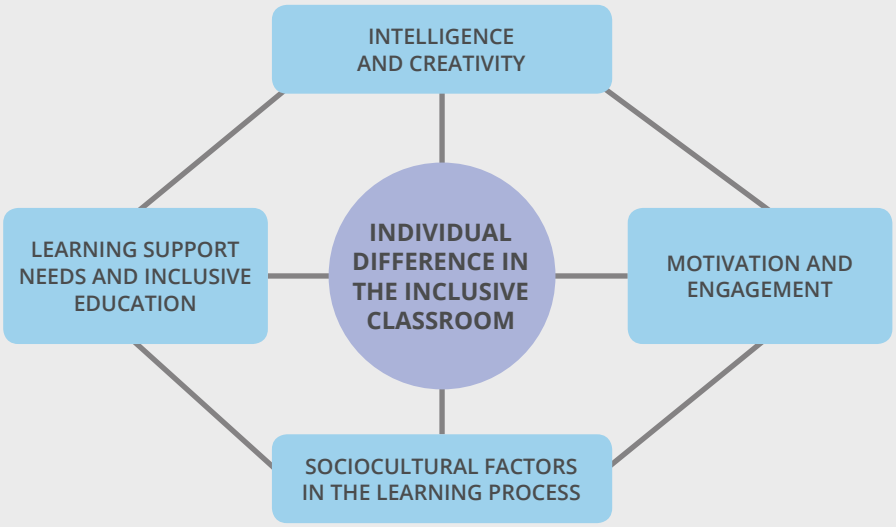
	Behavioural explanations of learning	Cognitive explanations of learning	Humanist explanations of learning
Role of teachers	A direct role – to assess current skills of students, identify behavioural objectives, design structured teaching programs that involve systematic control of stimuli and continuous feedback to learners, and to achieve planned outcomes efficiently	An active role – 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; to model, guide and support independence in learning	An indirect role – to facilitate learning by providing a stimulating and supportive environment, to actively involve students in learning, to participate alongside students in a learning community
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, 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; positive education, social and emotional learning, cooperative learning, active learning, and constructivism
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
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 (i.e. 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 environments Students need appropriate skills to participate effectively in groups Students lacking motivation may have difficulties learning in this type of program	Takes time; no immediate solutions for disruptive behaviour that can derail the approach 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

Source: iStock.com/nadia_bormotova



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 consider what each learner brings to the learning process.

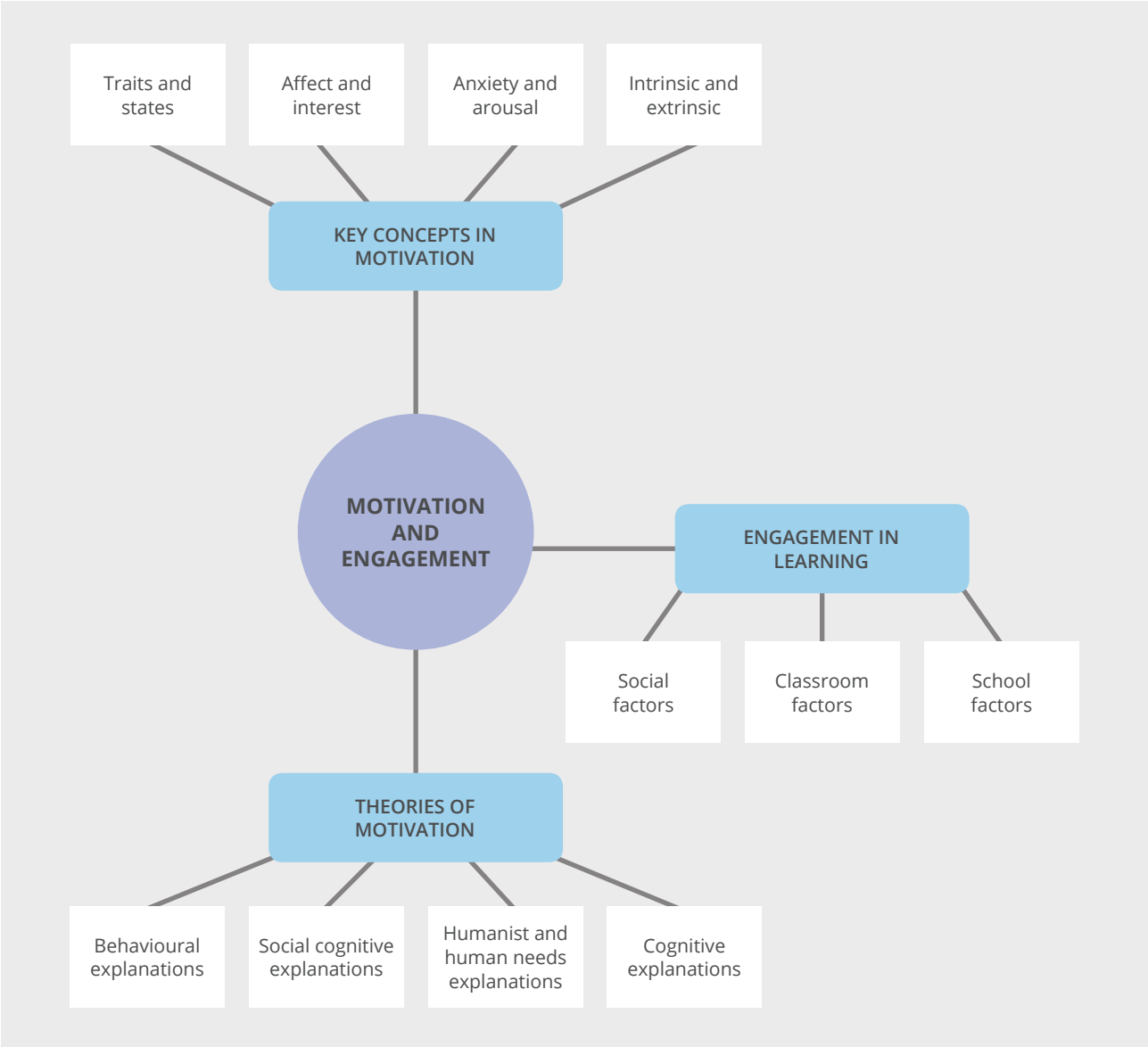
School systems and individual teachers also play a significant role in addressing sources of educational disadvantage, and taking steps to ensure that all learners are catered for and background factors affecting learning are considered. Teachers need to be aware of sources of 'cumulative' disadvantage 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, 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



Chapter 8 concept map

KEY QUESTIONS

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

- What is motivation and how does it influence behaviour and learning?
- What are some theories 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?

AMI AND KIMI

Ami is in her second year of university and her sister Kimi is in the final year of school. Both students are preparing to hand in major assignments and they discuss their workloads and social plans. Kimi is focused and has a study plan, which she discusses on the phone with her friends before postponing an after-school catchup because she has to finish her project. Ami groans and says, 'Gee, you're so good! I was never that focused at your age and I'm still not.' Kimi looks at her and rolls her eyes, 'Yeah, but how many times have I heard you say "Ps get degrees"? Do you think that many passes or fails on your record are going to look good in a job application?'

Feeling insulted, Ami replies, 'Oh, come on, a pass is fine.' Waving her hand at the extra books Kimi has borrowed to complete her history project, she says, 'Why learn all that stuff if you don't have to?'

'Well,' says Kimi, 'I learn it because I'm interested. This book has stuff we didn't even talk about in class. It's amazing to look into what people had to do back then in the Spanish flu compared to how we've been whinging about lockdown this year!'

Ami rolls her eyes. 'Anyway, now that I'm "freeee" from lockdown, I'm off to the shops with the girls. Enjoy studying!'

Kimi shakes her head and says, 'Honestly, Ami! You've got final exams next week. Anyone would think you didn't want to pass.'

Introduction

Whether or not Kimi's response actually helped Ami think about her study habits is unknown, but their conversation highlights a range of interesting processes at work. Kimi and Ami have very different forms of motivation. Each student has been affected by their social and environmental circumstances very differently. How do students such as Kimi and Ami develop and maintain their motivation over time, even in the face of adversities like COVID-19? Could students like Ami actively undermine their own performance by starting a task too late or by going to the shops instead of studying? Does it help Kimi cope with the school shutdowns by having a strong personal interest to drive her study habits? Was she less motivated for other subjects? In this chapter, we will explore these processes and many others by examining the concepts of motivation and engagement in learning.

8.1 Defining motivation and engagement

motivation
An internal process that energises, directs and maintains behaviour over time

engagement
The energy that connects and shows our participation in a context or an activity; it consists of behavioural, cognitive and emotional components

Motivation can be thought of as an internal process that *initiates* and *sustains* behaviour (Schunk et al., 2014). Each of these components is important. *Initiation* of behaviour is what starts you off and gets you going. The *sustaining* of behaviour ensures that this behaviour continues over time. **Engagement** can be described as 'energy in action', reflecting a connection between the person and the activity (Frydenberg et al., 2005). At school, engagement is often studied as three related but distinct domains of behavioural, cognitive and affective/emotional processes (Fredericks et al., 2004). Engagement can also be considered to exist in several different contexts, including at the level of *school* engagement, *classroom* engagement or engagement with specific *tasks*.

The terms *motivation* and *engagement* are often used interchangeably, as though they describe the same type of behaviour; however, they do not. Ainley (2012, p. 285) summarises these differences as follows: *motivation* is the underlying psychological process and *engagement* is the level of involvement and the connection between the person and the activity. A student can be motivated by a task or topic but may be 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 school, classroom and task-based contexts.

The concept of motivation is linked to many other concepts you have studied so far in this book, such as our feelings of self-concept and self-efficacy (**CHAPTER 4**), our cognitive 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 activities and achieve various goals.

8.2 Key concepts in motivation

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

state
A temporary condition or feeling

Traits are stable, lasting dispositions that motivate us to behave in certain ways. They may be innate (e.g. instinctive sex and exploratory drives) or learnt (e.g. 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**. These are usually short-term conditions or feelings, although these states can recur and are often innate (e.g. 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 like an exam. Many feelings of motivation are now recognised to be situational or reflective of states in certain situations. This means we cannot generalise about a student's motivation. Simply because Ami and Kimi appear more or less motivated in one learning context does not mean they will hold the same motivational orientation in another learning context.

Anxiety and arousal

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, many elite sports people (and other performers, such as musicians), report they experience some anxiety before their performance; they also admit there is an optimal level of anxiety and this may have to do with how they cope with their anxiety or appraise the situation (Ford et al., 2017).

anxiety
Feelings of tension, uneasiness and apprehension

arousal
Alertness and attentiveness

Performance anxiety in activities like competitive sports, music performance or even university exams has often been conceived in terms of the Yerkes-Dodson (1908) law. This law describes a fine balance between a state of arousal and performance (Yerkes & Dodson, 1908). As shown in **FIGURE 8.1**, 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 et al., 1999). Excessive levels of arousal associated with anxiety can lead to poor academic achievement and difficulty adjusting to school (Rodgers & Dunsmuir, 2013).

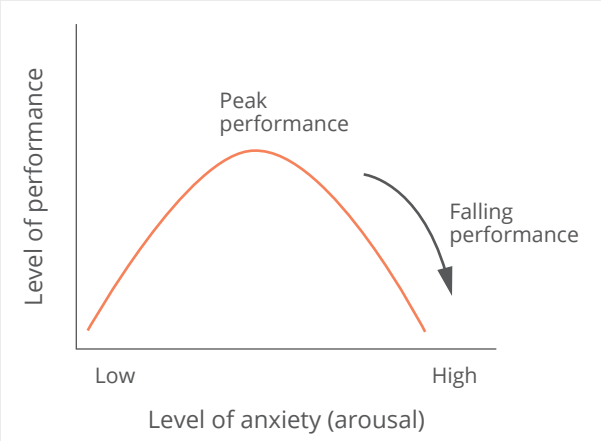


FIGURE 8.1 The Yerkes–Dodson law predicts a falling level of performance when arousal (or anxiety) reaches a certain level

Stress and anxiety have been observed in students preparing for high-stakes testing like the NAPLAN (National Assessment Program- Literacy and Numeracy) test in Australia (Wyn et al., 2014). A Year 5 student interviewed for a television program explained this feeling of stress (Hamish, Year 5 in Bowden, 2014): 'The teachers told me that if you don't do well in NAPLAN you won't get a good education ... and then if you don't get a good education you can't get a good job.' This anxiety was reported by students as feelings of tiredness, sleeping problems, hyperventilation, dizziness and fainting (Wyn et al., 2014). **CLASSROOM LINKS 8.1** provides more information about recognising and responding to anxiety in children and school students.

test anxiety
Fear of performing poorly in tests

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 Kimi in the opening story, when she explained her discovery of an interesting historical source. In this example, simply undertaking the task is its own reward. Intrinsic motivation is the ultimate goal in education at every level. When a student is intrinsically motivated, the task or activity they are completing is its own reward (Ryan et al., 2019).

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

intrinsic motivation
Motivation arising from internal sources, such as an individual's feelings of curiosity, excitement and satisfaction

extrinsic motivation
Motivation arising from the use of external rewards, such as food or praise

CHAPTER 5). 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 (e.g. praise), or as a means of avoiding something unpleasant (e.g. 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**).

CLASSROOM LINKS 8.1

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 than other children of their age or other learners at their level.
- Their anxiety stops them participating in normal learning or social activities at school or in other social contexts.
- These anxious feelings are consistently very intense.
- They may persist for some time after the event has passed.

At school, teachers can look out for the following signs of anxiety in their students:

- Students show perfectionistic tendencies, such as wanting their work to be perfect, and are dissatisfied with work to the extent that they may become anxious.
- The student is reluctant to ask for help, may avoid.
- They have problems joining in with other students or joining in class work.
- May ask to visit the sick bay, miss school or go to the toilet more frequently due to stomach upsets and other physical symptoms.
- Negative thinking or challenging behaviours, such as acting out.

How can teachers help?

Teachers are not expected to diagnose a mental health issue – this is not your role – but you may be able to notice the symptoms and behaviours and seek help and support the young person. The following principles can guide your approach to helping children with anxiety disorders:

- Social and emotional learning programs (see **CHAPTER 4**) can help all children develop coping strategies and support capacity to be resilient.
- Assist children to develop 'emotional language (see **CHAPTER 4**) so they can describe their thoughts and feelings.
- Help students learn to recognise their own internal cues or warning signs that they may be becoming anxious.
- Make changes and transitions in the classroom explicit with warning ahead of time.
- Make learning goals achievable by breaking tasks down into smaller steps; set small goals first, especially for tasks like presenting or speaking in public (see more in **CHAPTER 4**).
- Encourage the student to have a go and try new things.
- Help them try new 'self talk' that is positive and creates an internal dialogue to manage tasks in a positive mindset.

Please visit https://beyou.edu.au for many more tips and suggestions.

Adapted from Be You, 2020a, 2020b.

ACTIVITIES

1. Have you noticed how anxiety affects you as a learner?
2. Have you learnt any helpful coping strategies that you could model for students? Test these ideas with your classmates and see if they agree that your strategies are helpful.
3. How would anxiety affect a student's motivation and engagement in school?
4. Can you think of some steps you could take to gradually help a child overcome anxiety for a task like public speaking (see **CHAPTER 4** for an intervention idea).

Evidence suggests that intrinsic motivation decreases rapidly across the primary to secondary school years (Gillet et al., 2012; Gnambs & Hanfstingl, 2016), while extrinsic motivation declines too, and this is associated with poor academic performance (Corpus et al., 2009). Explanations for these declines in motivation include the student's perception of autonomy and support in the classroom, and changing perception of the motivational climate of classrooms, which may become increasingly performance oriented as children grow older. However, other evidence also suggests such a decline in 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).

Affect and interest

Although we have quite a good understanding of anxiety and its effect on learning and performance, the role of **affect**, or emotion, has generally been neglected in motivational research (Pekrun & Stephens, 2012). As described in **CHAPTER 4**, psychologists use the term 'affect' to refer to emotional states. The emotions that students experience in academic settings are significantly related to their motivation to learn. Researchers have found that emotional states contribute to academic achievement, while our academic achievement also influences our emotional state (Pekrun et al., 2017). Positive emotions tend to predict a range of positive educational outcomes, such as academic motivation, use of metacognitive strategies and academic performance (Trigueros et al., 2020). Not surprisingly, these emotional states can also contribute 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 usefully described 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

8.3 Theoretical views of motivation

Some students, like Kimi, are highly motivated to learn and seem driven by personal or intrinsic interests, while others, particularly adolescents, may feel that school has little relevance to their lives. They become increasingly bored and seem to lose motivation and generally uninterested in anything that happens in the classroom. Teachers recognise that there is tremendous variation in the level of motivation, energy and interest of students in their classroom.

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 rewards and punishment in motivating students to learn. Others are more concerned with students' cognitive beliefs, such as their expectations of success, or the way in which they attribute failure (is it one's own fault or someone else's?). Theories of motivation offer explanations of learner motivation, but each theory highlights a specific process that shapes learner motivation.

Behaviourist explanations

According to the behaviourist view of learning, reinforcements can be given to increase desirable behaviours (see **CHAPTER 5**). When Pavlov taught his dog to salivate to the sound of a bell, he was motivating the dog by associating a pleasant event (i.e. eating) with the bell ringing. When children are rewarded with a gold star for doing their sums correctly, they may look forward to the next task, anticipating further rewards. 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 of effective contingent reinforcement, so behaviourists emphasise the use of extrinsic reinforcement to stimulate student behaviours (see **FIGURE 8.2**). Reinforcement can take many forms, such as praise, a smile or a reward. Almost all teachers use extrinsic reinforcement in some form to motivate students, with online apps and token rewards commonplace in classrooms. But is this wise?

FIGURE 8.2 Could bored students be motivated by extrinsic rewards?

iStock.com/Goldfaery

Using extrinsic reinforcement and motivation

One of the greatest debates of behavioural and cognitive research to emerge over the last century concerns the use of extrinsic reinforcement (e.g. rewards and tokens) 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. However, important questions have arisen. 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' (Hidi, 2016; 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 (especially young 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 a particular target behaviour, the effect of the reward typically declines and the behaviour can return 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.

We now return to the question: 'Do extrinsic motivators reduce intrinsic motivation for other learning tasks?' Although at least three decades of research have examined this question, behavioural theorists and motivational theorists tend to disagree about the value of both extrinsic and intrinsic motivation.

Research on extrinsic reinforcement

These concerns seem to be supported by recent experimental research. A phenomenon known as the **undermining effect** or the 'over-justification effect' has been identified in experiments where participants are asked to complete an interesting activity and are given extrinsic rewards (e.g. money) in return for certain performance levels. Afterwards, these same participants are allowed to engage in the '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 et al., 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)! Researchers do seem to agree that external rewards may be most effective when material is uninteresting or when the individual is unmotivated, but there is less certainty about what happens if we apply awards to behaviour that was already motivated (see Hidi, 2016). The evidence certainly seems to support the notion that the effect of extrinsic or external reward depends on the circumstances in which we use rewards and the types of rewards we use. Essentially, these researchers have distinguished between different types of extrinsic rewards: verbal rewards, tangible rewards, and expected or unexpected awards.

undermining effect
The idea that some rewards can undermine intrinsic motivation

THINK ABOUT

- Have you ever experienced the 'undermining effect'?
- Why do you think the brain responds differently after rewards have been given for previously interesting or engaging activities?
- Why do you think rewards enhanced memory performance only for 'boring' materials?

Contingent and noncontingent rewards

Rewards can take the form of *contingent* or *noncontingent feedback* about human behaviour, and evidence suggests these forms are processed differently in the human brain (Hidi, 2016).

Contingent rewards deliver information or feedback that is closely related to the actual performance or task and tend to have a positive effect on motivation. For example, verbal feedback that is highly specific to the actual skill or task would be most effective, such as 'You applied that strategy really effectively to solve the problem'. On the other hand, noncontingent rewards are not closely related to a particular task or may be independent of any behaviour, and may be seen as ineffective (Hidi, 2016). Hidi (2016) summarises this as the beneficial effect of a reward that was *actively* earned compared to a noncontingent reward that was *passively* earned.

The case of token and tangible rewards

Tangible or *token rewards* include things such as trinkets or 'tokens' (e.g. stickers or food). Early research identified that these undermined intrinsic motivation (e.g. Wiersma, 1992); as discussed previously in relation to monetary rewards, there is a concern that these types of rewards interfere with reward and learning circuits in the brain (see **FIGURE 8.3**). However, research has found that tangible rewards *can* support intrinsic motivation if they are closely matched to the desired behaviour (i.e. the reward is *contingent*). For example, researchers Marinak and Gambrell (2008) conducted a reading intervention where students were given non-contingent or contingent rewards for good reading. Noncontingent rewards, such as trinkets (e.g. 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.

FIGURE 8.3 Simple tokens, such as star charts and stickers, might interfere with the learning process. Why?

Getty Images/JGI/Jamie Grill

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?

Expected or unexpected rewards

Expected rewards are those offered before a task is completed; for example, 'If you achieve a certain level or grade, you will earn this prize or reward'. However, various meta-analyses have identified negative effects. Deci and colleagues (1999) found that expected tangible rewards undermined intrinsic motivation, including interest in the task and free choice (i.e. the time spent on tasks after the reward was removed). This is also described in the experimental studies of monetary rewards discussed above. However, Hidi (2016) suggests the effect may be more due to the fact that the reward was removed, which causes a loss in the reward circuitry of the brain rather than that it was expected. Further, the interpretation of the reward to each individual may vary in terms of perceived meaning and value.

In contrast, researchers have found that *unexpected* rewards seem to have a particularly strong effect. Neurological research has shown that unexpected rewards and the novelty of the unexpected reward seem to have a very positive effect on the reward circuits of the brain and are also associated with positive emotion or affect in the individual (Hidi, 2016). 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.

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-belief is illustrated in **FIGURE 8.4**.

FIGURE 8.4 Our capacity to set goals and self-regulate our behaviour (i.e. 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**.

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 must be realistic and based on relevant criteria 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-efficacy	Self-efficacy must be based on realistic self-evaluation against important and relevant criteria The positive 'can do' sense of self-efficacy arises from mastery experiences (e.g. success on tasks). A poor sense of self-efficacy undermines future performance
Outcome expectations	Expectations can influence approaches to a task People form expectations based on personal experiences and observations of models; for example, 'If I make a study plan like Kimi, I might do better on tests'
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.

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.

Self-determination and human needs explanations

self-determination theory
People have a basic psychological need for autonomy, a sense of competence and relatedness to other people

Human needs-based theories of motivation, including Deci and Ryan's (2000) **self-determination theory** of human needs, are based on the premise that the human being is naturally inclined towards achieving a close integration of their own internal psychological makeup, and between themselves and their social world. This motivational theory proposes that three basic human needs must be satisfied:

- *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, 2000).

These basic needs are believed to underpin our capacity for growth, and are critical for social development and wellbeing (Ryan & Deci, 2000). If these needs are not met, our capacity for self-motivation and ability to reach 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 (see **FIGURE 8.5**).

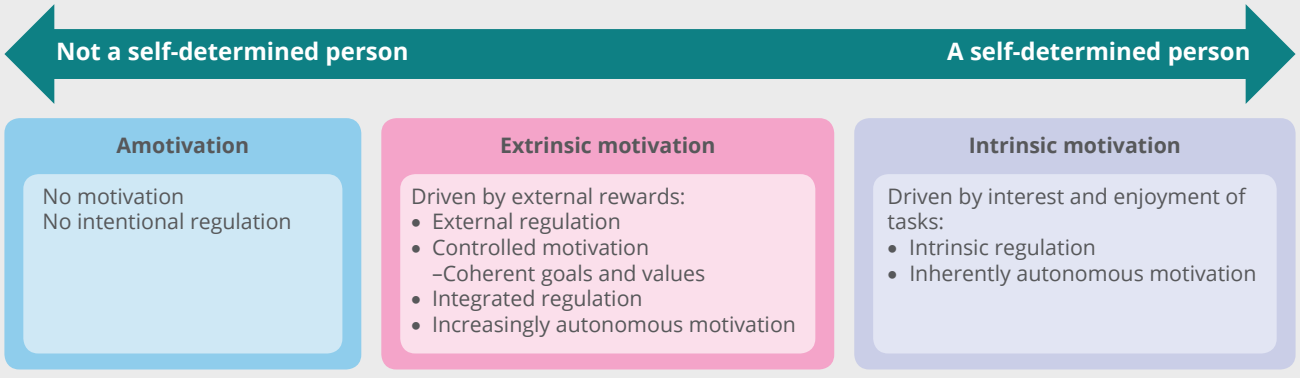


FIGURE 8.5 The self-determination continuum showing motivational approaches, self-regulation and sense of autonomy

Source: Adapted from Gagné and Deci (2005); Deci and Ryan (2000).

This theory proposes that our capacity for self-determination can be viewed on a continuum ranging from a person who experiences amotivation (i.e. a complete absence of motivation) to a completely self-determined person who is intrinsically motivated. 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.

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 **CLASSROOM LINKS 8.2**)

autonomy-supportive
Teacher behaviours that foster students' intrinsic motivational resources

CLASSROOM LINKS 8.2

Autonomy-supportive teaching strategies

Teachers can apply the principles of self-determination theory by using the 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	Listen 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.

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, 2000).

You may be starting to notice that social–cognitive and humanistic approaches to motivation have many similarities, and some of the language or terms 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 that also shape student motivation, such as interest, self-regulation and value of the task. These ideas are further explored in the following cognitive theories of motivation.

Cognitive explanations

Some of the most well-researched theories of motivation have arisen from cognitive explanations of motivation. These theories generally take a constructivist or social constructivist approach (i.e. they accept that children are innately active learners), 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 and colleagues (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

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

John Atkinson (1957) and David McClelland (McClelland et al., 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 et al., 1998).

Implicit theories of competence and ability

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 and can be grown and developed (Yeager & Dweck, 2012). These beliefs have also become known as 'mindsets'. In particular, learners holding a **growth mindset** (i.e. an incremental view of intelligence) 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 goal beliefs (see more on goal theories of motivation later in the chapter). In contrast, students holding entity beliefs tend to focus on their capacity to learn as an inherited, biological trait or beyond their control, and hence the notion of effort or trying harder is viewed negatively (Dweck & Molden, 2005). In some cases, students may even believe that putting in effort simply validates their lack of ability in an area.

growth mindset
A popular term to describe a state of mind that reflects an incremental theory of intelligence and ability

Developing mindsets

Research by Dweck and colleagues has shown that mindsets develop very early in life and are shaped by environmental conditions, such as sources of feedback from parents or teachers (as seen in **FIGURE 8.6**). In particular, the use of praise by parents and teachers is strongly implicated in the type of mindsets formed by young people. Early research identified this 'praise problem' in Year 5 students. Mueller and Dweck (1998) gave the students 10 questions from a fairly easy non-verbal IQ test (see more about intelligence tests in **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, students praised for their intelligence 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 praise 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 schoolwork was predictive of students who held an entity view of their intelligence.

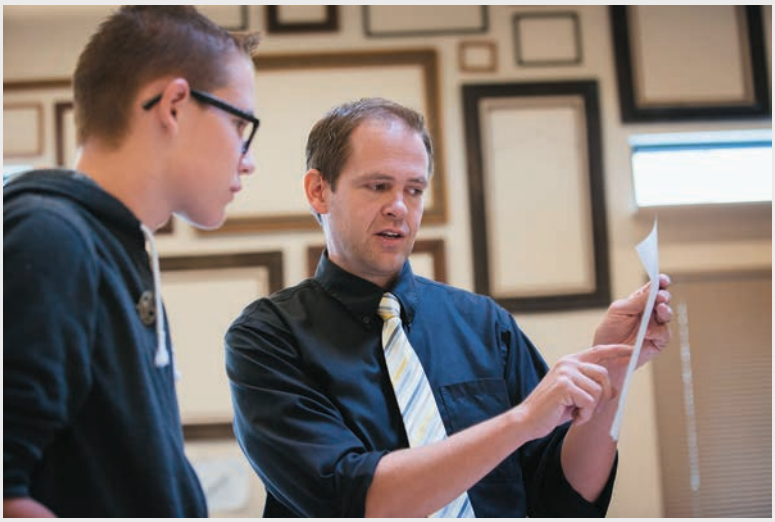


FIGURE 8.6 Delivering process praise to students tends to support a growth mindset

Source: Alamy Stock Photo/Blend Images

Fortunately, researchers have also discovered ways to change student mindset beliefs through relatively simple interventions that provide students with information about the brain. One of the aims of these interventions is to improve the academic achievement of learners with entity or fixed mindset beliefs and usually not achieving to their academic potential. In one of the earliest interventions with school students, Blackwell and colleagues (2007) conducted a series of eight workshops with low-achieving Year 7 students and successfully raised their maths grades. Mindset interventions are particularly effective for underachieving students (Paunesku et al., 2015).

Intervention methods to help change mindsets

The core of most interventions is a brief educational lesson involving reading a scientific article about the brain titled 'You can grow your intelligence' (Blackwell et al., 2007; Paunesku et al., 2015). The article explains basic neuroscience findings that the brain can grow and get smarter when it is challenged or has to work hard, a bit like a muscle in the body. Students in such interventions also complete writing exercises where they explain and relate the concepts to themselves, such as a time when they did not know something but worked hard and improved. Students may also write a letter explaining the concepts to a future student who may feel 'dumb' and may be struggling with their schoolwork. This technique of telling others about the growth mindset concept is known as 'saying is believing'. It is also known as a feature of a 'stealth' intervention. For example, instead of directly telling students about the neuroscience of the brain, the students are instead asked to help develop materials to train and pass on this message to other students (Yeager et al., 2016) (see **RESEARCH LINKS 8.1**).

RESEARCH LINKS 8.1

A growth mindset intervention: 'directly telling' versus 'explaining to others'

Mindset researchers David Yeager and colleagues (2016) were interested in the types of lessons and messages conveyed in mindset interventions. One of the things they wanted to test was whether *directly* telling students the research findings about the developing brain was more effective than if students had to explain and tell these research findings to other students (*indirectly* learning the concepts). They compared these different types of interventions in a classic A/B experimental design where condition A is compared to condition B. They tested these research problems among a very large sample of Year 9 students (N = 3005).

The research question

Is it more effective to deliver growth mindset information directly or indirectly to students?

Group A: Students read the scientific article about the brain and were *directly* told about the research concepts:

> 'Would you like to be smarter? Being smarter helps teens become the person they want to be in life … In this program, we share the research on how people can get smarter.'

Group B: Students *indirectly* learnt about this research concept by explaining it to other students:

> 'Students often do a great job explaining ideas to their peers because they see the world in similar ways. On the following pages, you will read some scientific findings about the human brain … We would like your help to explain this information in more personal ways that students will be able to understand. We'll use what we learn to help us improve the way we talk about these ideas with students in the future.'

The results

The researchers found that directly telling students about the scientific findings (Group A) led to smaller changes in mindsets compared to the 'explaining to others' intervention (Group B). This means that directly telling students about the brain was not quite as good at changing their mindset compared to asking the students to explain the concepts to other students.

The researchers went on to conduct more successful experiments to change the mindsets of students using this 'explaining to others' intervention approach.

Adapted from Yeager et al., 2016.

ACTIVITIES

1 What is the benefit of conducting this type of research about interventions to change a growth mindset?

2 What are the likely implications for the students if they participate in a Group B type intervention versus a Group A type intervention?

Yeager and colleagues (2016) suggest that these stealthy interventions may work more effectively because they help students summarise the key messages in their own words and in a way that is more relevant to them. The act of explaining the concept to someone else can also stimulate mental rehearsal of key concepts that may be enacted later and may also be less controlling to the student. It may help them convince themselves of the concepts in order to explain them to another student.

Today the aim of growth mindset interventions is to reduce the delivery time and make interventions scalable to reach many more students quickly and efficiently. Recent studies have adapted materials to online delivery platforms that deliver effective mindset interventions in just two online lessons (e.g. Paunesku et al., 2015). These brief, scalable interventions have been delivered to whole grades of students and have been effective in lifting the marks of low-performing students and improving the attitudes and beliefs of all students (Yeager et al., 2016).

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?

Although interventions may be necessary to change the developed mindsets of vulnerable students, there are also many practical steps parents and teachers can take to develop a positive growth mindset in their children and students. One step is to praise effort and processes – not abilities, intelligence or other fixed traits. By applying praise to the process used, adults can emphasise strategies or skills the child should repeat. This can motivate the child to try these strategies again in the future. Another step is to encourage students to seek challenges, not easy successes. Easy success can confirm for some students that effort is not needed, or they do not have to try hard. Learning from setbacks is a characteristic of growth mindsets and mastery-oriented learners. Importantly, the research findings we have discussed also suggest that young people can learn about the brain and simple neuroscience.

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 expectation of 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 (2006) have also found that students' beliefs in their abilities decline across the high school years.

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.

GO FURTHER
Appendix 8.1
Achievement motivation

Self-worth theory of motivation

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**). Learn about strategies for developing achievement motivation in the online materials, in appendix 8.1.

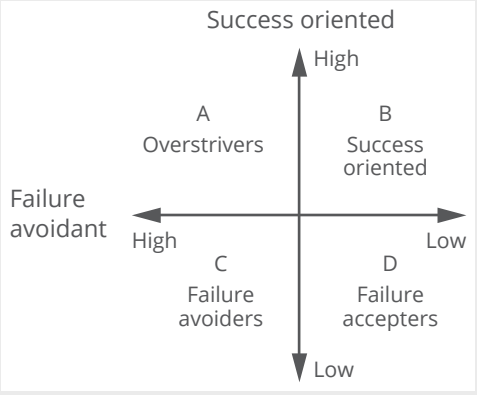


FIGURE 8.7 The overlapping influences of students' needs to avoid failure and strive for success

Source: Adapted from Covington, M. V. (1992). Making the grade: A self-worth perspective on motivation and school reform. Cambridge: Cambridge University Press.

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* who 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).

Australian researcher Andrew Martin has extensively studied the implications of students' achievement orientations. In particular, Martin and colleagues (2001) 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. Classic self-handicapping strategies include procrastination, reducing effort or avoiding practice for an upcoming task or test (Martin et al., 2001). These are the types of strategies that Ami suffered from in the opening story of this chapter. Another strategy is known as **defensive pessimism** whereby the student is thoughtful about the task at hand and their likely performance, but will defensively set lower goals and expectations on tasks that are easy for them to achieve. We saw this in Ami's statements 'P's get degrees!' and 'Why learn all that stuff if you don't have to?' In this way, defensive pessimism can be protective, buffering their failure by setting safe and low standards against which they will be judged (Martin et al., 2001). Martin integrated many of these concepts into an explanatory framework known as the Student Motivation and Engagement Wheel (see **RESEARCH LINKS 8.2**). 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.

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

RESEARCH LINKS 8.2

The Student Motivation and Engagement Wheel

Andrew Martin (2003a, 2003b, 2007) created and 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 has investigated whether these motivational effects were associated with stages of schooling, or whether boys and girls were affected differently.

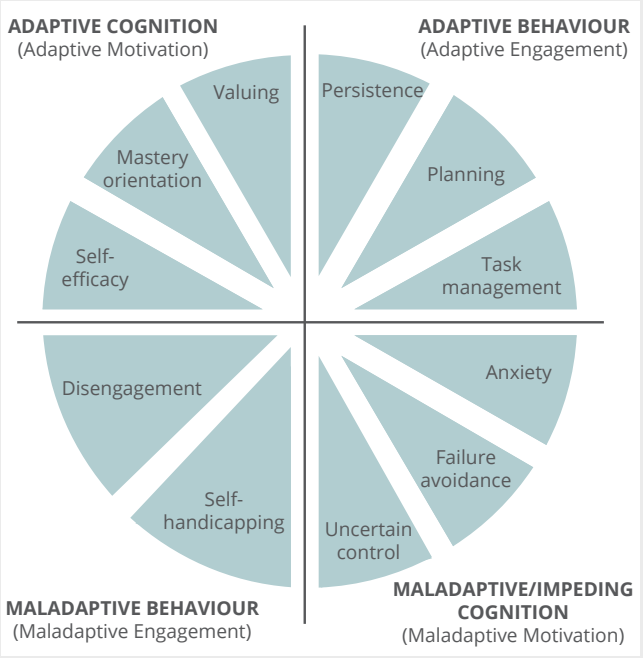


FIGURE 8.8 The Student Motivation and Engagement Wheel

Boosters, guzzlers and mufflers of school achievement

Adaptive thoughts and behaviours were positively associated with higher achievement on school tests. Martin has referred to these as *boosters* of motivation. For example, positive self-belief and persistence were associated with higher literacy and numeracy scores. 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.

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 Student 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 Kimi and Ami 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. Kimi 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 Ami does not do so well on her upcoming exams, she might say, 'That lecturer always sets bad exams'. These types of statements about failure experiences highlight three important features of our explanations of success or failure.

locus of control
A tendency to attribute success or failure to internal (controllable) or external (uncontrollable) factors

- *Internal or external causes* – when learners consistently attribute success or failure to internal factors, such as their own ability or effort, like Kimi, 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 poor teaching, as Ami appears to be suggesting.
- *Stable or unstable causes* – the cause or reason that learners give for success or failure may be stable (e.g. their aptitude or ability) or unstable (e.g. their mood at the time of a test). Can you tell if Kimi's and Ami'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 (i.e. controllable), or the degree of difficulty or quality of the examination questions (i.e. uncontrollable) (Weiner, 1992).

The motivational impact of these different attributions is quite important to consider. For example, attributing the causes of our success to stable, internal and controllable factors is likely to be advantageous (e.g. we know what we can control and repeat next time to obtain good outcomes). Similarly, attributing failure to unstable external causes, such as bad luck, might actually be quite self-protective in some circumstances (e.g. allowing the individual to protect their self-concept). In contrast, attributing failure to stable internal causes or uncontrollable external causes could actually be less adaptive (Chodkiewicz & Boyle, 2014). Why? It may be very limiting if learners believe they lack the ability to do well. This stable, internal attribution may be associated with the tendency to give up easily and avoid learning. It may also be appealing but not very useful to attribute outcomes to good or bad luck. This is an uncontrollable external cause and places no responsibility on the learner to expend effort or take control of their learning.

Perhaps it is not surprising that some attributional styles are considered maladaptive – students with maladaptive attributional styles do not perform as well as their peers and tend to give up easily or be resigned to failing (Chodkiewicz & Boyle, 2014). In contrast, the more adaptive, internally oriented students are more likely than externally oriented students to be viewed positively by their teachers (Schraw & Aplin, 1998).

Attribution and emotion

Research has also shown that attributions can shape subsequent emotions and motivation. For example, Weiner identified an important series of connections between our attributions and emotions that could further influence our future behaviours (see **TABLE 8.3**). Emotions such as pride could lead us to repeat the same learning behaviours that led to this positive emotion. If we feel guilty for not studying and we recognise that this is a behaviour we can control, then this emotion might motivate us to study harder next time.

TABLE 8.3 The link between attributions and emotions

Attribution	Emotion
A learner attributes success to internal attributes, such as their own high ability	Pride
A learner attributes failure to an internal and controllable cause, such as a lack of effort	Guilt or regret
A learner attributes failure to internal uncontrollable causes (e.g. low ability)	Shame, embarrassment
There are stable causes of failure (e.g. unfair teacher)	Hopelessness
There are unstable causes of failure (e.g. bad luck)	Hope

Source: Adapted from Weiner, 2010.

THINK ABOUT

- Can you think of a situation where you have made any of the attributions and emotions from **TABLE 8.3**?
- What was the motivational effect of the emotion? Did it motivate you to seek help, for example?

You may have noticed that **TABLE 8.3** did not include emotions such as anger. 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 (e.g. Pérez Nieto et al., 2000), or when students or adults are victimised or bullied (e.g. Aquino et al., 2004). However, these feelings may not necessarily be unhelpful to us; they may motivate us to make changes or seek to address the problem that has caused the negative emotion.

Developmental changes in attributional beliefs

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 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 (Nicholls & Miller, 1983). As we saw in the section on implicit beliefs about intelligence, students can believe their ability is either fixed or malleable. A developmental trend has been noted in research in which younger children conflated the meaning of ability and effort, believing that smart students work hard. In contrast, 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).

THINK ABOUT

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.

- You earned a good grade.
- You didn't do as well as you expected.

Return to the definitions of internal/external, stable/unstable and controllable attributions. Evaluate your responses against each of these criteria.

Attribution retraining

Importantly, there is evidence to show that attribution retraining interventions can improve a range of academic emotions, behaviours and achievement outcomes for learners of all ages

(Chodkiewicz & Boyle, 2014; Toland & Boyle, 2008). Attribution retraining interventions attempt to modify the student's maladaptive attribution to a more helpful belief pattern.

For example, Toland and Boyle (2008) attempted to modify attributions in a group of primary school aged children, 10 to 12 years of age with learning difficulties ($N = 21$). They employed a unique cognitive behavioural training approach in which children were taught the link between their thoughts, feelings and actions, and how to reframe their thoughts and feelings using 'I can' statements to replace previous negative statements. These thoughts were then linked to their schoolwork where children were encouraged to attribute success to their own efforts. The researchers assessed children's reading abilities before and after the intervention and found a significant and positive improvement in reading abilities after the intervention and a small but non-significant improvement in spelling ability. On average, about 80 per cent of parents believed they saw positive change in their child, while about 50 per cent of teachers thought they saw a major change; and, importantly, about 90 per cent of children believed they made a major change.

More recently in a similar intervention approach, Chodkiewicz and Boyle (2016) found that among 50 students aged 10 to 12 years old (31 students were in the intervention group and 19 in a control group), students in the attribution retraining group achieved a greater increase in reading scores compared to the control group students.

This evidence shows that attribution retraining interventions can improve outcomes in some academic domains and can create a sense of optimism in the students. In **IMPLICATIONS FOR EDUCATORS 8.1** we consider other possible ways that teachers could apply learning from these research studies to their classroom practice.

IMPLICATIONS FOR EDUCATORS 8.1

Can teachers intervene to change learning cognitions?

So far in this section on cognitive theories of motivation we have learnt about two types of interventions to change learner cognitions and improve their motivation. What can teachers learn from these types of interventions?

- *Teacher talk is important:* Teachers should avoid conveying fixed and negative messages about effort and ability in their feedback. This can occur when they use ability praise or make attributions to ability when giving students feedback.
- *Concepts of change:* Teachers can promote a more positive mindset and more adaptive attributions by simply reinforcing and modelling concepts of learning change. Using powerful turnaround phrases like 'Not yet', when a child says, 'I can't do it'. The teacher can use the words 'Not yet' to show that change and development is possible (Dweck, 2014).
- *Modelling mindsets:* Dweck cautions teachers and parents that their own mindsets are reflected in their classroom and parenting practices. Teachers and parents may say they promote a growth mindset but their language and feedback say something different (Dweck, 2015). Check your own attributional style and monitor language and use pedagogies to promote success and also learn from failures.

Goal theories of motivation

Goal theories of motivation are also another source of extensive debate in motivational theories. This debate centres on the value of two overarching goal structures that learners associate with tasks to be performed: mastery and performance goals. **Mastery goals** are closely related to the concept of intrinsic motivation, are widely viewed as the ultimate achievement goal, and are associated with persistence and effort in academic tasks. In addition, early research

mastery goal
A personal objective to achieve mastery of a task or skill

demonstrated that students with mastery orientations were more likely to employ deeper thinking strategies associated with self-regulation and metacognition (Coutino, 2007; Elliot et al., 1999; Vrugt & Oort, 2008). Such 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. On the other hand, **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. Early research associated these goals with many negative learning approaches, such as the avoidance strategies discussed earlier.

performance goal
A personal objective to perform well in an area of achievement

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 studies, performance goals were found to be quite adaptive with positive academic outcomes for students, whereas in other studies, performance goals did not lead to positive outcomes (Harackiewicz et al., 1998). Harackiewicz and colleagues (1998) identified that performance goals seemed to be advantageous for college (or university) students who were participating in performance-oriented, test-driven environments. They suggested that these students might be more advantaged if they adopted performance orientations that aligned with these performance-driven learning contexts. Subsequently, researchers recognised that the answers lie in the fact that their measures of student motivation were tapping into two different types of performance goal dimensions. These explained very different outcomes for students.

These two different performance goals became known as **performance-approach goals** and **performance-avoid goals**. Performance-approach goals are seen as more adaptive than performance-avoid goals. Learners who adopt an approach goal, like the college students just discussed and in **FIGURE 8.9**, are motivated by the desire to appear competent to others and show that they can outperform them; hence they strive to achieve good grades. Performance-avoid learners are more concerned with avoiding the appearance of incompetence, and are therefore associated with less adaptive behaviours than learners with approach orientations (Anderman & Wolters, 2006).

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

However, there was still a problem with confusing research findings about performance goals. Sometimes the research on performance-approach goals yielded positive results and other times negative outcomes for learners were found. It was discovered that researchers were using different language and therefore assessing different concepts in their measurement of motivation. For example, some measures have a focus on appearing competent to others (e.g. looking smart in the eyes of others) whereas others measure a desire to outperform peers (Linnenbrink-Garcia & Patall, 2016).

This distinction is very important because very different research findings result from each measurement approach (Hulleman et al., 2010). Specifically, when researchers measure the desire to appear

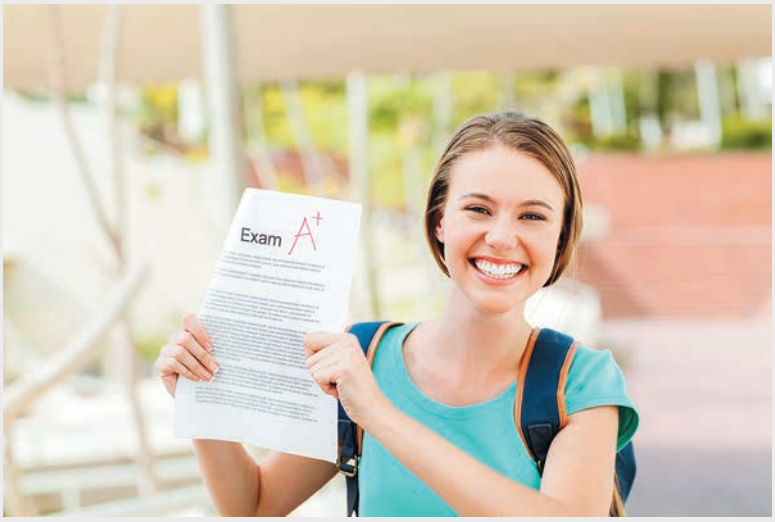


FIGURE 8.9 Is it better for students with performance-approach goals to show that they 'look smart' or that they can outperform others?

iStock.com/Neustockimages

competent (e.g. looking smart), the link between performance-approach goals and academic achievement is *negative*. In contrast, when the researchers measure the desire to outperform others, the association with academic achievement is *positive* (Senko et al., 2011). Why is this the case? Senko and colleagues (2011) point to examples of research that suggest that performance goals associated with demonstrating competence are associated with higher test anxiety, loss of interest and lower levels of effort and reduced self-efficacy.

Revisions to goal theories of motivation

These research findings have led researchers to apply the approach and avoidance goal dimensions to mastery goals (Elliot & McGregor, 2001). Initially, this was known as the 2 x 2 framework, where both the mastery and performance goals hold approach and avoidance dimensions. 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 seeks to avoid learning failure or a loss of their skills.

Research on the mastery-avoidance dimension is limited in comparison to other achievement goals (Linnenbrink-Garcia & Patall, 2016; Senko & Freund, 2015). Some evidence is beginning to emerge about the impact of mastery-avoidance goals in a range of areas. For example, Van Yperen and colleagues (2009) found that mastery-avoidance orientations had a negative effect on the capacity of participants to improve their performance. Senko and Freund (2015) found that young adults who were given mastery avoidance directions for a task (i.e. they should try to avoid doing worse than their last attempt on the task) struggled to cope under the avoidance goal orientation; they felt more performance pressure, had a reduced interest in the task and reduced perception of competence. In summary, mastery avoidance goal orientations, along with performance avoidance orientations, have a host of negative implications for learners – avoidant behaviours, such as self-handicapping, poor study strategies and negative affect (Linnenbrink-Garcia & Patall, 2016). On the other hand, older adults were able to cope more readily with the avoidance goal dimension. The researchers hypothesised that this may be due to their stage of life and work experience where workplace standards encourage striving to avoid loss of something valued, for example, the loss of income.

Achievement goals in the classroom

classroom goal structures
Messages in the classroom environment that emphasise certain achievement goals

So far, we have been discussing achievement goal theory as it relates to goals of individual students. Goal researchers have also held a long interest in the qualities of the classroom environment, such as teacher feedback, the rewards used and cultural values that convey goals to students (Urdan, 2010). Essentially, classroom goals are referred to as **classroom goal structures**, a term used to describe the 'messages' students receive from their classroom environment that make certain goals appear important (Urdan, 2010).

School and classroom practices like streaming or comparisons of student ability are said to reflect performance goal structures. In contrast, classrooms that emphasise students achieving their personal best (also known as PBs), or improving their own set of competence goals, are said to reflect mastery approach goals. When students report that their classroom has a mastery goal structure this is generally associated with a host of positive and adaptive learning outcomes and behaviours: student achievement, learning strategies and help-seeking behaviours. When students perceive performance goal structures in the classroom there is an association with less adaptive behaviours like self-handicapping, procrastinating and lower academic achievement (Urdan, 2010). You might be wondering what sort of classroom goal structure Ami might have? What sort of classroom goal structure might be found in Kimi's social studies classroom? These students each have their own motivational goals specific to each classroom environment, and these may be influenced by the practices and culture established by the teacher in that classroom.

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 or performance-approach goals among school-age learners? What benefit might each goal have?

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, which has significant implications for classroom practice and requires teachers to think carefully about the approaches they emphasise in their classrooms. **TABLE 8.4** summarises the different theoretical approaches to motivation discussed in this section, and **IMPLICATIONS FOR EDUCATORS 8.2** looks at their application in the classroom.

TABLE 8.4 Theories of motivation

Theories	Behavioural	Social–cognitive	Humanist and human needs	Cognitive
Major theorists	Skinner	Bandura	Maslow Ryan and Deci	Atkinson, Dweck, Weiner, Martin, Urdan and 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; 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 (e.g. goal theory)

IMPLICATIONS FOR EDUCATORS 8.2

Motivation in the classroom

Behavioural approaches

To apply behavioural approaches to motivation in classroom settings, teachers need to:

- use contingent reinforcement only when necessary if motivation is low or to ensure a behaviour is repeated
- recognise that student motivation is shaped by previous reinforcing experiences and these include contingent verbal feedback and unexpected rewards
- understand that concerns have been raised about overuse of expected and token (extrinsic) reinforcement that may undermine intrinsic motivation.

Social–cognitive approaches

The social–cognitive approach suggests that teachers need to:

- foster students' sense of agency, goal-directed behaviours and self-efficacy
- ensure that learners experience success, not just failure
- remember the four sources of self-efficacy that shape learners' perceptions of their ability
- recognise that motivation is affected by learners' judgements about their own efficacy.

Self-determination and human needs approaches

To apply self-determination and needs perspectives in classrooms, teachers need to:

- recognise that the human need for autonomy, competence and relatedness will influence motivation in the classroom
- know that they can convey autonomy-supportive teaching practices to students through their classroom pedagogy
- foster intrinsic (i.e. internal) motivation in students and de-emphasise reliance on extrinsic (i.e. external) motivation.

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 goals 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 classroom goal structures and the way this might influence student goals
- 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.

Strengths and limitations of motivation theories

Motivational theories 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. Importantly, recent theories have highlighted the link between motivation and emotion and subsequent influence on learning behaviours. Recognising these different motivational behaviours should provide educators with greater insight into students in their classrooms.

Some applications of motivational theories may have a limiting impact on learners. These include the careless or non-evidence-based 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, neglect of these factors in classroom approaches to motivation may be to the detriment of students' motivation and engagement.

8.4 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 individual, school, classroom or task level. Definitions of engagement often focus very narrowly on a few broad behavioural indicators, such as school participation, often measured by attendance and absentee rates. Some suggest that the many different explanations of engagement have contributed to a conceptual 'haziness' about what engagement actually is. Reports of engagement at school depend very much on how the researcher has defined engagement, in what context or situation they have measured engagement and exactly what they have measured in their study (Christenson et al., 2012). For example, terms such as 'school belonging' and 'connectedness' are also used to describe engagement.

The concept of engagement has been enhanced by an understanding that it is not a unidimensional 'feeling' or state of mind of the individual student. As described at the beginning of this chapter, Fredericks and colleagues (2004) described engagement as a complex state incorporating features of the student's behaviour, emotion and cognition, as outlined in **FIGURE 8.10**.

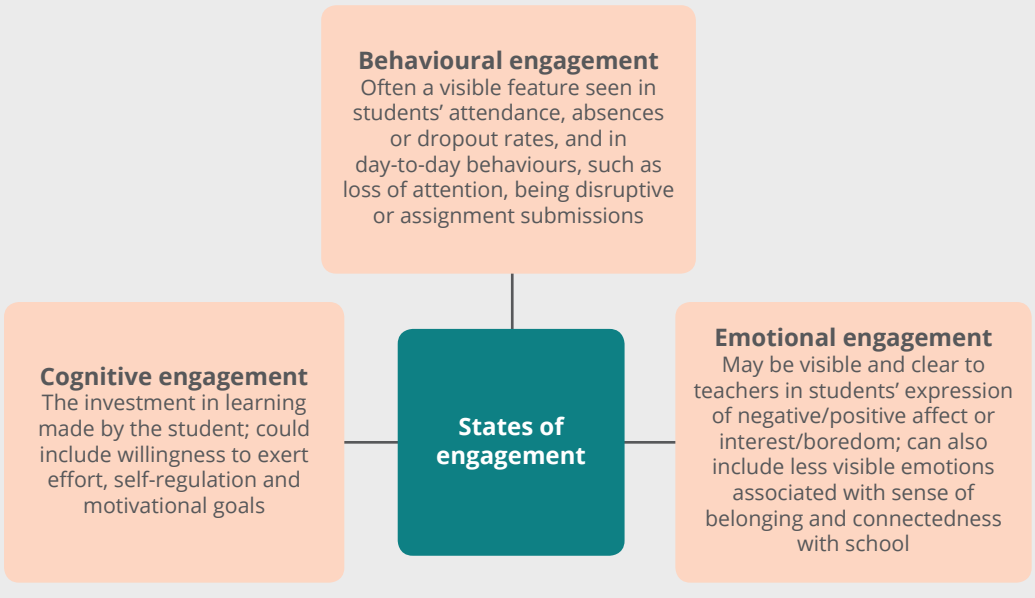


FIGURE 8.10 Three forms of student engagement

Skinner and Pitzer (2012) propose a multidimensional view of engagement that is particularly useful in thinking about all of these factors and the many contexts of engagement. They show that engagement can exist at many different levels of community institutions, such as families, churches, youth groups and schools. Focusing on schools in particular, they then show that engagement at school can include factors such as sporting involvement, the role of government policies and, of course, the classroom itself. As you can see in **FIGURE 8.11**, this classroom level of

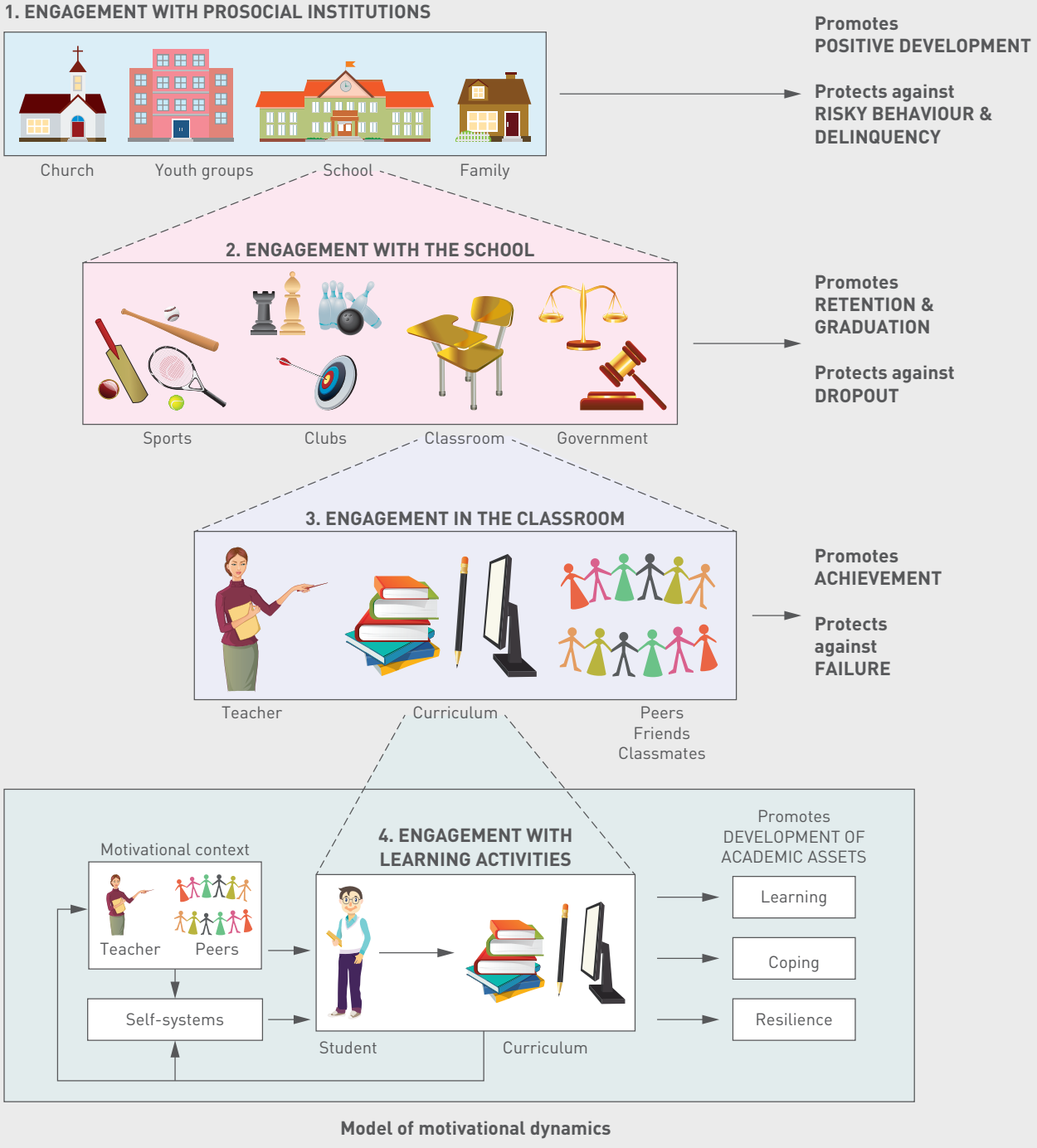


FIGURE 8.11 A multidimensional view of engagement in different contexts

Source: Skinner, E. A., & Pitzer, J. (2012). Developmental dynamics of engagement, coping, and everyday resilience. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), Handbook of research on student engagement (pp. 21-44). New York: Springer Science.

engagement includes curriculum and teacher–student relationships, and can be further broken down into engagement with specific learning activities.

Why is engagement important?

As shown in **FIGURE 8.11**, engagement can be seen as a complex multidimensional construct; when students feel a strong sense of school or classroom engagement, it is associated with a host of positive academic, emotional and social learning outcomes. School engagement appears to be particularly significant in the explanation of school completion or dropout and participation in schooling (Christenson et al., 2008). Classroom engagement is associated with enjoyment of learning, effort and persistence when faced with challenges (Christenson et al., 2012).

It is significant that Australian and international studies have identified very large proportions of young people who become increasingly and chronically disengaged throughout schooling. In Australia it is estimated that as many as 40 per cent of students are not optimally performing or engaged in school (Goss et al., 2017). Similarly, in New Zealand, as many as one third of all 14-year-olds reported they did not find school engaging and wanted to leave as soon as possible (Gibbs & Poskitt, 2010). In large national studies in the US, 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 many developed countries, minority and indigenous youth are often reported as less engaged in schooling, but this negative stereotype has been challenged. Bodkin-Andrews and Carlson (2016) encourage us to think of these western psychological conceptions as offering only a limited and ethnocentric view of indigenous youth. When we report low engagement or low participation rates of Māori (Gibbs & Poskitt, 2010) and Aboriginal and Torres Strait Islander youth (Goss et al., 2017), it is important to consider the stereotypes and widespread racial inequalities that these statistics may convey. A growing body of research conducted by indigenous researchers is instead seeking to identify different conceptualisations of these largely western views of identity, belonging and sense of self. For example, when Kickett-Tucker and Shahid (2019) (see **CHAPTER 4**) conducted research with Aboriginal children about their views of self, this research found that self-perceptions were tied to their sense of community and relationships with Elders. Dobia and colleagues (2014, as cited in Bodkin-Andrews & Carlson, 2016) found that student connectedness (i.e. engagement) to school was closely related to higher levels of participation in cultural activities and a strong sense of community. While we need to acknowledge the widespread inequalities and injustices still experienced by many youths around the world, Bodkin-Andrews and Carlson (2016) urge as to remember the diversity and strengths of indigenous identities and draw on these to address the existing inequalities we see.

It is widely accepted that engagement is a multidimensional construct and can vary from one setting to another (Christenson et al., 2012). This suggests that in addition to the individual factors the student brings to school, many contextual factors, including teaching and learning opportunities, expectations and support from school, family and community, all have a role to play. It is this complexity of engagement that has fascinated researchers for the last 25 years, and research is still discovering many factors that influence this complex state.

School factors that influence engagement

For some time, research has identified declining levels of motivation and engagement 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 explain the decline in motivation and engagement has been explained by expectancy-value-theory researchers

stage–environment fit
The match or mismatch between the developmental needs of the adolescent and their school environment

Eccles and Midgley (1989). They were most interested in the sudden and rapid decline in school achievement and motivation during the transition to high school and referred to this as a problem of **stage–environment fit**, noting that many high school classrooms may not suit the developmental stage of adolescence. The changing developmental needs at this stage of life reflect puberty and the changing emotional and cognitive needs of the adolescent, including a need for greater autonomy (see self-determination theory) and a sense of safety to explore these changing needs. This very important notion has been well supported by more than two decades of research. 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; 1993b). These early research findings have been replicated in further studies and are supported by more recent international findings.

Adopting this stage–environment fit model, recent studies have found that adolescents report relationships with teachers and peers as strongly related to their engagement in the transition to high school. A qualitative study of UK adolescents making the transition to high school found relationships with teachers were a source of both engagement and disengagement with school. For students with strong emotional engagement, teachers were described as 'nice', 'kind' and 'friendly'; in contrast, emotional disengagement was associated with reports of teacher discipline and restricted sense of autonomy (Symonds & Hargreaves, 2016). In a longitudinal follow-up of UK students from ages 12 to 16, Symonds et al. (2016) also found that emotionally disengaged youth had more problems with substance abuse and poorer psychological wellbeing, but recovered in their post-school years. This research demonstrates the significant effect of the school environment on student wellbeing, but once again, if we take a strengths-based approach, these results also demonstrate the possibility of recovery and resilience of young adults in post-school life.

Looking closely at the Longitudinal Study of Australian Youth (LSAY) data on 15-year-old Australian students, Gemici and Lu (2014) also found that some school factors 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. However, they also found that 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 outweighed many school factors. 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 factors that influence teenagers' school engagement may have been active *before* the age of 15.

School as a protective factor

This is a very brief account of school-level factors and engagement. These findings show that points of school transition that occur in late childhood may well be a point of decline in school engagement. The concept of stage–environment fit may explain the findings in the Australian study just discussed – particularly the authors' conclusion that engagement had already declined by the time students were 15 years of age. It is important to remember that these findings only relate to the concept of school 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-Stefanidi, 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 importance of school connectedness:

> 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.
>
> Source: Blum, R. (2005). A case for school connectedness. Educational Leadership, 62(7), 16–20.

Classroom factors that influence engagement

Several of the factors identified in the research discussed so far also relate to classroom factors that support student engagement. Teacher–student relationships largely exist in classroom contexts and are very important to students' sense of wellbeing and belonging in school (see **CHAPTER 14** for more on this). It seems that positive teacher–student relationships are particularly important as students grow older. A meta-analysis (Roorda et al., 2011) 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. It is possible that younger students are more affected by the lack of a close, warm relationship with teachers because they are still dependent on close adult attachments, whereas adolescents gain more benefit from positive and warmer relationships with teachers as they seek autonomy and independence from the ties of family. Overall, both positive and negative teacher–student relationships had an effect on students of all ages and grades, and had the greatest effect on students who were academically at risk because of disadvantaged or minority status in schools. As such, we cannot overlook the significance 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, as previously explained in the context of achievement goal theory.

Similarly, researchers who measure engagement by studying the concept of *academically engaged time* consider 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).

As such, there are a number of pedagogical and assessment practices that can be directly or theoretically linked to student classroom engagement. The most common approaches discussed in this very wide body of research have been summarised by Goss, Sonnemann and Griffiths (2017) as falling into two categories of *preventative* and *responsive* practices that promote engagement (see **FIGURE 8.12**).

Preventative	**High expectations**	There is clear evidence that teachers convey an expectation of success (or failure) to their students. Teacher expectations are visible and transparent and can be self-fulfilling for students. High and positive expectations for all students are essential.
	Strong teacher–student relationships	Students with a strong and positive view of their teachers have the greatest success at school. A positive teacher–student relationship is not about liking or popularity. Rather students say they expect their teachers to be warm and approachable, yet also firm but fair in their guidance and management of students.
	Clarity and structure in instruction	Research reports consistently say students flourish when teachers convey clear and consistent expectations for students. Teachers explicitly teach learning goals, behaviours and they act as role models to demonstrate these behaviours.
	Active learning	Student participation in the classroom is critical and students are given many opportunities to participate, speak and collaborate with peers.
Responsive	**Encouragement and praise**	Praise must be specific and genuine; insincere or overblown praise can undermine student beliefs in their own ability; overuse of rewards can undermine student sense of responsibility.
	Consistent corrections and consequences	Research supports the notion that consequences are an accepted part of classroom life in the event of transgressions but students expect clear and consistent consequences that are well explained. Punitive techniques like isolating students, excluding from classes, and streaming students into special classes can escalate the situation and make matters worse.

FIGURE 8.12 Classroom practices that support student engagement

Source: 'Engaging students: creating classrooms that improve learning' by Peter Goss and Julie Sonnemann, Grattan Institute, February 2017.

Interest and engagement

As we saw above, students feel engaged in classrooms when the work is *interesting.* What is interest and why do students like Kimi become interested in some school subjects but perhaps not others? One approach to examining motivation and engagement in the classroom considers the importance of interest in learning. Ainley (2012) defines interest as a core psychological process energising and directing student activities. More specifically, interest researchers acknowledge that interest has complex *individual* and *situational* forms, and Ainley (2012) asserts that these interact with classroom engagement.

Individual interest

Individual interest is highly specific to each individual and reflects growing knowledge in a particular area of interest; therefore, it is also slow to develop over time (Ainley et al., 2002; Hidi & Harackiewicz, 2000). 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 horses, despite the fact that the child has never seen a dinosaur or owned a horse. How does this level of knowledge develop?

Individual interest is a unique process that leads to independent and persistent seeking of knowledge and understanding 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. Although this type of interest enables teachers to connect topics of learning with a student's individual interest, it also means that certain features or topics in school classes may capture the attention more than others (Ainley et al., 2002).

Situational interest

Situational interest reflects a psychological state that can be aroused by specific features of the environment or a situation. Research on interest has identified the specific features of situations that can 'trigger' interest (see **FIGURE 8.13**), such as the emotion, novelty or ambiguity created when learners first approach a topic (Renninger et al., 2019). This is exactly the type of interest demonstrated by Kimi when her interest was triggered by a school project and she went on to maintain this interest with further reading and search for knowledge.

FIGURE 8.13 Students like Kimi can have their interest 'triggered', leading to deeper understanding and search for knowledge

Shutterstock.com/ZouZou

Hidi and Renninger (2006) suggested a four-phase model to explain the development of interest in the classroom. As shown in **FIGURE 8.14**, a number of factors can 'trigger' situational interest and lead to longer-term, sustained individual interest. Research has indicated that situational interest can be generated in three different ways:

- *triggered situational interest* – whether the presentation of course material grabs the students' attention
- *maintained feeling of situational interest* – the extent to which learning materials are engaging and enjoyable
- *maintained value feeling of situational interest* – whether or not the learner viewed the material as valuable and important (Linnenbrink-Garcia et al., 2010).

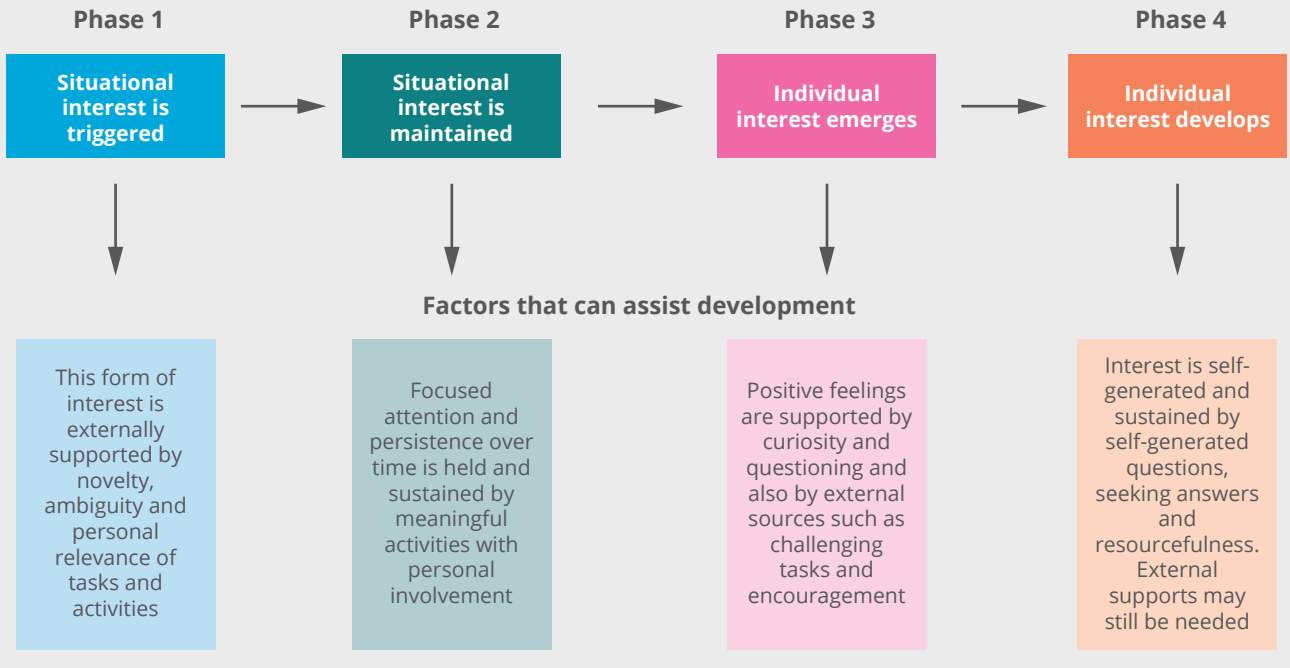


FIGURE 8.14 The development of interest in the classroom

The contextual and individual nature of interest development was highlighted in a recent study of 9- to 12-year-olds participating in a biology workshop (Renninger et al., 2019). The researchers tested a variety of workshop strategies, finding that a wide variety of pedagogical approaches could trigger the students' interest. They noted, too, that interest was triggered when the individual learner perceived greater personal relevance and demonstrated a level of awareness and readiness to learn. This is promising for teachers in that a variety of approaches can be triggers, but once again we are reminded of student diversity in the classroom.

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. It can be assumed that while positive peer relationships and friendships may motivate and engage students in their schools and classrooms, it must also be assumed that negative peer relationships and behaviours, such as bullying and peer rejection, would be a barrier to engagement. Juvonen and colleagues (2012) propose that peer relationships create a sense of belonging at school and this in turn supports school engagement (see **FIGURE 8.15**).

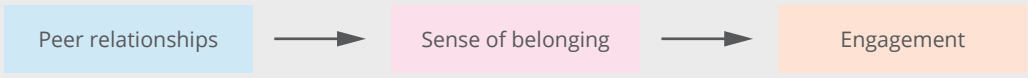


FIGURE 8.15 Relationships between peer relationships, belonging and engagement.

Source: Adapted from Juvonen, J., Espinoza, G. & Knifsend, C. (2012). The role of peer relationships in student academic and extracurricular engagement. In S. L. Christenson, A. L. Reschly & C. Wylie (Eds), Handbook of research on student engagement (pp. 387–401). New York: Springer Science+Business Media.

There is increasing evidence that peer relationships play a very important role in engagement and here we summarise some of ways in which peers play an important role.

Social and emotional support

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 perception of peer support among Year 5 students has been associated with emotional engagement in Year 6 (Estell & Perdue, 2013). Similarly, friendship quality also supports school engagement (Perdue et al., 2009). In contrast, Bellmore (2011) found that peer rejection in Year 5 preceded lower grade-point average scores among children during the transition to high school. Bullying appears to be particularly damaging to school engagement, with adolescent reports of bullying being associated with lower levels of engagement and a reduction in academic grades across the three years of middle school (Years 6 to 8) (Juvonen et al., 2011).

Socialised motivation

Peers and peer groups can influence student engagement and school adjustment by socialising certain beliefs and behaviours (Ryan et al., 2019). The saying that 'birds of a feather flock together' is also true for children's motivational and engagement proclivities. Researcher Thomas Kindermann (1993, 2007) has uniquely mapped the social networks of school students and consistently found that the natural peer groups formed in schools are composed of children with similar motivational orientations, and that even when group memberships change (e.g. a child leaves or joins the group), the group's motivational profile remains the same. Indeed, this form of

motivational 'homophily' has been identified in a number of studies related to many engagement constructs, including motivation, academic performance and school dropout (Kindermann & Gest, 2009).

Wentzel's (2012) theory of social motivation suggests that students pursue both social and academic goals that are also valued by their peers and teachers. Moreover, students' pursuit of social goals is closely related to their pursuit of academic goals and, hence, influences their motivation and engagement at school (see Wentzel & Ramani, 2016).

Increasingly, researchers are learning that the social context of motivation engagement is at least as important as classroom or teacher-level factors. For example, it is not only the teacher who can influence achievement goals in the classroom, but across the school year friends can also socialise performance approach and mastery goals between one another (Shin & Ryan, 2014). Teachers are wise to pay attention to students' friends in classrooms, with growing evidence that friends are not only similar in the motivational orientations and engagement behaviours, but become increasingly similar over time (Ryan et al., 2019). This may provide an avenue for teachers to approach student groups with similar and differentiated support strategies and recognise when particular interventions might be needed for groups of friends.

8.5 Concluding comments

Motivation and engagement have been defined in different ways, but each construct represents a critical element in the learning–teaching process. Both have a powerful effect on children's progress at school and on their experiences as adults. Motivation initiates and sustains behaviours, and is usually described as an individual-level variable. Engagement reflects various views of this energy in action, and can be viewed as a factor either within the student or within the wider culture of schools. Increasingly, it is recognised that both motivation and engagement do not reside solely as characteristics of the individual learner but are also shaped by the teacher and climate within the school and classroom. 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 support and stimulation to ensure that student engagement is maintained and enhanced, as interest may be slow to develop and fleeting. Failure to achieve these goals may reduce the chances of a learner developing a sense of mastery and belonging and a desire to continue learning beyond the years of schooling.

STUDY TOOLS

Chapter review

8.1 Defining motivation and engagement

- Motivation is an internal process that initiates and sustains behaviour over time. It can be shaped by external processes in school, classroom and peer contexts.
- 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.

8.2 Key concepts in motivation

- Poor motivation frequently leads to low achievement at school and, for teachers, problems in classroom management.

8.3 Theoretical views of motivation

- Cognitive theories explain the link between cognitive processes and achievement or performance in school.

8.4 Engagement in learning

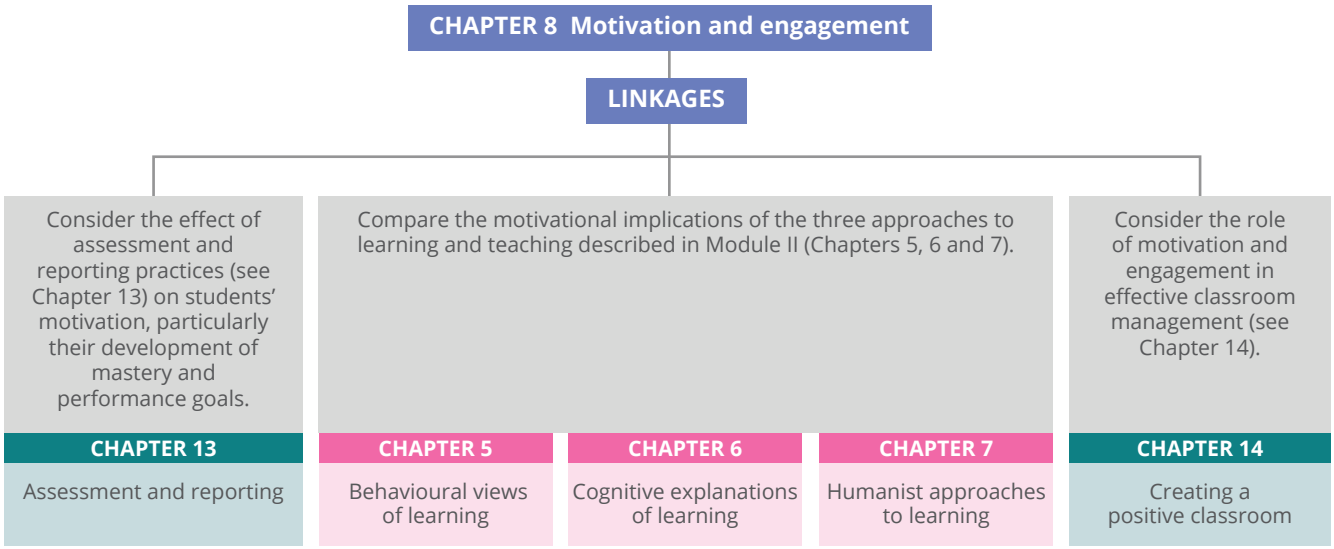
- Classroom engagement is associated with enjoyment of learning, effort and persistence when faced with challenges.

8.5 Engagement in learning

- 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 beliefs and 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.

Putting it together

Making links between 'motivation and engagement' and material in other chapters



Questions and activities for self-assessment and discussion

1 What are some of the theories of motivation? Can you give an example of classroom practice that reflects each motivational theory?
2 Explain to someone you know the brain-based concepts that support a 'growth mindset'. How does explaining concepts of a growth mindset benefit the learner?
3 Summarise the debate about the value of mastery versus performance goals.
4 Within your own personal philosophy of teaching, explain your approach to student engagement. How will you respond to students who are less motivated and engaged?

Further research

Go further

The online appendices contain additional material that you should refer to when reading this chapter. The appendix available for this chapter is:

Appendix 8.1 Achievement motivation.

Recommended websites

Be You – Learn more about how anxiety can affect student motivation, engagement and learning at school: https://beyou.edu.au

PERTS Evidence-based education for everyone. Learn more about how researchers developed growth mindset interventions for schools and classrooms: https://www.perts.net

Self-determination theory. Learn more about Ryan and Deci's view of human needs and motivation: http://selfdeterminationtheory.org

Recommended reading

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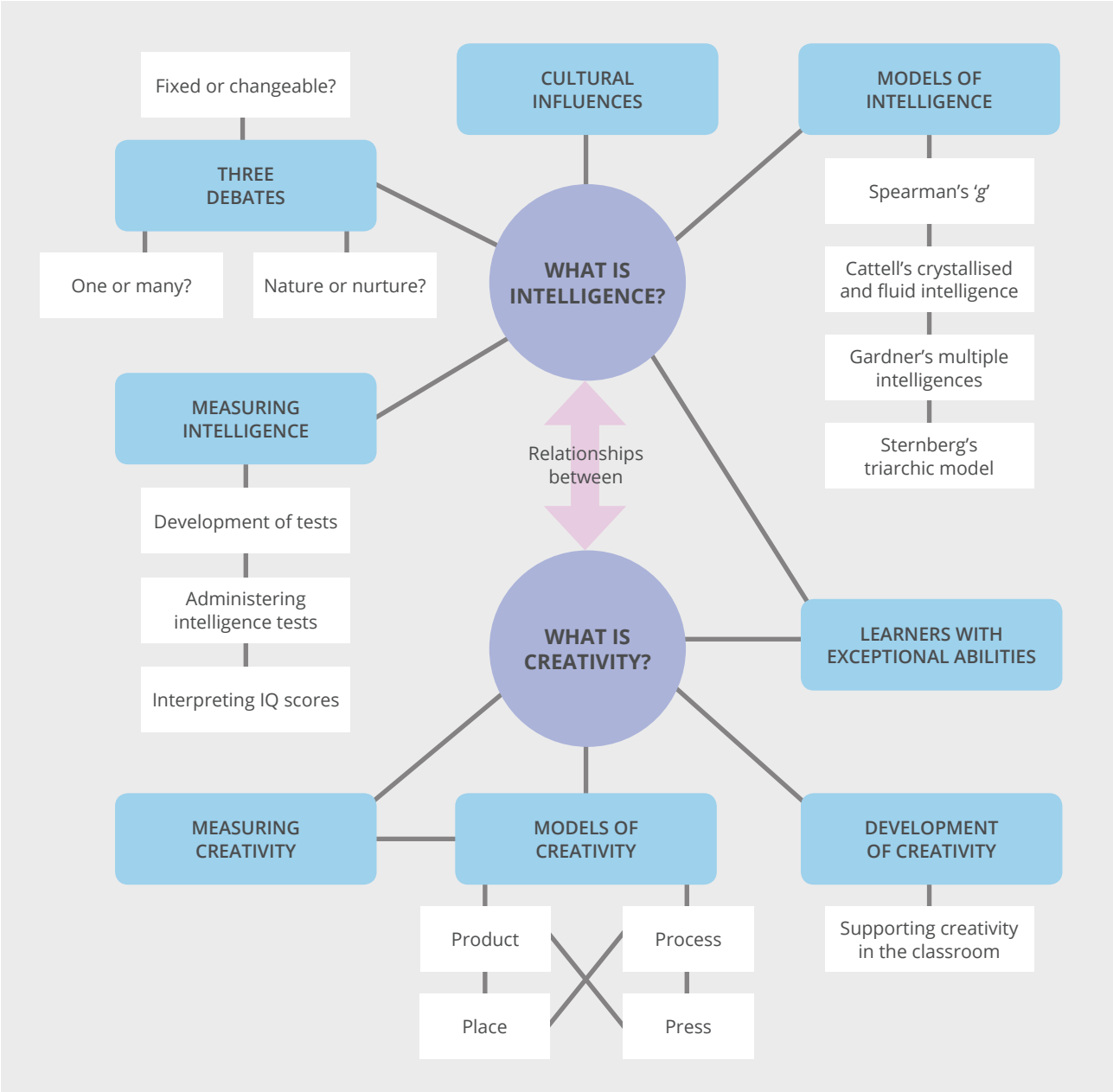
CHAPTER 9

Intelligence and creativity



Chapter 9 concept map

KEY QUESTIONS

After reading this chapter, you should be able to answer the following key 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?
- What is creativity?
- How can creativity be supported and developed in the classroom?

SIMON, KUMAR, MATT AND BENJI

Four students are working side by side on a design problem. They have been given the task of improving an umbrella. Simon breaks a technical umbrella drawing into its component parts, and suggests they think about each one and how it can be improved. Kumar wants to look at different umbrella designs and take from the best of them to shape their own design. Matt starts with the problems umbrellas have – turning inside out in the wind, dripping on the floor – and thinks about how to solve those. Benji imagines how else he could escape rain and starts to draw a magic shield that would repel the raindrops. Which of these would you class as an intelligent approach? What about creative?

Introduction

This chapter explores approaches to intelligence and creativity, and looks at how they can be supported in schools.

9.1 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 not. 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 9.1**). 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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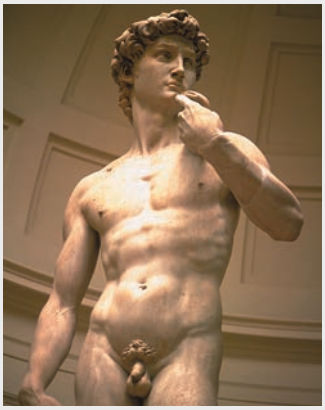
Alamy Stock Photo/Jeffery Titcomb


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FIGURE 9.1 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, but 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.

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 (i.e. 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* – smartness, knowledge, ability, competence and power
- *luoro* – social qualities, such as respect and care for others, obedience, diligence and readiness to share
- *paro* – the thinking involved in problem-solving and caring for others
- *winjo* – comprehending and understanding.

For Luo children, teachers and parents, the four attributes of intelligence are interrelated and all are used by the Luo people when 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. 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	Task efficiency	General cognition	Understanding how to handle real-life problems
Social competence	Positive social competence	Interpersonal intelligence	Initiative
Verbal ability	Receptive social competence	Intrapersonal intelligence	Respect
		Intellectual self-assertion	Knowledge and skills
		Intellectual self-effacement	

Adapted from data reported in Azuma & Kashiwagi, 1987; Sternberg, 2007.

Characterising intelligence

Sternberg (2002, 2003, 2007, 2012, see below) 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 (e.g. 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 (i.e. fluid intelligence), but appear to demonstrate more limited abilities in critical analysis (i.e. 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 US 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.

Seeking universal aspects of intelligence, Demetriou and Christou (2015) argued that cognitive processes involved in making sense of information received, such as working memory, reasoning and executive control (discussed in **CHAPTERS 3** and **6**), are the basis of intelligence. Fernandez and Abe (2018) identified language, visual processing, auditory processing, attention, short-term memory, spatial skills and executive function as existing universally, although their expression differs from one culture to another. These information-processing views of intelligence have also linked to some of the neurological work, which has identified speed of processing and efficiency of neural networks (Sternberg, 2018) as keys in the functioning of the brain relating to intelligence.

9.2 Models of intelligence

There are also disagreements among (largely western) 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 (e.g. 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. 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 an **intelligence quotient (IQ)**. It also tends to be the way in which we talk about intelligence – as a singular capacity that people have to varying degrees.

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

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 (i.e. repeating a sequence of digits) and coding (i.e. 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. One study (Kievit et al., 2017) looked at changes in a range of scores over two points in time, and found that some at least of these different abilities are connected and support one another, rather than operating as 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 and Sternberg's theory).

Spearman and *g*

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). However, Spearman also observed that there is often considerable variability in how individuals perform on the different types of items used in intelligence tests (e.g. 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.

general mental ability (*g*)
Basic intellectual capacity

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 **RESEARCH LINKS 9.3**).

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, and explains more of academic achievement than does any specific ability (Zaboski et al., 2018). Warne and Burningham (2019) found *g* in 31 non-western nations. However, debate continues over the structure of the abilities that make up *g*, and that sit beyond it.

Cattell's crystallised and fluid intelligence

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. This model also addresses the question of whether intelligence is fixed or changeable, with effects of experience on crystallised, and of training on fluid intelligence over time. Moving through **FIGURE 9.2** from top to bottom, as the intellectual skills become more specific from broad to narrow abilities, they become more changeable (Mpofu et al., 2017).

crystallised intelligence
Culturally based, fact-oriented knowledge gained through experience

fluid intelligence
Non-verbal abilities associated with manipulation of information, seeing complex relationships and solving problems

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 level – **FIGURE 9.2** illustrates this model. A meta-analysis of the relationship between the various levels of the Cattell–Horn–Carroll model with academic achievement found that *g* explained most variance in academic abilities, while the broad abilities were less useful in assessing academic difficulty (Zaboski et al., 2018). The debate about the structure of intelligence continues, with further models being proposed and tested.

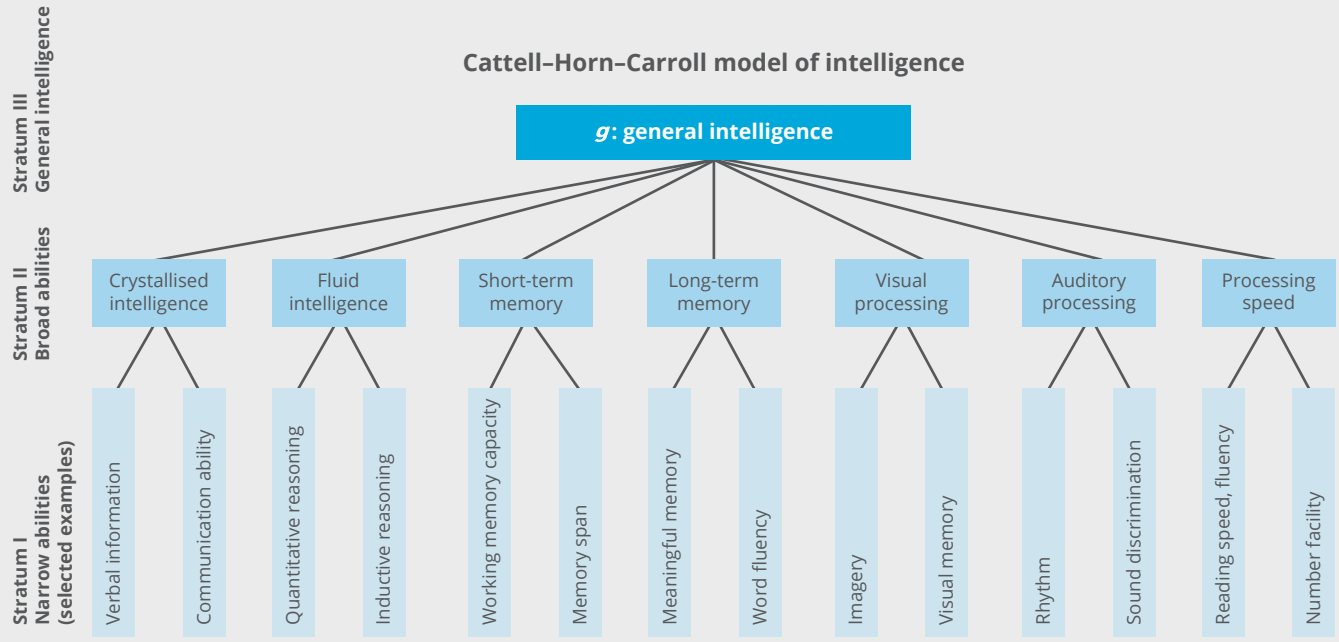

FIGURE 9.2 The Cattell–Horn–Carroll model: under *g*, at least 16 broad and more than 80 narrow abilities have been identified. A selection of these is shown here

Adapted from Schneider, W. J., & McGrew, K. (2012).

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 intelligence has traditionally been viewed as fairly stable from early adolescence, particularly in intelligence testing, Nisbett et al. (2012) identified a number of environmental factors, such as schooling, that influence it, as we will see later in this chapter.

As we explained above, the Cattell–Horn–Carroll model of intelligence suggests that specific factors of intelligence are changeable, whereas the broad factor of *g* is relatively stable from late adolescence. A number of theorists, such as Gardner and Sternberg, also 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 (i.e. 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

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 relatively autonomous, 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 **TABLE 9.2**).

multiple intelligences (MI) Eight or more domains of intellectual functioning

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, Marie Curie, Ada Lovelace, Peter Doherty, Elizabeth Blackburn
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
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

Adapted from Gardner, 1983, 1999; Granott & Gardner, 1994, p. 174; McGrath, 2005; Torff & Gardner, pp. 143–144.

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 **TABLE 9.2** for some of the famous people Gardner referred to as 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 (discussed further in the following section).

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 et al., 1997, p. 262).

THINK ABOUT

Can you identify strengths and weaknesses in your own profile of the eight intelligences? What did you look for as indicators?

Thinking critically about Gardner's theory of intelligence

A survey of teachers and non-teachers showed general acceptance of the idea that 'there are many kinds of intelligence' (84%; Warne & Burton, 2020). However, a survey of experts in intelligence showed low acceptance of the theory of multiple intelligences (24%; Rindermann et al., 2020). Research can help us to examine the evidence supporting or refuting a particular theory.

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 (e.g. Brody, 1992; Sternberg et al., 2019). 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 are therefore weak indicators. Studies of how the brain works show that in most tasks we draw on a number of areas at once (Sternberg et al., 2019; 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. A series of studies by Shearer (2020) reviewed neurological work to determine whether there was evidence supporting the existence of the eight intelligences Gardner had proposed. He found evidence both for *g* and for the eight, each having a neural architecture; that is, they have each been identified in one or more studies as having a locality (or localities) in the brain. However, Haier's overview of neuroscience and intelligence (2016, cited in Sternberg et al., 2019) showed that abilities draw on multiple areas of the brain. Psychometric studies likewise show evidence for a *g* that links various abilities (Castejon et al., 2010; Visser et al., 2006), challenging the theory's dismissal of *g*. Others have questioned whether the eight intelligences Gardner describes are all really 'intelligence' (Willingham, 2004). They could be thought of as talents or abilities, and indeed, Gardner said 'I believe that human cognitive competence is better described in terms of a set of abilities, talents, or mental skills, which I call "intelligences"' (Gardner, 2011, p. 8).

Measurement of the intelligences has been difficult to develop, given the broad and sometimes vague description of some of the intelligences (Furnham, 2009). However, 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.

Why might educators be supportive of the theory, despite these challenges? 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. However, in a blog by Strauss (2020), Gardner cautioned that his theory made no suggestions for education beyond encouraging educators to think of their students' varying profiles of intelligences when teaching or assessing. 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. However, research into the effectiveness of such programs is difficult to find.

Limitations of Gardner's theory

With the benefit of hindsight, Gardner (2020) identified a number of limitations in his theory, drawing on research that had emerged in the previous 37 years. Among the changes he would make, are

- wider attention to ideas of human potential in different cultures and historical eras
- more attention to personal, social and emotional areas (discussed later in this chapter), rather than the focus on cognition of the original theory
- consideration of morality, and how intelligence is used in ways that are positive for society (Sternberg, discussed later in this chapter, has also looked at wisdom in his more recent work)
- a finer-grained description rather than eight or nine intelligences, working with neuroscientific work
- consideration of what ability in various domains looks like at the extremes of genius and deficit, rather than simply identifying the intelligences.

Gardner has also written to caution teachers against misapplying the theory, and to respond to some of the critiques of his theory that have emerged. In 2020, Gardner identified that his theory was NOT saying:

- ☒ *Intelligences are things we are born with* – rather, he argued that they arise from cultural needs and values, and can be developed and strengthened through activity. The claim that they are universal comes from the fact that all societies use these capacities in some form (Gardner, 2020).
- ☒ *Any one intelligence works completely independent of others* – Gardner (2011) argued that, while the intelligences operate relatively independent of one another, when applied to any activity they would work together, and that any complex activity requires the synthesis of more than one.
- ☒ *People have one intelligence* – this would limit potential rather than expanding it. Gardner's theory proposes that we all have a profile of strengths and weaknesses in the full range of (at least) eight intelligences.
- ☒ *Intelligences are like learning styles* – rather than approaching all content in a particular way (a learning style), Gardner's intelligences describe capacity to solve problems in a particular domain.

Emotional intelligence

Following from Gardner's extended notions of intelligence, and a recognition that social abilities are present in views of intelligence in a number of non-western cultures (Mpofu et al., 2017), a number of writers have argued for the categorisation of a range of abilities as intelligences beyond the traditional western view that focuses on cognitive abilities. These include 'personal intelligence', 'social intelligence' and 'emotional intelligence', as forms of intelligence (Mayer et al., 2016), with Mpofu and colleagues (2017) arguing that there are both interpersonal (social) and individual elements to intelligence. The term *emotional intelligence* (EI) is rather tangled in education literature, applied to a number of different approaches. Hughes and Evans (2018) identified three main sets: ability EI, trait EI, and emotional and social competencies (ESC). The third of these is addressed in **CHAPTERS 4** and **7**, while trait EI is identified as describing personality rather than intelligence. Some of the skills involved in trait EI, alongside social and emotional competencies, are addressed in social and emotional learning programs discussed in **CHAPTER 7**. Hughes and Evans (2018) argued that ability EI and trait EI contribute separately to regulation of one's own and others' emotions, and through this emotional regulation to outcomes. The discussion here focuses on ability EI, as the set most closely related to intelligence.

Ability emotional intelligence

emotional intelligence
The ability to recognise and understand emotions, and to use emotional information to enhance thought

According to Mayer and colleagues (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 perceiving and expressing emotions, using emotion to facilitate thought, understanding emotions and managing emotions. Importantly, this conception of emotional intelligence links cognitive and emotional processes together in solving problems.

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. Mayer and colleagues (2016) identified emotional intelligence as a broad intelligence fitting into the Cattell–Horn–Carroll model at the second stratum, alongside capacities such as reasoning, memory and processing (see **FIGURE 9.2**).

Emotional intelligence is proposed to influence learning by helping students to manage challenges such as adapting to classroom rules, participating in a range of varied activities and succeeding in social relationships at school (Qualter & Davis, 2020). Qualter and Davis (2020) explained that through increases in executive function, children come to understand the causes and consequences of emotions in the various social situations they both observe and are involved in, and thereby learn to behave and respond appropriately. Emotional intelligence thus helps students in relationships with teachers and peers, in classroom and playground collaboration, and in setting and meeting learning goals. Emotional regulation, which is influenced by emotional intelligence, enables students to manage stressful classroom situations, and maintain their focus on learning. Consider some examples of students with an upcoming test. One student might feel bored with studying, while another might feel anxious about the test; one might be excited about the holiday they have planned following the test, and still another might be sad about the breakup of their relationship. If they can manage their emotions to keep focused on the study they are doing, they are likely to learn more in the time they spend studying.

Emotional intelligence and academic learning

A meta-analysis of emotional intelligence and its ability to predict academic performance found that understanding causes and consequences of emotions, having a vocabulary to understand and talk about emotion, and knowing how to manage emotion were the most powerful elements of emotional intelligence that influenced academic performance. This influence happened in part through social relationships at school (with peers and teachers) that are supported by the emotion regulation made possible by emotional intelligence (MacCann et al., 2020).

The relationship between academic learning and emotional intelligence has led to school-based interventions designed to improve school performance by enhancing competencies such as the ability to understand and manage emotions (MacCann et al., 2020; Qualter & Davis, 2020). There is some evidence that such interventions are effective for improving students' academic achievement and social and emotional skills, as well as learning environments (see **RESEARCH LINKS 9.1**). 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 in detail. Social and emotional learning are discussed in **CHAPTER 7**.

RESEARCH LINKS 9.1

RULER: a social and emotional learning program that builds emotional intelligence in schools

Brackett and colleagues (2019) described a successful social and emotional learning program that was developed by researchers and practitioners at the Yale Center for Emotional Intelligence, and has been running for over 15 years in various US schools as well as internationally, including in Australian schools. RULER is a whole-of-school, systemic approach that includes a curriculum taught in the school as well as guidelines, principles and practices that develop learning environments in which emotions are openly discussed. As well as the school curriculum, professional development is provided for school staff, and workshops are run with families to ensure the knowledge and skills are embedded across the school community. In developing the approach, researchers applied emotional intelligence theory alongside developmental and ecological systems theories. The RULER approach can be implemented from pre-kinder to the end of secondary school, with units for each grade.

The approach aims to develop a growth mindset that 'emotions matter', as well as emotional intelligence skills of:

- Recognising emotions in self and others
- Understanding emotions and their causes and consequences
- Labelling emotions
- Expressing feelings appropriately
- Regulating emotions through strategies for addressing current emotions and their causes.

A number of research studies are cited by Brackett et al. (2019) that evaluated the impact of the approach by comparing classrooms implementing RULER with those that have not. These studies have identified benefits from teaching these emotional intelligence skills on *classroom climate* with more warmth and connectedness between and among teachers and students; more positive climates; greater respect of student perspectives as rated by independent observers; higher emotional and instruction support, and better classroom organisation; and on *students' outcomes* of English grades; work habits/social development; emotional intelligence and social skills; and lower levels of school problems, anxiety and depression. An additional longitudinal study by Cipriano and colleagues (2019) looked at RULER's effects on school engagement of Year 5 students at risk of academic failure, finding increased engagement of these students in Year 6, and improved behaviour in Year 7.

See more about the RULER approach at https://www.ycei.org

Sternberg's model of successful intelligence

One of the most prolific writers about intelligence is Robert Sternberg (e.g. 1985, 1997, 2003, 2005, 2010, 2020). 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 (e.g. linguistic, mathematical, musical and spatial),

and their separate nature, Sternberg is more interested in the *application* of intelligences, and the ways they work together (Sternberg, 2018). He has argued that individuals who are more intelligent display their abilities through their capacity 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 and because, in it, he identified three key aspects of intelligent behaviour (Sternberg, 1997, p. 344) – see **FIGURE 9.3**.

triarchic model of successful intelligence Intelligence defined as thinking (analytic), responding to new experiences (creative) and coping with everyday situations (practical)

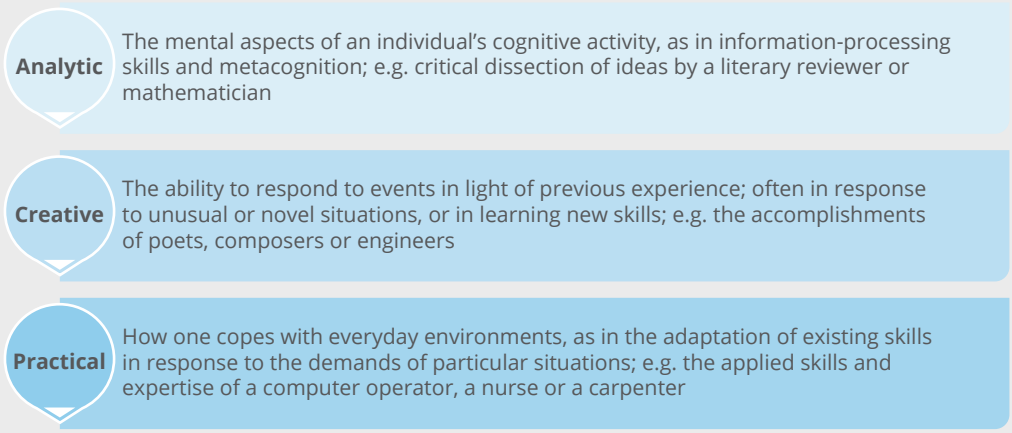

FIGURE 9.3 Sternberg's triarchic model of successful intelligence

In this theory, Sternberg was also interested in three questions that equally apply to analytic, creative and practical intelligence:

1 *How does intelligence relate to the internal world?* This is about processing information and, in particular, how problem-solving involves metacognitive processes of planning, monitoring and evaluating; processes of carrying out the plan for solving the problem; and processes of acquiring knowledge about how to solve the problem.
2 *How does intelligence relate to experience?* Here Sternberg was interested in how prior experience influences information processing, and how a novel problem makes different demands on processes than a familiar problem, in which some of the processes have become automatic.
3 *How does intelligence relate to the external world?* With a definition of intelligence as ability to successfully adapt to the environment (Sternberg, 2018), the theory suggested intelligence involves adapting to and shaping the current environment, and selecting new environments for success.

Applying triarchic theory in 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 – ask students to compare and contrast, analyse, evaluate, critique, explain why, explain what caused ..., or evaluate what is assumed by ...
- *creative* abilities – ask students to create, invent, design, imagine, imagine what you would do if ..., show how you would ..., suppose that ..., or say what would happen if ...
- *practical* abilities – ask students to apply, show how you can use ...; implement, or demonstrate how.

Application of the successful intelligence theory has been tested with primary- and secondary-aged students, comparing effects of instruction balancing analytical, creative and practical abilities with instruction focused on memory of the content, and instruction based on critical thinking alone. Following teaching of a unit on social studies or science, students in the successful intelligence group did better than those in the other groups on tests of memory for the content, and on performance assessments of analytical, creative and practical learning (Sternberg et al., 1998). In other studies, similar results were found for reading comprehension in a number of curriculum areas (Grigorenko et al., 2002), although a large study that sought to replicate these effects in 223 classrooms with more than 7500 students found effects at near chance level, in which the successful intelligence group did better in some cases, and other groups did better in others (Sternberg et al., 2014).

Sternberg also distinguished between academic intelligence, measured by traditional tests of general or fluid and crystallised intelligence, and successful intelligence (i.e. the ability to succeed in life in terms of personal goals and life experiences) or practical intelligence (i.e. competence in everyday life as measured by tests of tacit or real-world knowledge and understanding) (Sternberg, 2005; Sternberg et al., 2014).

Sternberg (1997, p. 360) 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's work regarding intelligence continues. In 2003 he recognised wisdom as another aspect of intelligent behaviour, thinking not just about how well people think or solve problems but also about how these abilities are applied for the benefit of society. In 2019 he published a paper on adaptive intelligence, exploring intelligence as adaptation to the environment, and bringing together the theories about wisdom, creativity and successful intelligence.

Is intelligence mainly influenced by nature or nurture?

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 (i.e. nature) and the role of environmental factors (i.e. 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.

nature–nurture debate
Controversy over the relative influence that inherent characteristics and environmental factors have on development

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 et al., 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).

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 (Grace et al., 2017). 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 et al., 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.

FIGURE 9.4 School environments can influence intelligence by supporting cognitive challenges and encouraging students to engage with these challenges

Getty Images/Westend61

While these findings are about explanations rather than causes, they also highlight the importance of environment to intelligence (see **FIGURE 9.4**). 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 et al., 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 previously (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, schooling affects intelligence – as we would hope as educators (Ritchie & Tucker-Drob, 2018). 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 an increase in years of compulsory schooling in Norway produced substantial gains in IQ (3.7 IQ points as a result of each extra year of school) for the population (Brinch & Galloway, 2011). Ritchie and Tucker-Drob (2018) conducted a meta-analysis of the effect of education on intelligence, finding that the effect of one extra year of education was 1 to 5 IQ points, and this effect was maintained into later life. Ritchie and colleagues (2015) found that this effect is likely to be on specific skills rather than general intelligence more broadly. This prompts the question, 'What are the aspects of schooling that make the most difference to an individual's intelligence?'

Hunt (2011, p. 26) 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'. 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

When reviewing models of intelligence, it is important to consider the strengths and limitations present.

Strengths of models of intelligence

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 of models of intelligence

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. It is also important to remember that these theories have largely been developed by western psychologists, based on work with western populations (Henrich et al., 2010), although attempts have been made to validate them more widely. They may best describe intelligence in WEIRD (western, educated, industrialised, rich, democratic) societies, rather than universally.

TABLE 9.3 summarises the strengths and limitations of the models of intelligence proposed by Spearman, Gardner, Sternberg, and Cattell and Carroll. **IMPLICATIONS FOR EDUCATORS 9.1** briefly discusses some implications of these models for 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?

IMPLICATIONS FOR EDUCATORS 9.1

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 (e.g. Sternberg, 1997; Sternberg et al., 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).

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	Gardner did not endorse measurement of 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?

9.3 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; instead, tests such as Weschler's intelligence scales (described further in the following) identify strengths and weaknesses in various components of intelligence that can help teachers to address particular skills with individual students. Nonetheless, it is helpful to know the origins of intelligence testing.

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 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 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 (i.e. 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 US. 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 as well as adults.

The original meaning of intelligence quotient, 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 12-year-old). However, the formula is only applicable when a child's ability to answer questions on an IQ test (i.e. 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 scored on a test (i.e. 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 measures how far a particular test score is above or below the mean score of the relevant age cohort. It provides a method for rank-ordering individuals in terms of their performance on a test.

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

To collect the information needed to establish mean scores for different age groups, Wechsler's intelligence tests (e.g. 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, 4th edition [WPPSI-IV]) were administered to very large samples of adults and children. These samples were selected to represent demographic characteristics, such as age, gender and social class. Information derived from the representative group of adults and children (i.e. the 'standardisation sample'), such as expected scores for individuals of a certain age and gender, are provided in the test manual and are used by psychologists when interpreting individual scores.

Rather than providing an IQ score alone, the WISC-V provides scores for five cognitive domains: Verbal Comprehension, Visual Spatial, Fluid Reasoning, Working Memory and Processing Speed. Each of these in turn is made up of tests of component skills, so that the psychologist can identify particular aspects of a domain that are of strength or weakness for an individual.

Interpreting IQ scores

Most intelligence tests are designed to have a mean score of 100, with a 'standard deviation' of approximately 15 or 16. 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. The range of scores for children who can progress satisfactorily in the regular

school system is roughly between 84 and 166. This represents one standard deviation above and below the mean of 100. Those who fall in the bottom 2 per cent may require a high level of additional support in school (see **CHAPTER 10**), while those who fall in the top 2 per cent are identified as 'gifted' (identification of gifted students is discussed later in this chapter).

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 US, 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, 2012; see **RESEARCH LINKS 9.2**), 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, where access to learning support programs is determined by IQ score.

RESEARCH LINKS 9.2

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 (i.e. problem-solving, abstract reasoning) show greater gains than those of crystallised intelligence (i.e. 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?

Explanations are likely changes in environment rather than any change in the genetic composition of the population (Bratsberg & Rogeberg, 2018):

- *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. However, scores on other kinds of tests (e.g. 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 Flynn (2009) discounted this explanation through

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an analysis of British data. It would be expected to make a difference to those of low SES, 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) argued 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) proposed 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?

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, 5th edition (PPVT-5), can be administered to children individually or in groups by an experienced teacher or other professional. Individual tests 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. Individual tests are more expensive to administer than group tests, but have higher reliability (i.e. the same response is obtained on successive occasions) and validity (i.e. the tests measure what they are designed to measure). See **CHAPTER 13** for more on tests and assessment procedures.

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.

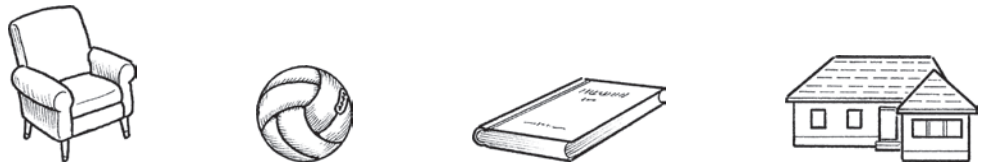
RESEARCH LINKS 9.3 shows some typical items you might expect to find in an intelligence test.

RESEARCH LINKS 9.3

Typical items in intelligence tests

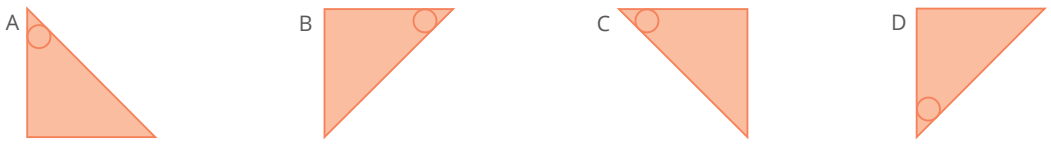
Tests of intelligence typically include items tapping a variety of skills:

- *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 correlations between creativity and scores on intelligence tests, and scores on these tests have been shown to predict creative output in life (Lubinski et al., 2006), although there are generally no items in intelligence tests that tap creativity itself (Sternberg et al., 2019).

The third set of skills is variously described (Hunt, 2011; Nisbett et al., 2012); the terms used include persistence, impulse control, intellectual engagement, conscientiousness and self-discipline, and 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

As with the models of intelligence outlined earlier in this chapter, it is important to consider the 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. Tests such as the WISC identify particular strengths and weaknesses in the various skills that form the sub-scales of the test, and so can pinpoint how learners can be supported according to their particular pattern of strengths and weaknesses. 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. Validity issues relate to the use of tests in groups other than the one for whom a test has been designed. Tests may also have limited use as a result of the restricted range of skills measured. Tests are typically limited to cognitive processes. Developmental systems theories, introduced in **CHAPTER 2**, suggest all domains work together and that social, emotional, physical and motivational skills as well as the context influence learning and the expression of intelligence. 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.

THINK ABOUT

Given the limitations of standardised testing of intelligence, they are rarely used in schools. How else would you identify potential and particular learning needs in your students?

Some issues that need to be considered by educators when using information from intelligence tests are outlined in **IMPLICATIONS FOR EDUCATORS 9.2**.

IMPLICATIONS FOR EDUCATORS 9.2

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 has 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. Other information should be considered in this identification, alongside formal test results.
- Teachers need to know how to interpret scores derived from intelligence tests.

9.4 Ability and potential

Intelligence is a measure of the potential of individuals. As we have seen, this is increasingly recognised as changeable rather than fixed, and as dependent on more than genetic factors; the child's own personality and activity play a role, as does the environment (including what students experience in schools and early childhood settings) in the development and realisation of potential. This has implications for how we think about children at the extreme end of potential – children described as 'gifted'. Dai (2020) critiqued previous definitions of giftedness, such as Gagné's (2003, discussed below), that identify gifted children in terms of a high IQ score. This tends to describe giftedness as a trait of the child – largely genetically determined, and fixed. It has led to concerns about 'underachieving gifted children' (Siegle & McCoach, 2018) who do not fulfil the promise of their potential. Dai suggested that even using Gardner's multiple intelligences as a way of identifying gifted children has maintained this 'trait' view. Instead he believes that potential should be viewed as a developmental process, influenced both by the individual, their characteristics and activity, and by the sociocultural environment.

According to Dai's evolving complexity theory, children are born with particular abilities and dispositions that they bring to their interactions with others and the physical environment. As they encounter various challenges and opportunities in their environment, they make 'characteristic adaptations' that shape their personality, motivation, interests and sense of self. These adaptations themselves result in particular choices and actions that will further develop abilities and shape potential. At some point they start to pursue particular opportunities and interests, forming an identity which results in further guiding where their potential goes. These opportunities, and those who may teach and support them, help them to reach a higher level of ability than they might have otherwise. Therefore, potential emerges from the individual's characteristics interacting with their environment.

This is consistent with current dynamic systems views of development, as described in **CHAPTER 2**. It also allows for the fluctuations that we see in the realisation of children's potential, with some developing talent early and others later in life; and with their pursuit of that potential changing at different points, in response to shifts in personal, environmental and sociocultural choices and conditions. Consider this in terms of the children described in **CASE STUDY 9.1**.

CASE STUDY 9.1

Gifted students

Michael

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 timelines, 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 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'.

Jamal

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 do not appear too many years apart as Jamal progresses through school.

Chwee

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

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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.

ACTIVITIES

Identify the particular gifts or talents of the three students described here.

1 Where do these come from? Imagine a life story for them that shows how their abilities and dispositions might have been developed and shaped by interactions with environments, their own choices and activity, and others' interactions with them.

2 What difficulties do their particular gifts present for the teacher and for them as students?

4 How can you envisage change occurring; will this be in the person, in the environment, or in the two interacting?

5 What strategies might teachers use to push and sustain their abilities and talents?

There are implications in this model for the approach to gifted education, and to individual teachers' work with their students. Rather than identifying gifted students as arriving with a 'gift' and developing programs for them, Dai suggested teachers would consider the potentials in each of their students, and what opportunities, challenges, supports and tools could work with their individual personalities and abilities to push them to develop beyond their current abilities, and sustain interest and commitment. Other approaches to giftedness are described in the following sections.

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 (i.e. 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). Other conceptions of giftedness are discussed in **CHAPTER 10**.

gifted
Significantly superior potential to achieve in one or more domains

talent
Significantly superior performance in one or more domains

As we discussed above, high intelligence or ability 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, which interact with personal characteristics such as motivation, confidence, self-esteem, perseverance and personality (Dai, 2020; Renzulli, 2013). Students with high ability can also underachieve, for reasons that

may be both intrapersonal (e.g. lack of motivation, low self-esteem, poor health, and learning and language difficulties) and environmental (e.g. disadvantaged SES, minority cultural group, low teacher expectations and inappropriate or ineffective teaching practices; Siegle & McCoach, 2018).

Renzulli (1978, 2002, 2016), 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 (e.g. 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 SES, 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: 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 (e.g. Australia Curriculum, Assessment and Reporting Authority, 2012), although tests of general ability tend to be used as one option alongside a range of other mechanisms, such as teacher nomination, to identify such students (e.g. New Zealand Ministry of Education, 2012; Queensland Department of Education and Training, 2020).

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 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' (i.e. who have other identified needs; see **CHAPTER 10**), and those from lower SES (New Zealand Ministry of Education, 2012).

9.5 Creativity

We sometimes identify creativity with the arts and media, with famous artists, such as Brett Whiteley or film director Taika Waititi, and their work is certainly agreed to be creative. Consider also these creative endeavours: Josie is designing a solution for keeping possums out of the roof of her house. Janet is working out how to solve a difficult mathematics problem at school. Jo is developing a lesson plan that will challenge her students across a range of ability levels, and engage them with a topic they have been bored by previously. 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, and indeed, that creative thinking is essential for solving the problems of the present and the future – on a personal, local and global scale. The Alice Springs (Mparntwe) Education Declaration (Education Council, 2019) identified development of all Australians as creative individuals as a core goal, and creative and critical thinking is a competency in the Australian and New Zealand curricula, running across all curriculum areas.

What is creativity?

As with intelligence, creativity is difficult to define, and people from different cultures have varying, implicit views regarding what is creative. Although we would probably all be able to identify people or products we would think of as creative, we might find it more difficult to specify the basis on which we make that judgement (see **FIGURE 9.5**).

According to Kaufman and Sternberg (2010), **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, utility and quality (Kaufman & Glaveanu, 2019). That is, something is judged as creative if it is good, innovative and useful for its context. Hence, creativity is culturally and contextually determined; what is seen as good, new and useful in one context would not be considered so in another (Lubart, 2010). 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 (e.g. Torrance, 1988). We discuss measurement of creativity further below.

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

FIGURE 9.5 Designs for a new creature. Which is most creative? How would you decide?

Matthew Duchesne, © Milk and Honey Photography, 2010.

thinking may be seen across domains (or subject areas), as well as its results in products within a specific domain (Beghetto & Plucker, 2006).

Stein (1953) and later Csikszentmihalyi (1996) made an important distinction between levels of creativity, calling them 'big C', referring to the work of eminent creative people, such as Paul Cézanne or Albert Einstein, that have significantly influenced their domain of art or science, and have endured across time; and 'little c', referring to the creativity we all engage in every day, as exemplified in the introduction to this section. Stein argued that *big C* tends to focus on creative products, whereas *little c* looks at creative experiences. Kaufman and Beghetto (2009) extended this further, adding two more categories to differentiate aspects of *little c*. 'Mini-c' creativity is part of the learning process, and links to the construction of knowledge that Piaget and Vygotsky proposed children are engaged in. 'Pro-c' creativity is that of professional creators who have not yet attained eminent status.

Models of creativity

As with intelligence, there are a number of models of creativity, reflecting emphasis on different facets of this complex concept.

The four Ps of creativity

Rhodes (1962) identified four Ps of creativity that have distinguished various approaches to the field. Kozbelt and colleagues (2010) used these to compare different models. We have already talked about two of the Ps above: *product* and *process*. The others are *person* and *place*.

Product

Product is the focus of psychometric approaches to creativity and those that seek to measure it. Individuals' responses to a stimulus, or works they produce, may be scored according to various criteria, enabling correlations to be made between creativity scores and other variables. We discuss measurement further in the next section.

Process

Some theories of creativity emphasise the cognitive processes that are involved in creative thinking. Neurological studies of creativity typically take this approach. For example, Cassotti and colleagues (2016) identified the prefrontal cortex as being involved in both creative thinking and inhibitory control (see **CHAPTER 3** for a discussion of this executive function). In line with work showing interactions between the executive functions of inhibitory control and cognitive flexibility (e.g. Dajani & Uddin, 2015), they argued that inhibitory control supports creativity by allowing people to suppress or inhibit their automatic first response to solving a task, so that they can explore new ideas. Cognitive theories also emphasise process. These might look, for example, at divergent and convergent thinking, both of which are needed to ensure novelty and evaluation of appropriateness (Guilford, 1967), or at the stages of thinking in the creative process (e.g. Runco & Chand, 1995).

Person

Some approaches identify aspects of the person that influence creativity. Feist (2019) identified cognitive traits, such as openness to experience and cognitive flexibility; social traits, such as extraversion, particularly in being independent, confident and assertive, doubting or questioning authority, and non-conformity; and motivational traits, such as persistence, ambition and drive, together with positive emotions. Amabile and Pillemer (2012) looked at motivation, and identified intrinsic motivation or task-focused motivation as supportive. In some situations, they reported that extrinsic motivation can also 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. (See **CHAPTER 8** for more on motivation.) Ways of supporting these characteristics to encourage creative thinking in schools are discussed in the section on teaching creativity that follows.

FIGURE 9.6 Environments can encourage creativity by supporting exploration, curiosity and autonomy. How could you create these conditions in your classroom?

iStock.com/monkeybusinessimages

Place and press

Press refers to the press of environments (i.e. places) for an activity. Theories looking at this facet investigate interactions between an individual's characteristics (i.e. aspects of person) and the environment in which they operate (see **FIGURE 9.6**). Amabile and Pillemer (2012) noted the importance of actions of significant others that influence intrinsic versus extrinsic motivation, for example. Sternberg (2012) recognised that stimulation from people as well as materials was important, and identified the importance of support from adults and peers, as well as from the broader culture, for creativity to flourish. *Place* is looked at particularly in developmental work on creativity, which has identified the role of child-rearing practices, such as encouraging exploration, autonomy, questioning and discussion, in children's and adolescents' creativity (Russ & Fiorelli, 2010). Dul (2019) looked at the physical environment's influence on creativity, identifying factors that *enable* creativity (e.g. having the right tools, being adaptable to individuals' needs, and distraction free); that provide *meaning* by supporting freedom, inspiration, interaction, privacy and relaxation; and that influence *mood* through light, sound, smell, colour, plants and furniture.

Persuasion and potential

Two additional facets are raised by Kozbelt and colleagues (2010): *persuasion*, or the ability of the creative person to persuade others of the value of their novel idea or product; and *potential*, which is particularly seen in developmental theories. A child might have the necessary aspects of *person* but requires the *press* of environmental factors for their *potential* to be realised.

Csikszentmihalyi's systems theory

Systems theories of creativity look at how the multiple facets of person, process, product and place influence one another. One example is Csikszentmihalyi's (1996) theory of creativity. Csikszentmihalyi recognised the importance of the social context and culture in which people live, to support and guide an individual's creative effort. He argued that while psychologists have tended to focus on the individual (i.e. the person and process), three factors are involved in creativity: person, field and domain. *Domain* refers to the area in which the person's work is created, each with its own particular cultural rules and practices, for example, art, music or science. The *field* contains the social context – the people – who judge creative products. Csikszentmihalyi argued that 'Big C' creative works vary the content, rules or practices of their domain in some new way. For this to happen, they must be recognised as valuable by people in the field. Various fields (i.e. groups of influential people in various domains) sit within society, that preferences particular problems and solutions, and gives the field its power to make decisions about what is valuable. Similarly, various domains sit within the broader culture, and both influence and are influenced by it.

Measuring creativity

Measuring creativity enables us to answer questions about what influences creativity, and to evaluate the effectiveness of interventions that seek to develop it. It has also helped to tease out the relationship between intelligence and creativity (Plucker et al., 2019; Silvia, 2015).

The best-known measures of creativity are probably tests of the *process*. These are tests of divergent thinking that ask the participant to come up with multiple responses to a question. This may involve uses for objects ('How many uses can you find for a brick?'), consequences of improbable situations ('What if the clouds had strings attached to them. How many consequences can you think of?'), or improvements to common objects ('How could you improve a stuffed toy dog?'), among many others. They were originally developed by Guilford in the 1950s, and then further by Torrance through the 1960s, who developed the Torrance Tests of Creative Thinking (TTCT) and used criteria of fluency (i.e. number of responses), flexibility (i.e. number of ideas), originality and elaboration (i.e. extension of ideas) to score responses. Torrance continued to develop the tasks through the following decades, later adding other criteria for scoring these tasks, and additional tasks (Torrance, 2008). For example, a series of figural sub-tests was developed, in which people add to an abstract line or shape to develop a picture. This measures a different aspect of divergent thinking to the verbal subtests (Kaufman, 2016).

However, as we saw in the section on models of creativity, there are other cognitive *processes* involved in creativity in addition to divergent thinking. Generation of metaphors to describe an experience, musical improvisation, and solutions for impossible problems have been tasks seeking to tap other aspects of creativity. Neurological studies use brain imaging to identify areas of the brain associated with creativity. For example, Kleibeuker and colleagues (2016) linked developments in the frontal cortex with developments in creativity in childhood and adolescence, and Yoruk and Runco (2014) reported that both hemispheres are involved in creative activity.

Tests focusing on the creative *person* have been developed from studies of creative people that identified personality characteristics (Simonton, 2016), and aspects of motivation (Amabile, 1985) related to creativity, and sometimes the interactions between the two (Prabhu et al., 2008). These characteristics are then included in inventories of creativity traits that people may be asked to respond to in a questionnaire.

Other tests focus on rating of creative *products*. The Consensual Assessment Technique (Amabile, 2018) asks experts to rate the creativity of a specific product (e.g. a story, drawing, drama performance or musical composition). An expert is defined as someone with at least 10 years of experience in their field. Interestingly, Baer and colleagues (2009) reported that whether their expertise was in teaching, writing or creativity research, experts' judgements of the creativity of Year 8 writing tended to agree. By contrast, agreement between experts' and novices' judgements is less likely. **FIGURE 9.5** asked you to rate the creativity of some objects created by children. According to research studies, those of you with expertise (i.e. with children, sculpture or creativity research) are unlikely to agree with those who are novices in these areas about the creativity of the pieces (Kaufman, 2016).

More recently, *systems theories*, recognising the interaction of multiple facets of creativity, have led to other kinds of measures, including measures of creative activity in daily life (Plucker & Makel, 2010). For example, Conner and Silvia (2015) asked people to keep a daily diary of creativity and emotion states, and were able to identify high-activation positive emotions, such as feeling enthusiastic, as associated with higher levels of creativity, while negative emotional states either had no effect or suppressed creativity. Personality characteristics, such as openness, moderated this link, with more open people finding stronger effects of emotional state on their creativity.

See **IMPLICATIONS FOR EDUCATORS 9.3** for some examples of creativity test items.

IMPLICATIONS FOR EDUCATORS 9.3

Measures of creativity

Amabile (1996) identified three main types of creativity tests: tests of personality, tests of cognitive behaviour, and biographies or questionnaires about tasks or achievements. Presented here are examples of each of these types of test items.

When measuring creativity, it is recommended that a range of types of assessments are used, as each measures a different aspect.

Tests of creative personality

Creative personality scale (Gough, 1979)

> 'Please indicate which of the following (30) adjectives best describe yourself.'

Items scored positively include wide interests, original, intelligent, humorous. The scale also includes items that are scored negatively, such as narrow interests, cautious, honest.

Biographies

Biographical Inventory of Creative Behaviours (Batey & Furnham, 2010)

> Choose from a list of 34 items those you've been actively involved in over the last 12 months: e.g. written a short story, produced your own website, designed and planted a garden, composed a piece of music.

Runco Ideational Behavior Scale (Runco et al., 2000–2001).

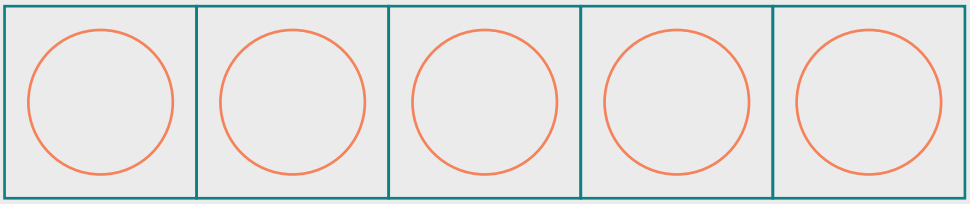
> Rate how often you have the following ideas: 0 = Never; 1 = approximately once a year; 2 = once or twice each month (approximately); 3 = once or twice each week (approximately); 4 = Just about every day, and sometimes more than once each day.
>
> e.g. 'Approximately how often do you have ideas for making your work easier?'
>
> 'Approximately how often do you have ideas about what you will be doing in the future?'

Tests of cognitive behaviour

The main tests used are tests of divergent thinking, of which there are many types (Runco et al., 2016). Responses are generally scored for:

- originality – responses that are not suggested by more than 1 per cent of others
- fluency – the number of responses
- flexibility – the number of different categories of ideas
- elaboration – the number of elements.

1 In three minutes, use the image as a start for a drawing. Try to think of as many different pictures as you can, and have fun with this. (The sheet would have a full page of the following circles.)



2 'People typically use everyday items for specific purposes. Often there are alternative uses for the same objects. For example, a newspaper could be used as a hat or a blanket, and many other things. For the following items, list as many alternative uses as you can. The more uses you think of, the better. Do not worry about spelling.' (Runco et al., 2016).
e.g. a comb, a tyre, a brick or a toothbrush

3 'List alternative titles for each movie, play, and book listed below. Spelling does not matter and there are no grades for this. Have fun and list as many alternatives as you can.' (Runco et al., 2016).
e.g. Star Wars: The last Jedi
Matilda
Harry Potter and the Philosopher's Stone

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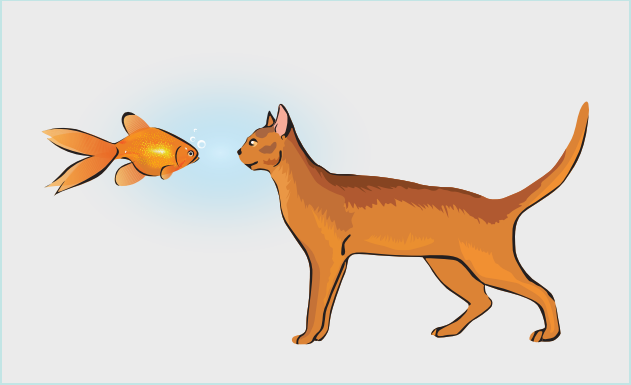
4 Realistic problem generation: 'List problems with your friends, peers, schoolmates, or spouses (any individual of the same approximate age). These problems might be real, or they might be hypothetical and imaginary. Do not limit yourself; the more problems you can list, the better. (Do not worry about spelling, and take your time.)' (Runco et al., 2016).

5 'Create a humorous caption for this cartoon:'



ACTIVITIES

1 Consider each of these tests of creativity. Which comes closest to assessing creative potential? What are the weaknesses?

2 Are there other elements of creativity that are not addressed here? How would you measure them?

3 Is creativity measurable? What issues make it problematic?

Development of creativity

Creativity, like other cognitive skills we looked at in **CHAPTER 3**, and social and emotional skills discussed in **CHAPTER 4**, develops throughout childhood and adolescence, although the pattern of development is irregular, showing peaks and slumps, and with considerable individual differences evident. Barbot et al. (2016) argued that both the discontinuities and the individual differences can be explained by differences in fit between individuals' resources of motivation, cognition and personality, and the demands of particular creative tasks. Environments play a role here too, in shaping individuals' cognition, motivation and personality, in responding to them, and in the context they provide for each task. Hence, as you may have experienced yourself, people may show high levels of creativity in one task, and quite low levels in another that is perhaps in a different domain or set in a different situation. Baer (2016) similarly argued that creativity is domain-specific and that training of creativity needs to also be tied to a particular domain, or even a particular task. We take this idea up further when we consider supporting creativity in the classroom. In addition, Barbot et al. (2016) pointed out that the various cognitive, personality and motivational resources for creativity each have differing patterns of development, which interact with the demands of each task, resulting in discontinuities in development across tasks and across time.

Nonetheless, brain development is reflected in developments in creativity, suggesting that there are underlying key processes that support creativity (Kleibeuker et al., 2016). We looked at some of these in the section on models of creativity above. While executive functions supporting creativity, such as inhibition control and cognitive flexibility, show large changes in early childhood, studies of personality characteristics related to creativity suggest that adolescence and early adulthood are periods in which the greatest change occurs in this domain (Plucker & Makel, 2010).

Supporting creativity in the classroom

Creative (and critical) thinking is a general capability in the Australian and the New Zealand curricula; students are encouraged to value 'innovation, inquiry and curiosity, by thinking critically, creatively and reflectively' (New Zealand Ministry of Education, 2015). How can teachers support creativity in their classrooms? Kampylis and Berki (2014) stressed that creative thinking can be supported in all curriculum areas; Baer (2016) went further, arguing that if we want our efforts in supporting creativity to be successful, it must be addressed in each content area, rather than being dealt with in a generic way. Davies and colleagues (2013) 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 in **IMPLICATIONS FOR EDUCATORS 9.4**.

Gajda and colleagues (2017) identified classrooms in which there were positive correlations between creativity and academic achievement, and then looked at how teacher and student behaviour differed in these classrooms compared to others without this positive correlation. Teachers in the classrooms with a positive relationship between academic achievement and creativity were more likely to show the caring behaviours of careful listening to questions, delayed assessment of ideas, group work organisation, and authenticity or genuineness. The power of this to support creativity is seen in the student behaviours; students' positive engagement and ideation (i.e. generation of ideas) were linked to teachers' caring behaviours.

IMPLICATIONS FOR EDUCATORS 9.4

Strategies for fostering creativity in your classroom

Kampylis and Berki (2014) summarised characteristics of classrooms that support creative thinking, with considerable overlap with Davies and colleagues' (2013) 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
- Taking students outside the classroom to encourage 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 in the Queensland longitudinal study of productive pedagogies.
- 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 is identified as important to developing creative thinking. Risk taking is essential to the

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creative process, and 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 students 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 & 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.

In classrooms that supported creativity, opportunities were provided for students to share, and then further explore their ideas, as shown in **FIGURE 9.7**.

Teaching creativity

Creative thinking is an education goal in Australia (Council of Australian Governments Education Council (2019) and a key competency in the New Zealand curriculum (Ministry of Education New Zealand, 2015). It must therefore not just be encouraged but taught in classrooms. While critical and creative thinking are paired here, Beghetto (2020) distinguished between the two, stating that while both involve evaluation, creative thinking involves the generation of new ideas. Teachers can support creative thinking simply by providing opportunities for it; for example, introducing uncertainty in lessons by asking students to predict what will happen in a story, or imagine how history might change if a particular event occurred. Creative possibilities can be generated through divergent thinking, combining different ideas, and thinking outside of the domain. Beghetto emphasised that all teachers can (and should) teach creativity within the existing curriculum.

Sternberg (2019) suggested a number of techniques teachers can use to teach for creativity. The first is to encourage students to identify and define problems, rather than only solving problems posed. This links to engagement through autonomy supportive practice (Deci & Ryan, 2008). Learning how to pose questions and challenge assumptions is more important for creativity than answering provided questions, according to Sternberg. Students can also benefit by learning how to explain and sell their creative ideas to others through activities such as a 'big ideas panel' or idea generation forums that allow students to identify helpful elements of even the silliest idea. However, Sternberg cautions against the common practice of brainstorming without evaluation of the ideas generated. Knowledge is important for creativity, particularly to ensure ideas are useful as well as novel (remembering the definition of creativity includes both these aspects). Sternberg cautions, however, that it can limit creativity by funnelling thinking in a particular direction. For this reason, linking novices with experts could produce more creative ideas that still draw on knowledge and experience.

FIGURE 9.7 Learning environments can support creativity by encouraging collaboration and exploration, and by stimulating ideas

Getty Images/Hero Images

Persistence in the face of difficulties is important to creative ideas overcoming roadblocks along the way. Teaching *about* creativity (Beghetto, 2019), and common processes that occur in the course of development and realisation of a creative idea, can help students to recognise these difficulties as part of the creative process, rather than an insurmountable block. Linked to this, learning to delay gratification is important for students to persist with an idea or creative project. Teachers can help by setting long-term projects, and not immediately rewarding performance. Encouraging students to work with their peers to overcome obstacles can also provide support. Willingness to take risks is one of the characteristics of creative people discussed earlier. Therefore, finding ways to reward risk taking in the safe environment of the classroom is important. Building self-efficacy and helping students to identify their passions are also important roles of teachers seeking to encourage creative thinking in their students.

Teachers' responses to students are part of their teaching, and can support students' creativity by providing a role model (sharing thinking and experience of the creative process), providing time for a response, rewarding creativity through assessment criteria, and permitting and even valuing mistakes.

THINK ABOUT

What, if any, strategies were used in the schools you attended to encourage and develop creativity? How effective were these strategies?

Relationship between intelligence and creativity

We have seen references to creativity in some of the theories of intelligence reviewed earlier in this chapter. You may recall that Cattell proposed two types of intelligence that sat under *g*: crystallised and fluid intelligence. Fluid intelligence has links to creativity, in reasoning about novel problems (Cramond et al., 2010), while crystallised intelligence may also play a role, providing domain knowledge and supporting creators in evaluating their work. Sternberg's triarchic theory includes creative intelligence as one of the three dimensions necessary to successful intelligence. Earlier, Guilford (1967) developed a model of human intellect (the Structure of Intellect model) that included both intelligence and creativity. He proposed divergent and convergent operations (which have been related to creativity and intelligence, respectively) as separate things. The relationship between creativity and intelligence has been a question through the history of the two constructs.

Kim (2005) conducted a meta-analysis of studies examining the relationship between intelligence and creativity, finding an average correlation of 0.17 (a quite small significant relationship), with a weaker relationship in younger children. As recently as 2008, the agreed position of psychologists was that intelligence and creativity were separate processes (Silvia, 2015). However, in a reminder of the importance of sourcing recent studies, Silvia (2015) identified developments in measurement of creativity in neurological studies and in statistical analysis that have challenged these assumptions. For example, re-analysing previous studies using recent statistical tools showed an increase in the size of correlations between intelligence and creativity. We have already discussed executive functions and their role in creativity. Neurological studies have confirmed links between the executive functions of inhibition control, working memory and cognitive flexibility and divergent thinking (Benedek et al., 2014; Cassotti et al., 2016). Silvia also reviewed studies showing links between fluid intelligence and creative tasks. In addition,

Kaufman (2016), reviewing the literature, identified a number of information-processing elements (see **CHAPTER 3**) that have been linked to creativity via tests of divergent thinking – including retrieval of information from long-term memory, working memory and attention. Taken together, Silvia argues that these studies suggest close links between intelligence and creativity.

Relationship between creativity and academic achievement

Like the relationship between creativity and intelligence, that between creativity and academic achievement has been a question from at least the 1960s (Gajda et al., 2017). A meta-analysis of studies measuring the relationship reported an overall effect size of 0.22. You might recall from **CHAPTER 1** that Hattie cited 0.4 as the average effect size of factors influencing learning; so although significant, 0.22 is fairly modest by comparison. However, meta-analyses are designed to average out differences across different groups or contexts, and these differences might reveal important information about factors that can influence the relationship.

Beghetto (2016) used the term *creative learning* to refer to the interactions between creativity and learning, which run in both directions. Creativity can influence learning (or achievement) through generation of new ideas, and construction of understanding, as we saw in Piaget's theory in **CHAPTER 3**. However, the strength of this relationship varies for different subjects (Beghetto & Baxter, 2012) and in different classrooms, as we explored with reference to Gajda and colleagues' (2017) study (above). Learning can influence creativity through domain knowledge, which has been established as an important influence on creativity, both in the amount of knowledge, and the way that it is used (Beghetto, 2016).

9.6 Concluding comments

Intelligence and creativity have each 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. Your model of creativity may influence your approach to questioning, the activities you design, and the ways you organise your classroom around individual or group work. Intelligence provides potential for learning that can be realised if appropriate opportunities are provided within educational programs. Creativity is recognised as a key set of abilities that both influence and are influenced by learning, and that can be supported by teachers' and students' actions. Failure to achieve these goals of intelligence and creativity leaves the whole community poorer.

STUDY TOOLS

Chapter review

9.1 What is intelligence?

- 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.
- Definitions of intelligence vary across cultures, as well as among different theorists.

9.2 Models of intelligence

- Models of intelligence can be categorised by their responses to the questions: 'Is intelligence one thing (Spearman, IQ), or many (Cattell-Horn-Carrol, Gardner, Sternberg)?'; 'Is intelligence fixed or changeable?', and 'Is intelligence mainly a result of nature or nurture?'
- Teachers' answers to these questions can influence their approach to their students, while students' answers can also influence their approach to learning.
- Emotional intelligence is an example of the widening conceptions of intelligence that have developed, as well as focusing in on particular sets of skills that influence thinking and behaviour.

9.3 Measuring intelligence

- Tests and other assessment procedures designed to measure intelligence need to reflect diverse areas of human experience.
- While early measurements focused on intelligence as a singular thing (IQ), more recent measures, such as Wechsler's Intelligence Scales, identify strengths and weaknesses in a range of abilities.

9.4 Ability and potential

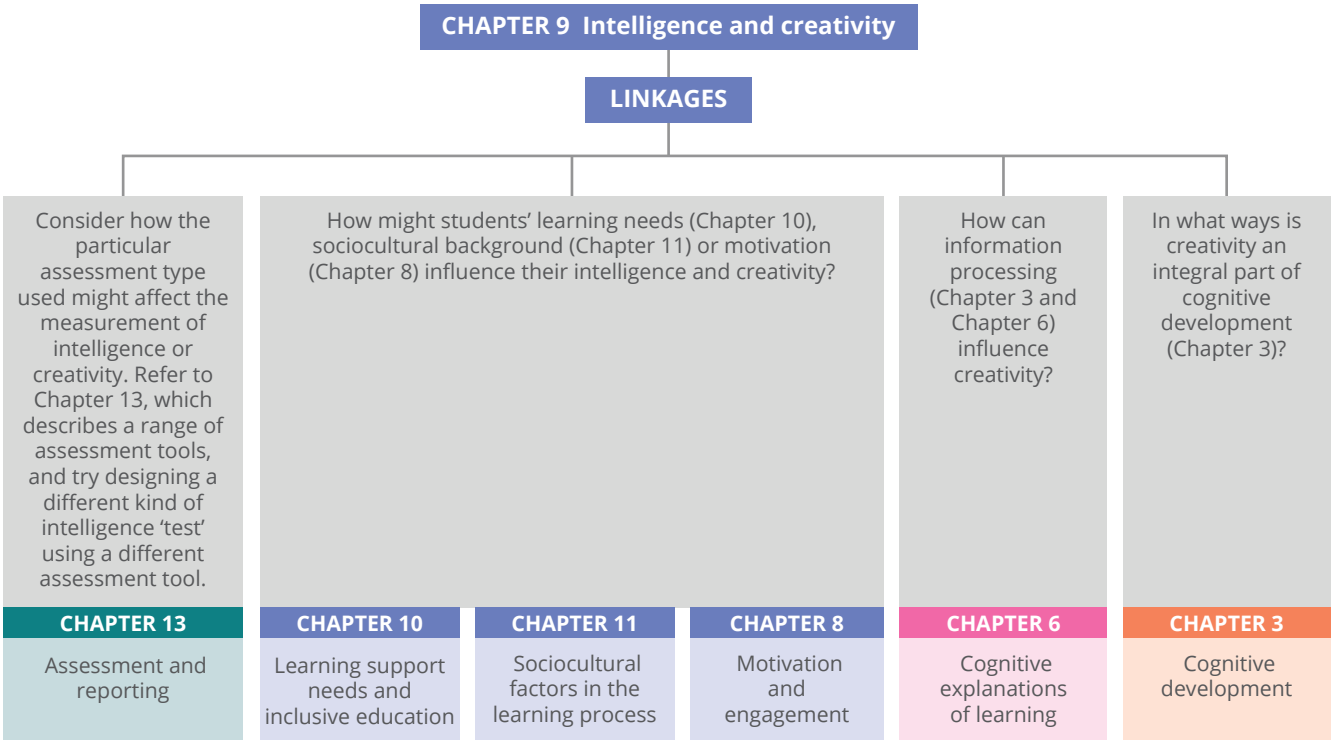
- Students with high levels of intelligence have been described as 'gifted', although potential in other areas is also recognised as giftedness. Giftedness is distinguished from 'talent' in which potential is realised, to acknowledge that there are multiple personal and environmental factors that come in between potential and its realisation as achievement.

9.5 Creativity

- Creativity is linked to novelty, utility and quality. As a cognitive process, it has a close relationship with intelligence.
- Models of creativity can be organised according to process, person, product and press, with current systems approaches recognising the interaction of these facets of the construct. Measurement of creativity has also addressed these four Ps.
- Creativity can be supported through learning environments, learning relationships and pedagogy. It is important to support creativity in each curriculum area, and for specific tasks.

Putting it together

Making links between 'intelligence and creativity' and material in other chapters



Questions and activities for self-assessment and discussion

1 How would you define an intelligent person? How important is academic intelligence? What about practical intelligence?

2 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

3 Present a case for why emotional intelligence should be included as part of the school curriculum. Consider the opposite case.

4 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?

5 Devise some ways of identifying potential in your students. How will you work to maximise this for all students in your classes?
6 Draw a concept map of the factors contributing to, and resulting from, intelligence. Add creativity to this concept map and consider the interconnections between the various factors and the two concepts.
7 How will you support creative thinking in your classroom? How will you determine whether your efforts are successful?

Further research

Recommended websites

To learn more about approaches to supporting creativity and intelligence in schools, visit the following sites:

Australian Curriculum: Critical and Creative thinking: https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/critical-and-creative-thinking/

Creativity Culture and Education: http://www.creativityculture education.org

Recommended reading

Dai, D. Y. (2020). Rethinking human potential from a talent development perspective. *Journal for the Education of the Gifted, 43*(1), 19–37.

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cognitive control: The common and differential involvement of executive functions in intelligence and creativity. *Intelligence, 46*, 73–83.

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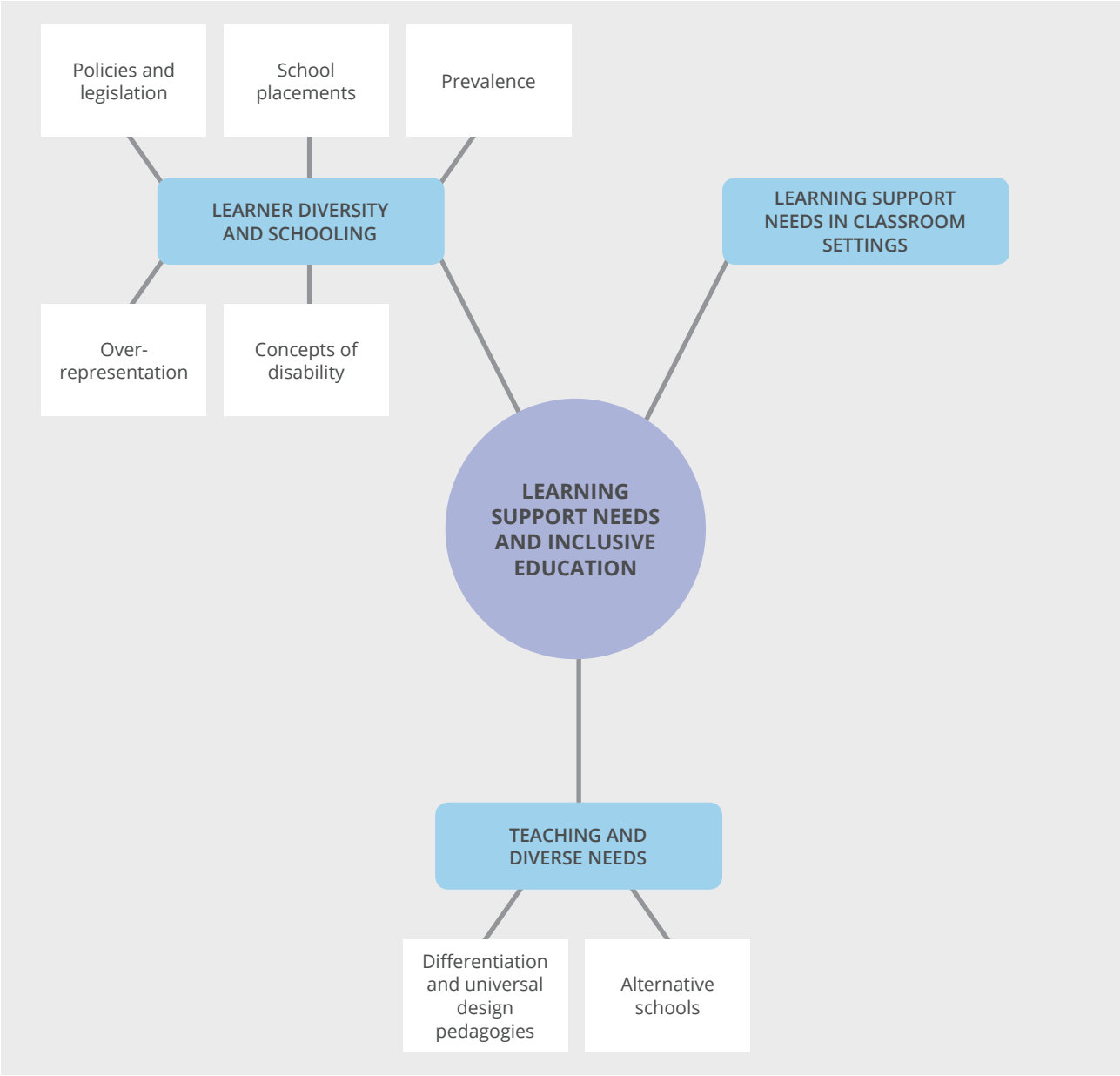
CHAPTER 10

Learning support needs and inclusive education



Chapter 10 concept map

KEY QUESTIONS

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

- What is meant by 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?

CARLSON

Carlson began his schooling journey at a public primary school along with his older brother and younger sister. He enjoys technology-related lessons, is a keen reader of comics and enjoys playing video games after school. He has below-average achievement in all school subjects and has been diagnosed with autism spectrum disorder and a mild intellectual disability, despite high scores in spatial and mathematical abilities in standard intelligence tests. Carlson was never taught to read in his primary school class and never received a specialist reading intervention. He has several sensory sensitivities, including aversion to loud noises and an extreme aversion to being touched on his shoulders, head or hair. He received repeated suspensions from primary school, which was often associated with behavioural outbursts related to these sensory aversions. His siblings reported that he was bullied by classmates who deliberately tapped his head or pulled his hair. His mother and father made a decision to remove him from primary school and home schooled him after a teacher used his knuckles to rap Carlson on the head several times and told him to 'Pay attention!'; predictably, Carlson had a strong reaction and swore at the teacher, resulting in another suspension.

Now in Year 8 at high school, Carlson is in a specialist class for students with emotional and behavioural diagnoses. This year he has started to attend regular classes for most of his subjects. There are several interventions in place that are designed to address his learning support needs. Carlson has learnt to read; he now writes his own comic strips for fun, and enjoys finding hacks and cheats to share in his online gaming community. His brother and sister are losing patience with him reading the nutrition panel on the cereal packets at the breakfast table and reminding them how much sugar their cereal has; his mum and dad are thrilled that this high school has a 'no exclusions' policy, and his mum has been able to return to full-time work for the first time in 13 years.

Introduction

The lives of students like Carlson who have any sort of additional learning support needs have changed dramatically in recent decades. Today, many students like Carlson should expect a wide range of inclusive learning supports to be available at the school; they should expect positive and supportive relationships with their peers and teachers, but this may not be the case. Unfortunately, the treatment of persons with disabilities in schooling (and other areas of life) is still quite variable and has often been associated with marginalised and discriminatory processes. As we can see, the treatment of students with disabilities can also have wider ramifications for the whole family and may result in lifelong disadvantage for the young person.

This chapter introduces the notion of responding to learners with additional learning support needs in inclusive education classrooms. The concept of disability is explored and the teaching and learning implications associated with a range of learning support needs in school today are introduced. It is important to note that this chapter specifically focuses on learning support needs associated with disability, mental health, chronic health conditions and also learners of high ability (often referred to as 'gifted' learners). **CHAPTER 11** also considers other diverse learning support needs associated with a range of sociocultural factors including socioeconomic, ethnicity, race and cultural factors. The current chapter is not intended to reflect the curriculum-based pedagogical content of a typical inclusive or special education textbook. Rather, it attempts to address erroneous beliefs about disability and dispel myths about learners who need additional support in the classroom. Numerous examples of positive approaches to disability and diversity in our classrooms are offered.

10.1 Learner diversity and schooling

Classrooms are heterogeneous communities. This means they are made up of a diversity of learners. However, this has not always been the case. In the past, learners like Carlson, with cognitive learning support needs, may have been automatically excluded from regular schools and placed in segregated or separate special schools or classes. Over several decades, particularly from the 1960s onward, changes in social attitudes, such as the principle of **normalisation**, began to influence inclusion in regular schools (see **IMPLICATIONS FOR EDUCATORS 10.1**). In practice, this process of including all students in regular schools has been gradual and some may argue, incomplete. For example, there is evidence that certain types of learners, such as those with emotional and behavioural diagnoses, are still disproportionately excluded from school today. This is explored later in this chapter and further in **CHAPTER 11**.

normalisation
Giving people with disabilities access to the daily experiences and activities available to those in the community who do not have a disability

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 student requiring additional support in their regular neighbourhood school classroom. This term arises from an international movement and acceptance of the view that all students have a right to participate fully in their community (Foreman & Arthur-Kelly, 2014). This includes the right to attend their local school, be accommodated in regular classes and have their learning support needs addressed. Terms such as **special education** are also used to refer to the system of programs and services provided for children who require support in school, but this provision does not carry the same inclusive intent of the principles of inclusive education and the term is falling into disuse. In part, this may be because the word 'special' raises philosophical concerns about inclusivity and stigma that may arise with the term; it may also be associated with the historical use of 'special' schools where children with disabilities were routinely segregated from other students. Fewer of these segregated schools remain in modern educational systems.

IMPLICATIONS FOR EDUCATORS 10.1

Principles of normalisation

The concept of normalisation was defined by Wolfensberger (1972) and Nirje (1985) 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. 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 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 deinstitutionalisation of people with disabilities began, 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.

Australia and New Zealand are signatories to the United Nations Salamanca Declaration (UNESCO, 1994) and the Convention on the Rights of Persons with Disabilities (UN, 2006), which explicitly advocate a shift to inclusive education and rights of all people with a disability to receive an education. In these declarations 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 these international agreements and the intent 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 additional learning support needs or disabilities 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 1993*) provide a context for allowing people with disabilities to access educational services without discrimination or prejudice. In Australia, the Disability Standards for Education (Commonwealth of Australia, Attorney-General's Department, 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 in 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 (e.g. 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-General's Department, 2005).

This federal Act relates to educational provision in all sectors of education in Australia, including universities, though terms such as 'reasonable adjustment' may be open to interpretation and debate as to what sort of adjustments are considered 'reasonable'. This 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 (2017).

School placements for learners with additional support needs

least restrictive environment (LRE)
The setting that is as close as possible to that experienced by children who do not have disabilities

In practice, most school systems provide a range of educational services and resources to support the learning needs of students. Following from the principles of normalisation, 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. Today, the term 'least restrictive environment' can be applied to consider which educational services represent the most normative and least restrictive placement for a young person. The LRE can be viewed as a continuum ranging from the LRE 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. In some cases, a particular form of segregation occurs in the case of academically selective high schools. For example, in the state of New South Wales in Australia, where there are higher numbers of selective high schools, only learners with high academic achievement levels may attend these schools.

Students may also experience an environment that is part way along the LRE continuum in a partial form of inclusion, whereby they attend a special classroom or support unit attached to the regular school and have some placements in a regular class. This reflects Carlson's school placement in Year 8. These students may have higher or very specific support needs that can be met in the support unit, but they may also attend regular school classes as well. For example, a student with cognitive support needs may attend classes in the support unit that provide highly individualised programming, but the student may also participate in regular classes where fewer adjustments to the curriculum are required, such as for Carlson in a technology classroom. Similarly, a child who requires some form of health or medical treatment during the school day may also return to a support unit for such treatments.

Today, in many developed educational regions around the world, students with disabilities are experiencing a higher degree of participation in school than ever before. 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. Sometimes the school placement of a child might reflect differences in the preferences of students and their families; not all students with specific learning support needs want to attend a regular school, and some may choose to attend a more specialised school, as is seen in the case of academically selective schools for students of high ability.

Prevalence of disability and learning support needs

The Australian Bureau of Statistics (ABS) routinely collects information about the prevalence of disability in Australia in the Survey of Disability, Ageing and Carers. This type of information is helpful for educational systems as it allows for estimates of the number of students and types of learning support needs that we may encounter in our schools and classrooms. The ABS (2019) estimated that in 2018 there were approximately 297 000 children aged five to 14 years with a disability in Australia. Boys in this age group tended to have a higher prevalence of disability compared to girls. Most children with a disability were attending school (95.8%), with around one third (31.2%) of these children attending some type of special school or class. Regardless of school type, most children with disabilities attending school (66.5%) experienced difficulties at school. The most common difficulties included learning difficulties (48.7%) and trouble fitting in socially (38.8%). Boys also experienced a higher rate of communication difficulties (35.2%) compared to girls (21%).

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 not attending regular mainstream schools and are 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 US. 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
Refers to the historical movement (approx. 1960s–1980s) that saw the removal of children with disabilities from institutions and segregated schools and the start of educating these children in regular classrooms

Unfortunately, such over-representation and claims of discrimination persist. Similar studies have noted the over-representation of minority youth in special education in Australia. For example, Aboriginal and Torres Strait Islander youth are significantly more likely to be over-represented in certain forms of special education, particularly schools for students in the identified support categories of emotional disturbance, behaviour disorder and juvenile detention (Graham, 2012). In New Zealand, Pasifika and Māori youth are more likely to be 'stood down', suspended or expelled from school, while Māori students have the highest rates of expulsion (Education Counts, 2020). Some 30 years after Dunn's (1968) original paper, African-American and minority youth in the US today are still over-represented in school suspension and expulsion rates (National Council on Disability, 2018). The reasons for this over-representation in certain forms of special schooling placements are difficult to assess empirically. Numerous factors, such as discrimination, teacher attitudes, teacher quality and curriculum qualities, have been suggested to play a role (Graham, 2012). For example, the annual survey by the organisation Children and Young People with Disability Australia (CYDA; 2019) found that families and young people (N = 505) reported exclusion from events and activities at school (e.g. excursions, camps, sporting events; 40%); were bullied at school in the last year (48%); and were subject to restraint or seclusion (31%). The CYDA describes many of these practices as abusive and violent (and illegal), including solitary confinement of the child with no supervision or other person present (21%) and use of physical, social, mechanical or chemical restraints (21%). As one parent explained: 'In the disability unit he was left in a room on his own and when he became agitated and broke a window they rang me and suspended him on two occasions' (p. 16). As we will discuss in **CHAPTER 11** and

CHAPTER 14, many factors influence the inclusive and positive nature of our school environments and there are many opportunities for teachers to play a role in fostering more inclusive schools.

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? Children and young people with a disability may reject this classification and labelling as a 'disabled' person. For example, 13 of the 24 students interviewed by McMaugh (2011) rejected this label; they denied their disability had affected them in anyway despite acknowledging the discriminatory behaviours of others.

The World Health Organization (WHO) initially developed a classification system that was used internationally to describe health conditions and disabilities using the terms 'disability', 'impairment' and 'handicap'. These terms describe the person and their condition as the source of disability and as the reason for impairment, resulting in handicaps. As noted by the children reported above, these terms do not accurately define or describe the person, or the experience of having a disability, and were discarded when the WHO classification system was extensively revised; it is now referred to as the *International classification of functioning, disability and health* (ICF) (WHO, 2009) (see **IMPLICATIONS FOR EDUCATORS 10.2**). The revised ICF system focuses on the interaction between an individual's health condition or disability, and environmental and personal factors that then lead to the experience of disability (see **FIGURE 10.1**).

IMPLICATIONS FOR EDUCATORS 10.2

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 interaction between the health condition of the person and their environmental and personal circumstances. 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.
>
> World Health Organization, 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. The WHO, however, made a very deliberate decision to move away from terms such as 'impairment' and 'handicap'. This partly reflects a broader social concern that the tendency to label and identify people according to their disability or condition is stigmatising. Over time, a variety of stigmatising terms have been used to label and identify children with disabilities, such as 'a handicapped child', 'a retarded student' or 'a mentally impaired person'. These terms have been replaced with more neutral terms such as 'intellectual disability', which refers to the condition and not to the person. In some of these cases, the language or label changed because it was often simply wrong and quite derogatory. For example, people who have 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 (see also **CLASSROOM LINKS 10.1**).

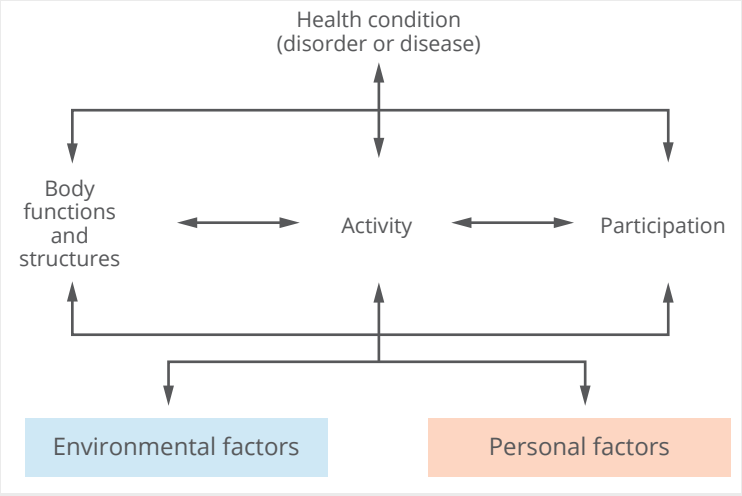


FIGURE 10.1 Interactions between the health condition, environmental factors and personal factors: components of the ICF

Source: Australian Institute of Health and Welfare.

CLASSROOM LINKS 10.1

Labelling and stigma

Why is language important? 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 language terms and labels are used to discredit a person or shape an identity that is considered '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.

In all cases, it is now considered more acceptable to use **person-first language** by referring to the person first, not their disability or condition; the identification of their disability or condition should only occur if it is relevant and necessary. It is much more acceptable to refer to the person first and separate the person from the characteristics of the condition; for example: 'Carlson *has* an intellectual disability', not 'Carlson *is* retarded or disabled' – the latter term implies that Carlson is defined by the condition of an intellectual disability, rather than acknowledging that he is a person first and foremost who also just happens to have this condition. If there is no particular reason to identify Carlson as a student with a disability, it is preferable to simply introduce him as you would any other student: 'This is Carlson. He is in Year 8 and would like to become a game designer.' Carlson's technology teacher, for example, never describes Carlson as having a disability when she brags about his programming skills to her colleagues in the

person-first language The practice of referring to the person or individual before you refer to the label of their condition

staffroom. Rather, the teachers who now work with Carlson in high school know that he has additional support needs and he is just referred to as 'Carlson' who might require some extra explanations and adjusted learning outcomes in their classrooms.

You may notice in textbooks or websites that there are differences in language referring to disability and learning support needs around the world. For example, until very recently the term 'mentally retarded' was still the official term to describe an intellectual disability in the US. In 2010, the US Congress passed 'Rosa's Law', which meant that all references to 'mental retardation' in US laws would change to 'intellectual disability'. Gradual changes in language are now occurring in all public institutions and policy documents across the US (see United States of America, 2010). In the UK, the term 'learning disability' may be used to refer to intellectual disability, but in Australia and the US the terms 'learning disability' and 'learning difficulty' usually refer to people *without* an intellectual disability, but who experience other neurological or information-processing problems. Different terminology can be confusing for people reading textbooks and research papers from different parts of the world. We advise students of teacher education in Australia and New Zealand not to adopt the terms used in international textbooks, such as 'retarded'. Like Carlson's high school teachers, 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 that describes the nature of the medical or health condition very broadly. 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 a child's condition must be medically assessed and formally identified as a 'disability' before the child becomes 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 labels might convey some understanding of the nature of a condition, they do not provide adequate information about how each individual will be affected by this 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 (e.g. help in learning to read or hold a pencil) rather than on a singular program that is erroneously believed to address the needs of any child with a particular condition label.

10.2 Learning support needs in classroom settings

This section considers the educational needs of children in seven areas of prevalent or increasing disability, as identified in surveys such as those described in the previous sections. Although we are describing conditions 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 the section 'A non-categorical view of disability'. 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 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 individual learners with additional needs in their classrooms.

Intellectual and cognitive differences

Conditions that limit cognitive abilities are among the leading and most prevalent causes of intellectual disability. These conditions include 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 (e.g. birth to 18 years of age) (American Psychiatric Association, 2013).

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.

There has been a tendency to classify the severity of the condition by the level of IQ into categories of mild, moderate or severe intellectual impairment (a categorical approach). This has often been used in school systems as a proxy assessment for determining placement in regular or 'special classes'. However, the weaknesses of IQ assessments are well known (see **CHAPTER 9**) and thus many other measures and tests of adaptive skills are also needed to assess a student's learning support needs. For example, some students may come to school with ability to complete most functional tasks of any child their age, such as holding a pencil or going to the bathroom by themselves. However, some children may have fewer functional skills. This may be because some conditions may be accompanied by other conditions or characteristics, such as difficulties with speech and communication, eyesight, fine and gross motor coordination, and regulating behaviour and emotions.

Thorough and wide-ranging assessments of children with such conditions are often made 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, and this misunderstanding can lead to labelling and stigma. Erroneous beliefs about intellectual ability have led to assumptions that people with intellectual disabilities are the equivalent age of a much younger child or cannot learn. These assumptions are untrue. The danger of such 'myths' and assumptions is that they can impose serious limitations on the person with a disability. This is outlined in the ICF framework (see **FIGURE 10.1**), which states that disability can arise from the environment. For example, assumptions about the equivalent age of the child can lead to the infantilising or 'babying' of people with intellectual disabilities. In the classroom this can have serious consequences, such as inappropriate work or tasks that include babyish themes or concepts suited to a much younger child (this is also sometimes referred to as 'dumbing down' the curriculum). Similarly, language or talk directed to the child can be overly 'babyish' or directorial. Such teacher treatment of a child is also visible to peers, who may respond to the child in similar ways. Significant advocacy movements, led by people with intellectual disabilities, have attempted to dispel such myths (see **FIGURE 10.2**).

Implications of intellectual and cognitive differences

Conditions associated with cognitive learning support needs are very diverse and this means all children will vary in their individual areas of strengths and support needs. We can expect children with such diagnoses to have many of the same strengths in specific skills and interests similar to other children their age, such as creative arts, drama, sporting activities or clubs, such as Scouts; and interests in age-appropriate topics, such as fashion, dating or online gaming (as we saw with Carlson). In some cases, certain condition characteristics may mean the child will need assistance with memory or recall of information and organising and sequencing their thoughts or what they would like to say. Processing information may take a little more time, and learning to read may be difficult for some children. The implications for classroom practice will depend on assessments of each child's specific learning needs; the following are some general strategies for classroom practice that might help any child who needs support with skills like organising and sequencing thoughts to follow instructions, or needs more time to think and solve problems:

- Consult directly with the parents and child themselves about their strengths, the 'what works' strategies to help the child, and the child's preferred activities and learning needs.
- Talk in a *normal tone of voice* to the young person with a cognitive support need – you may need to use more explicit language with instructions provided in small units of information.
- Age-appropriate adaptations should always be offered; for example, literacy and reading themes should be the same as for other classmates, but expected outcomes may be adapted.
- Offer all students the chance to remain in formal education and attain their school-completion certificates.
- Alternative curricula in the senior years may be available, such as the Life Skills curricula (NSW Board of Studies, 2014), and vocational courses (see Tara's story in **FIGURE 10.2**).
- Physical development, physical fitness and health education should not be neglected. Participation in physical activities or sports should be done after consulting with parents about any possible health considerations and this information should be updated regularly because health needs can change as any child develops. Lots of practice and experience with motor skills is an essential part of development for all children, as we saw in **CHAPTER 2**.

FIGURE 10.2 Tara has a Certificate II in Business Administration and works in training and administration as a disability advocate and educator

Reproduced with permission from Council for Intellectual Disability and Tara

Specific learning disabilities

The term 'learning disability', was adopted to describe puzzling cases where children who exhibited significant learning or academic difficulties did not have an intellectual disability or a sensory impairment, such as vision or hearing loss (Hannan, 2013). Terms such as 'specific learning disabilities' and 'learning difficulties' have arisen to describe a range of conditions, including difficulties in reading and spelling, maths and language processing and comprehension. Diagnostic labels such as 'dyslexia' refer to disorders in the process of learning to read and spell and 'dyscalculia' to disorders relating to maths and numeracy. There are a host of other terms associated with learning disabilities, but many of these terms do not yet have clear or validated diagnostic criteria (Hannan, 2013).

In order for a person to be classified as having such a condition, other possible causes of learning difficulties 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 (Australian Psychological Society [APS], n.d.). The cause of specific learning disabilities is the subject of much research and many factors, including genetic and environmental, that affect neurological development are implicated (Hannan, 2013).

As with other labelled conditions, specific learning disabilities are also widely misunderstood and also subject to a range of untested or non-validated interventions. Sometimes interventions will be offered that are non-evidence based or do not have scientific validity or have not been rigorously tested and evaluated. Examples include a range of sensory and physical therapies or many food- and diet-based remedies. In contrast, because of intensive research in understanding learning disabilities we now know that there are strong research-based and validated interventions available, including much better understanding of how to intervene in the area of reading disorders, for example (Hannan, 2013). We saw that Carlson benefited from such specific interventions in his high school classroom.

Specific learning disabilities may also be accompanied by other non-academic difficulties, 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.). As noted, these conditions affect every child very differently, and generalisations about behaviour or social skills should not be made.

Implications of specific learning disabilities

As we have emphasised previously, approaches to learning support needs must address the specific skill areas where difficulties are noted for each individual (this is an example of a non-categorical approach). Therefore, it is essential that teachers recognise the widespread heterogeneity and complexity of each individual diagnosis of a specific learning disorder. Collaborate with parents and psychologists to understand reports or diagnostics that will direct specific interventions in the area of concern.

Practise your skills of evaluating and locating evidence to support practices in the classroom. Has the recommended intervention been validated in scientific reports and controlled studies? (See **TABLE 2.1** for some instances of neuromyths and the evidence that counters them.) As with the previous recommendations for practice, consider the impact of any condition on other factors, such as fatigue, stress and anxiety, social isolation or peer rejection. It is likely some children with specific learning disabilities will also experience co-occurring conditions related to or arising from their condition.

As all children move through education, higher cognitive-load tolerance and faster processing is expected. Good teaching practices that 'lighten the load' for learners with specific disabilities include:

- breaking complex instructions into smaller steps and providing worked examples to relieve cognitive load (see **CHAPTER 6**)
- providing specific instruction in metacognitive strategies and metacognitive awareness, which has been proven to be effective in this population
- compensating for poor spelling and numeracy skills with ICT applications, such as spell checkers and calculators.

Attention deficit hyperactivity disorder (ADHD)

We have included Attention deficit hyperactivity disorder (ADHD) here as a significant exemplar even though it may also be considered a form of learning disability. This condition is best understood as a syndrome of complex learning and behavioural characteristics that affects each person very differently. Diagnosis is complex and the diagnostic criteria have varied over time, causing confusion and misunderstanding for teachers and parents.

There are three main subtypes within this diagnostic classification:

- *Predominantly inattentive* – characteristics include an inability to focus on details or sustain attention for long periods of time; being easily distracted; inability to follow a set of instructions or follow through on tasks; and problems organising actions.
- *Predominantly 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.
- *Combined inattentive and hyperactive-impulsive* – will include excessive features of both of the previous two subtypes.

The behaviours in these subtypes must be present before the age of 12 and must be pervasive in that the symptoms are evident in two or more settings of the child's life, such as home life and school (American Psychiatric Association, 2013).

The consequences of these differences in attention and impulse control are very serious for any learner regardless of the specific diagnostic label. Any condition that affects attention and working memory processes may be associated with limitations or delays in acquiring reading and numeracy skills. For any person, difficulty in self-regulation or controlling impulses is particularly associated with the appearance (and stigma) 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. Conditions such as ADHD are widely recognised as neurobiological conditions (see Epstein & Loren, 2013).

Implications of attention deficit hyperactivity disorder

ADHD has been provided here as an exemplar of a syndrome comprised of varying characteristics 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:

- Evidence-based cognitive and behavioural training approaches can assist children but strategies with little evidence may even be harmful (see **RESEARCH LINKS 10.1**). Good research studies can help you find strategies that have a good evidence base (e.g. Harrison et al., 2019).
- All children can benefit from training in simple self-regulation strategies by setting small, manageable goals and using simple concepts of time management and self-monitoring. There are many ICT apps and tools that are useful in this regard (see **RESEARCH LINKS 10.1**).
- Keeping a stable and consistent classroom routine, and giving advance notice of changes of pace or topic, are important for all learners and can be made even more explicit to learners with attentional support needs.

RESEARCH LINKS 10.1

To fidget or not to fidget?

You may have noticed that fidget spinners and other fidget toy gadgets have recently emerged as a trend. Many untested claims about benefits and use in the classroom have since emerged. In a carefully controlled experiment, Graziano and colleagues (2020) asked whether or not the use of fidget spinners would assist five-year-olds with ADHD with their attention during class time.

Children who were given the attention spinners demonstrated *poorer* attention during the trial compared to children without spinners. The researchers reported most children used the fidget spinners constantly during the five-minute observation periods. They concluded that there is a lack of rigorous evidence testing the effects of such gadgets on children in the classroom but warn that fidget spinners negatively affected young children with ADHD in these classrooms.

Self-monitoring gadgets

In contrast to the recent emergence of fidget spinners, other devices and gadgets to help students with ADHD self-monitor their learning behaviours have been around for some time. There is good evidence that self-monitoring can help with self-regulation and attention in class time. In a well-designed experimental study,

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Morrison and colleagues (2014) asked whether use of a tactile (vibrating) timer would help two Year 9 students stay on task during their biology classes. Using multiple trials with a baseline design using no timer compared to later trials with a timer, and a final trial with timer removed, these students increased their rate of correct work completion to levels that were the same as their classmates. They concluded that these silent timers (they did not beep or interrupt other students) were well accepted in the classroom and could be used to support self-monitoring in the classroom.

- 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' or 'disciplining' the child; instead work towards learning support strategies that ignore minor symptoms, such as fidgeting, and reward and reinforce on-task behaviours.
- Ensure success with doable tasks, combined with precise and constructive verbal feedback early and often during tasks to keep the child on track and avoid the 'failure cycle'.

Autism spectrum disorders (ASD)

The term 'autism spectrum disorder' is so named because it includes a wide variety of conditions and diverse effects of these conditions 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. These conditions appear very early in a child's development and are often referred to as developmental disorders, but effects on development vary markedly from one child to another. For example, one child may have a diagnosis of lower cognitive function as measured on standard IQ tests and another child might have variable or very high cognitive function (APS, n.d.). Over the years, the diagnostic criteria have changed; this means that in Australia

and internationally it has been very difficult to determine exact incidence or prevalence rates, but recent evidence shows prevalence rates are increasing (ABS, 2019). This increase may be attributed to changes in diagnostic criteria over time (ABS, 2019). As described in the case study of Carlson, the schooling of young people with ASD can be characterised by very high rates of exclusion from school.

At a very general level, the APS (n.d.) summarises the key characteristics of ASD into three main areas:

1 *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.
2 *Social awareness and interaction* – some children may have difficulty applying the social 'rules' of behaviour like 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 people 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.
3 *Activities and interests* – some young people with ASD do not experience enjoyment of typical childhood games or activities, such as ball sports, running or chasing, and may have very specialised interests, such as collecting household objects (batteries, string) or objects of certain colours. They may develop strong interest or 'fixations' in usual objects or patterns of arranging objects. Removal or loss of fixated objects can cause enormous distress and they may carry an object constantly. Depending on their level of intelligence or social awareness, the interests of the child can be quite mature or reflective of worldly concerns, but nonetheless the interest level is often excessive and 'fixated', and may lead to excessive talking about the interest or rejection of others to focus on the interest.

Other notable characteristics that have great relevance in the classroom include unusual sensitivities and behaviours. Labels on clothes can be unbearable to some; loud classrooms can be frightening and confusing; their sense of smell can be heightened, leading to feelings of nausea or rejection of certain foods; touch can be unwanted; and repetitive and sometimes harmful behaviours, such as rocking, head banging or hand movements.

There is no known cause or explanation of ASD, although a genetic factor may be involved in some cases – twin studies have shown an increased likelihood of both twins having the condition if one twin is diagnosed. Brain imaging studies have shown some differences in neurological development, particularly in the white matter of the brain that forms vital connections throughout the brain (see **CHAPTER 2**) (Just et al., 2012).

The broad spectrum of these behaviours requires very careful assessment and, typically, diagnosis will begin in the preschool years when parents or carers notice unusual behaviours or limited development of speech, for example. All other possible conditions and causes must be eliminated, and families can face years of assessments and testing as this is a lifelong disability with different effects as the person grows up.

Implications of autism spectrum disorders

Some basic implications for teaching and learning are outlined here for general consideration; however, it is important to remember that each child will vary in their learning and support needs:

- Verbal and non-verbal communication skills may be affected. The student may not make eye contact or look directly at the teacher, so minimise gestures and hand signals.
- Augmentative or alternative communication systems, such as pictorial communication systems (see **FIGURE 10.3**) have a strong evidence base as an effective way to teach communication skills, and as an ongoing system of communication for children with few verbal skills.
- Teachers should deliver instructions by catching the child's attention first and using direct and positively framed verbal statements or clear and simple pictographs and symbols.
- Abstract, metaphorical or symbolic language may be misunderstood; for example: 'As fast as lightning!'
- Sarcastic, joking or playful language structures commonly used among adolescent peers may not be understood; for example, 'Oh, good one Tom!'
- Social skills instruction may be necessary for everyday social skills, such as saying 'Hello' to someone, using 'I' statements to express needs, using assertive phrases such as 'stop', taking turns or asking to join a game.
- Monitor bullying and peer harassment rigorously. Provide a buddy or support person for playground activities but ensure peers are trained carefully in alternative communications skills.
- Changes in routine can be very stressful, so prepare for change by providing plenty of advance warning. Use visual aids or photographs to explain a new routine, such as a school excursion or new activity; for example, pictographs of a swimming costume and photos of the swimming pool and swimming instructor may be useful to explain a new routine of swimming classes.
- Provide quiet and calm spaces where the child can rest and recover from overwhelming or stressful experiences. Ensure spaces are safe and visible to the teacher at all times.

FIGURE 10.3 Pictorial communication systems are a picture-based system of small cards or pictorial icons that can be selected, pointed to or are exchanged between communication partners

Physical disabilities and chronic health conditions

Conditions leading to physical disability or limitations on physical mobility include a wide variety of congenital and acquired conditions, and also include many chronic health conditions. Children may be born with physical disabilities, such as spina bifida or cerebral palsy, or may acquire physical restrictions or limitations due to spinal cord injury, or other illnesses, such as arthritis, diabetes or cystic fibrosis, to name just a few examples. Some physical disabilities also arise from genetic conditions, such as muscular dystrophy.

Cerebral palsy (CP)

The most common cause of physical disability in Australian children is cerebral palsy or CP, a term that describes a wide range of disabling conditions in which messages from the brain to the muscles of the body are distorted, mistimed or sometimes not received at all (Victorian

Government, 2012). This breakdown of neurological messaging causes a wide range of symptoms, typically characterised by erratic and uncontrollable body movements. However, these motor-control deficits can also affect all other processes governed by motor control, such as eyesight and the ability to direct and control one's gaze and focus, or speech and the ability to swallow and eat. There are different types of CP known as spastic, athetoid, ataxic and mixed forms. Spastic CP is the most common form and causes 'spasticity' or stiffness and tightness of the muscles; athetoid CP leads to uncontrolled and erratic movements; ataxic CP is the least common and affects balance and coordination, and is characterised by shaky, unsteady tremors. The mixed form can encompass a number of these subtypes. Within each subtype, the degree of physical disability also differs, and can lead to quadriplegia, in which all four limbs are affected; paraplegia, in which the legs are affected; diplegia, in which all four limbs are affected, but the legs more so than the arms; or hemiplegia, in which one side of the body is affected (Cerebral Palsy Alliance, n.d.).

Cerebral palsy is detected early in life when parents and caregivers typically become concerned about the muscle tone or movements of their baby and developmental milestones that are not being met. Assessment is a complex range of physical and neurological tests, and sometimes occurs over a long period of time as the child develops and further limitations become evident.

This diverse range of conditions means that every child with CP must be carefully assessed and supported on a case-by-case basis. The impact of the condition can range from extremely mild physical restriction to severe and profound quadriplegia restricting all physical movement. Speech may be very limited for some people. Moderate to severe intellectual disability is known to occur for one in five people, and specific learning disabilities can also be present in many cases (Cerebral Palsy Alliance, n.d.). Great caution is needed in making any assumption about a student's intellectual capacity, however, as standard assessments of intelligence cannot be reliably completed with this population due to limitations of speech and motor control. It is a myth that the level of spasticity or movement is associated with intellectual ability. It is recommended that teachers never make assumptions about the child's intellect or learning potential, and instead assume the child can understand what is being said unless it is shown or indicated to be otherwise.

Chronic health conditions

There are also a range of other chronic health conditions that can restrict a child's mobility, involvement in school and general health and wellbeing. Chronic health conditions are those defined by:

- a duration of more than six months
- a pattern of reoccurrence or deterioration
- a poor prognosis
- consequences or sequelae that impact on the person's quality of life (Australian Institute of Health and Welfare [AIHW], 2005).

Chronic health conditions are of interest in education because of the consequences or sequelae that affect the child's life. Obesity is an example of a condition that has sequelae that may lead to the development of other conditions, such as diabetes (Type 2), and poorer quality of life due to exercise or movement restrictions. Other child health conditions, such as cancer or cystic fibrosis (which affects the lungs), cause frequent or prolonged periods of hospitalisation, meaning the child misses out on school and typical social interactions with peers. Common concerns expressed by children with chronic health conditions include catching up with missed schoolwork, missing out on school life (e.g. excursions), or feeling they are at risk of not progressing in school. Some also report scrutiny and questions about their condition from peers that can be very personal and discomfiting (McMaugh, 2006).

Generally, it is accepted that children with chronic illnesses and their families are at greater risk of experiencing psychological or emotional difficulties than other children and families (AIHW, 2005). This is thought to be because of multiple factors arising from the chronic stress and burden of illness, including socioeconomic stress, as many parents cannot work or gain full-time employment when caring for a chronically sick child. Siblings also experience stress, and this is well recognised in the health sector with a number of charity and support organisations, such as CanTeen, addressing the support needs of not only youth with cancer but their siblings as well.

Physical disabilities and health conditions are very broad categories of conditions that lead to different types of health or physical impairment, mobility restrictions and other impacts on quality of life. These conditions may or may not be associated with other problems, and a high level of participation in schooling can be expected. However, this group of learners requires support and understanding to enable them to access the school environment and to deal with the stigma associated with often visible and obvious chronic health conditions. Bullying and peer abuse related to their chronic condition or disability is widely reported by this group of children, but many can enjoy full participation in school if support is provided (McMaugh, 2011).

Implications of physical disabilities and chronic health conditions

Generally, children with physical disabilities have a high degree of participation in regular school environments. Children with chronic health conditions, however, may miss a larger number of school days compared with other children. Physical adaptations to the school environment have improved access to school for many children with physical or mobility restrictions, but special attention is required to keep a child with a chronic condition on track with schoolwork and meeting educational outcomes:

- Assess mobility and access in all areas of school life, including the built environment and during school excursions and other out-of-school activities. It is discriminatory to plan activities in which children cannot participate due to their disability or health condition (see **CASE STUDY 10.1**).
- Many ICT devices and applications or assistive aids can support children who have fine and gross motor limitations for tasks, such as writing or maintaining an upright position; e.g. laptop computers, voice recorders and transcribers and posture-supportive seating, are simple aids that can enhance the classroom participation of many students.
- Motor-control problems or learning difficulties may mean learners take longer to respond or may have difficulty expressing thoughts in words. These learners may benefit from alternative ways of responding, such as using picture cards or visual symbols (see **FIGURE 10.3**).
- Medical needs may need to be addressed in school time, including breaks to take medication, receive physiotherapy or for changing catheters or checking medical devices.
- Respect the child's right to privacy at all times. It may be necessary to implement tolerance and diversity training, but never use a child as an example and never disclose a child's condition without their and their parents' express consent and understanding of possible consequences.
- Adolescence can be an especially sensitive period when heightened concerns about body image and physical appearance are the age group 'norm'. Children and teenagers can have mistaken beliefs about illness, such as fear of contagion.

CASE STUDY 10.1

When chronic illness goes to school – Carly's story

Carly is 12 years old and has just started high school. She has cystic fibrosis, which is a genetic condition that affects the lungs, digestive and reproductive systems. For Carly, this means frequent hospitalisations, some surgeries, and very restricted lung function. As Carly explains, there are also changes to her appearance: 'I've taken steroids all my life, so I'm short. People wonder why I'm so short and they ask how old I am. They can't believe I'm in Year 7.'

Starting high school has been 'interesting' for Carly. She needs to practise some new social skills, such as explaining her condition to peers and keeping her cool when being asked personal questions: 'It was sort of hard introducing myself to people 'cause I always coughed and that, so I had to tell them what was wrong.' Carly is very concerned that her peers are worried about contagion: 'I guess I was worried that they would think they could catch it off me and wouldn't hang around me or anything. So that's why I tell everybody that you can't catch it, because I'm scared that they won't hang around me or talk to me, or something like that.'

Keeping up with schoolwork is also a major concern. Carly hopes to become a writer some day. She misses out on worksheets and homework tasks and often feels as if she is falling behind. Recently she became very upset because she missed out on going on a school excursion: 'The principal has a points system and I didn't get enough points [due to being absent from school] so I didn't get to go on the excursion.'

She also finds the physical environment at school very challenging because the sporting fields are a long way from the main school buildings and books are heavy to carry around: 'The bag! The heavy school bag and the walking from every room to the next. And every time we do sport, we're sort of rushed! Run to the change room! Put everything in your bag! It's really hard! Usually I've got a headache by the time I get there from lack of oxygen and go "Ohhhh, I can't do it!".'

Source: McMaugh, 2004, 2006, 2011.

ACTIVITIES

1. What are the educational or quality-of-life consequences arising from Carly's condition?
2. Review the Disability Standards for Education (2005). Has Carly experienced any form of discrimination or inappropriate exclusion from school life?
3. Can you think of any reasonable adjustments that could be made to assist Carly in managing the educational restrictions she is experiencing?

Sensory and speech disabilities

Sensory and speech disabilities are a very broad range of conditions, including all cases of impairments related to eyes, ears and speech. As such, this broad category includes impairments of vision or hearing, of which there is a diverse range, as well as disorders of speech and communication, which are also diverse in nature.

Vision and hearing impairment

Along with the most common childhood health conditions of asthma and allergies, vision impairments are one of the most common long-term health problems, affecting approximately four in every 10 000 Australian children (Royal Institute for Deaf and Blind Children, 2012). However, for the most part, vision impairments are relatively mild, with blindness or severe vision loss less common. Similarly, a significant degree of hearing impairment occurs with much greater frequency in children, with about one in 1000 children born with significant hearing loss (Mehl & Thomson, 1998). A further group of children will acquire hearing loss in childhood through illness, accident or other factors, and require hearing aids to compensate for this loss of hearing. Both vision and hearing loss occur with greater frequency in Indigenous populations, and treatment and access to services may be much less available in remote locations.

In cases of severe vision or hearing loss, compensatory supports are needed. These include braille materials and computers to support reading and writing for students with vision impairments, and sign language, hearing aids or cochlear implants for children with hearing loss. However, the degree of vision and hearing loss can vary widely among those affected, and types of vision loss are diverse. In some cases, learners may require special lighting or larger print and magnifying lenses; those with hearing impairment may use a variety of hearing aids, and sign language must be learnt just like all language. Not all children will necessarily benefit from the same types of assistive devices, and it is a common myth that the cochlear implant will 'cure' children's deafness; however, such implants are particularly helpful for certain types of hearing loss but not others. In all cases, early intervention is essential to address learning needs, such as literacy skills.

Speech and communication disorders

Speech and communication disorders are related to sensory processes, such as hearing, but are characterised by a broad range of disorders that include delayed development (usually when accompanied by intellectual or developmental disorders), and problems of expressive and receptive communication. A communication disorder or disability is said to exist when a person has difficulty being understood by others or difficulty in understanding others. Speech Pathology Australia (n.d.) reports that one in seven Australians has such a disability.

Communication and speech disabilities can arise from a wide range of causes. Some children may be born with physiological defects of the mouth or palate, such as cleft palate; others may be born with conditions such as cerebral palsy, leading to motor-control problems in the production of speech. Speech and communication disorders also arise from illnesses or traumatic events, such as a head injury or stroke, which affect the neurological processes of communication. Some children experience developmental delays or intellectual disability that lead to poor word understanding, reading ability and the ability to express themselves. Others may experience disorders of speech, such as stuttering. Many of these conditions lead to problems of expressive communication, so that a person has difficulty expressing their needs and wants. Receptive communication disorders are said to occur when the person does not perceive sound and language in the same way as others. For example, a hearing impairment or loss of hearing can cause a problem in receptive understanding of language, and conditions such as auditory processing disorders mean the person cannot perceive and distinguish sounds in the same way as others.

Communication and speech disorders have a wide range of effects on the developing learner. Literacy skills are clearly most affected, but so is the personal wellbeing of the student. Embarrassment and frustration can occur when the child is teased because of stuttering, or cannot express their needs in class. Confusion and misunderstanding arise when the student cannot follow instructions properly or is always 'out of step' with the class while they try to assess what the teacher has just asked them to do. As discussed earlier, boys have a higher prevalence of communication-related diagnoses than girls.

Implications of sensory and speech disabilities

The diverse nature of sensory and speech disabilities makes it very difficult to state general implications for teaching and learning, but some basic implications are outlined here for general consideration.

- Many students with hearing impairment will use some form of assistive device, such as a hearing aid or implant to understand speech; intensive language support and modelling of language is required to gain speaking and listening skills.

- Assistive technologies may be used in some classrooms, and teachers will require some training in using these devices and systems.
- Students may use sign language. In Australia sign language is known as Auslan, and New Zealand sign language is New Zealand Sign Language (NZSL). Both are officially recognised languages and both are complex languages with their own vocabulary and grammar. However, they are able to be learnt rapidly by peers in school. In New Zealand, local Māori concepts and terminology are included, which means that sign language can vary from one region to another. Full integration in school and university is possible with trained sign-language interpreters.
- Ensure that background noise is minimised; always face students when talking (e.g. do not talk into the whiteboard).
- Support communication for all students by providing visual guides, written translations and subtitles on audio-visual materials.
- Most children with severe vision impairment or blindness will learn how to read by using braille, which is a series of raised dots that represent alphabet, punctuation and numbers. This is a learnt process that requires intensive training.
- Full classroom integration is possible for children with vision impairment with careful planning and attention to acquiring translations of texts and written materials in braille ahead of time. Assistive technologies, such as text to voice translators and voice recorders, also assist learning.
- Some learners with vision impairment may need larger print texts, magnifiers or additional lighting, and hence desk size and positioning in the classroom may need consideration.
- Throughout schooling, children require mobility support and training to learn how to move around the school (this starts in preschool), or to learn how to cross busy roads or catch public transport in the later years of school.
- Communication disorders affect all areas of the child's life and care must be taken to be sensitive to the child's feelings, to avoid embarrassing the child when they are slow to follow instructions or respond in class.
- Avoid overuse of 'call and response' strategies in the classroom. These strategies disadvantage a large group of learners with communication disorders and a range of specific learning disabilities. Allow for a range of response or presentation strategies, including time for reflection so students can think and prepare their responses.
- Close liaison with speech therapists and parents will allow teachers to follow the child's progress and allow for the practising of new communication skills in classroom settings.

Mental health conditions

Psychiatric or mental health conditions are a significant cause of disability among Australian and New Zealand children, but it is extremely difficult to estimate the exact prevalence of such conditions. In some cases, there is a lack of recent data or estimates may be incomplete due to under-reporting in certain sectors of the populations, such as for indigenous youth in each country. In both countries, estimates are based on the inclusion of a number of different conditions, including emotional or behavioural concerns, ADHD, anxiety, and depressive illnesses. In recent surveys in New Zealand, the prevalence of significant social, emotional and behavioural problems among children aged three to 14 years of age is 8 per cent (New Zealand Ministry of Health, 2018). In Australia, a study found that 13.9 per cent of children and adolescents aged four to 17 years had experienced a mental health disorder (Lawrence et al., 2015).

Factors and stressors that contribute to mental health conditions

The range of mental health conditions experienced by Australian and New Zealand children is diverse and often co-occurs with other conditions. A range of social and environmental conditions may also contribute. Factors such as poor parent–child attachment, abuse and neglect in the family, experience of bullying or violence at school (see **CHAPTER 4**), and the presence of parental mental health disorders, are all known risk factors for the emergence of childhood mental health disorders.

Be You is an Australian mental health initiative for educators that aims to promote the mental health of children and young people in Australia. The New Zealand Child and Youth Wellbeing Strategy has a similar aim to promote the wellbeing of young people in three priority areas of reducing child poverty, supporting young people by addressing family and sexual violence, and supporting young people by focusing on learning support and mental wellbeing. You can find the weblinks for both of these organisations in the 'Recommended websites' section at the end of this chapter.

The Australian framework stresses that mental health exists on a continuum – it is not a binary concept of mental illness or no illness – rather all people have a state of mental health and this can vary and change across our lifetime. They also stress that it is not the teachers' role to diagnose a mental health condition but rather teachers can use the framework to respond at any point that suits the situation.

Implications of mental health conditions

Mental health conditions can present serious difficulties in every area of a child's life. Classroom learning is affected by both **internalising** and **externalising behaviours**, but teachers are much more likely to respond to externalised behaviours (e.g. displays of aggressiveness, impulsiveness or non-compliance) than to attend to signs of internalised behaviours (e.g. loneliness, depression or anxiety).

internalising behaviours Inhibited and withdrawn types of behaviours, such as loneliness, depression or anxiety

externalising behaviours Acting out behaviours, such as displays of aggressiveness, impulsiveness or non-compliance

- Be alert and help identify when a young person may need additional help or support.
- Understand when you need to seek professional advice and refer young people on to other professionals for help.
- Be aware that mental health concerns can present as internalising behaviours; this means signs of mental health concerns can be easily overlooked by teachers.
- Be aware that teachers may neglect to identify externalising mental health concerns and instead mistake these as 'behavioural problems'.
- Use caution when identifying and labelling students with mental health concerns because labels, such as 'conduct disorder' or 'disturbed', can be very stigmatising. It is important to maintain privacy and confidentiality when dealing with all students who have disabilities or mental health concerns due to such stigma.
- Learning, concentration and attention may all be affected, so apply the strategies discussed above for other conditions as they relate to cognitive learning implications for each child.
- Model and display positive social and emotional health behaviours in your classroom by showing respect for students, solving disputes with students calmly and respectfully, and creating a 'safe space' for discussing troubling issues.
- Update your knowledge regularly and undertake professional development and further training in the social and emotional health and wellbeing of young people.

Learners with high abilities

Learners with high abilities or talents in specific areas are often far advanced compared to peers in one or more areas of academic skills or other abilities. These learners also need additional learning support in the classroom.

It may surprise you to know that many advocates for high-ability children consider them a neglected and underserved population in our schools and classrooms. Both the Australian and New Zealand curricula recognise the needs of high-ability students. In both jurisdictions the concept of high ability is defined very broadly to include not just high intellectual ability but skills and talents in other areas as well. In Australia, selective secondary schools and special opportunity classrooms in primary schools have been a feature of the provision for students with high demonstrated ability in some states, such as New South Wales, since the 1930s. As explained earlier in this chapter, in New South Wales students qualify to enter such schools on the basis of ability as demonstrated in tests of reading, mathematics, general ability and writing.

A variety of labels have been applied to these learners, including terms such as 'gifted', 'gifted learners', 'gifted and talented learners' and 'exceptional learners'. As explained in **CHAPTER 9**, high intelligence, as measured on IQ tests, has often been used to diagnose 'gifted' students. However, today there is a much broader acceptance of a wider definition of higher abilities to include a range of talents and skills.

Peters and colleagues (2014) explain that labels such as 'giftedness' can be problematic. They suggest such terms are 'educationally nondescript' and connote some type of endowment and seem to suggest that high academic achievement is a permanent quality. Further, these authors point out that although such labelling may lead to specialised classes, enrichment and interesting and challenging tasks for some students deemed 'gifted', while the provision of appropriate challenge and interesting activities for *all* students is overlooked. Labels may mean that only identified students who meet a certain criteria receive a program or service, but the general principle of offering learning support to any student who shows ability or potential in any area of schooling endeavour may be more inclusive.

Implications for learners with high abilities

- Terms such as 'gifted and talented' are now common (but controversial) labels for students with high abilities; take care to monitor the effects of labelling and maintain the privacy of students and their families; do not disclose diagnostic assessments such as IQ scores.
- Specific forms of educational accommodations, such as grade acceleration (allowing students to move faster through the education system) and extension and enrichment activities, are recommended to support these students (see **CLASSROOM LINKS 10.2**).
- As suggested by Peters and colleagues (2014), take care to ensure all students (not just those identified as gifted) are offered appropriate extension and challenge, as this is a key factor in motivation and engagement (see **CHAPTER 8**).
- Monitor students' self-concept and the effects of social comparison in selective school and special class placements (see the big-fish-little-pond concept in **CHAPTER 4**).
- Exams or tests for special school or class placements can lead to anxiety for some students. See **CHAPTER 4** for more information about anxiety and some appropriate ways to respond.
- Be aware that students identified as high ability are just as susceptible to disability or other conditions as any other child. Teachers must be mindful to monitor and acknowledge high ability in learners who also have other disabilities, particularly those with learning disabilities and conditions like ADHD and autism, who may often be overlooked and not identified.

CLASSROOM LINKS 10.2

Acceleration, extension and enrichment

Acceleration, extension and enrichment are forms of educational adjustment and **curriculum differentiation** to enhance students' experiences, knowledge and skills (VanTassel-Baska, 2005). These provisions involve programs and services at the school and classroom levels, where students are given additional opportunities to learn. This often involves planning and managing their own projects and developing their interests, with the guidance and assistance of teachers. Although the specific strategies listed in **TABLE 10.1** are usually applied to the population of high-ability learners, it is most inclusive to consider that all learners deserve enrichment and extension at some times in their learning experiences regardless of their diagnostic label.

acceleration
Allowing students to move faster through the education system

curriculum differentiation
Modification of instruction, materials and assessment procedures to match learner needs

TABLE 10.1 Strategies for acceleration, extension and enrichment

Acceleration strategies	Extension activities	Enrichment activities
Enables high ability and advanced students to participate in learning based on their own performance level rather than fixed or lock-step grade levels. It may involve grade-level acceleration and content acceleration (curriculum flexibility), e.g.: • early entry to school or early entry to high school • exemption from knowledge and skills already demonstrated • placement at a higher level for specific content areas (e.g. mathematics and physics) • year skipping or placement at higher year level • whole-group acceleration where the whole class is given fast-paced learning.	Encourages expansion of knowledge and skills in the regular classroom and can be provided through inquiry-based learning projects, flexible grouping strategies and on-site learning centres using negotiated curriculum contracts, peer tutoring and community mentors, e.g.: • learning centres where special topics can be explored • challenge centres where advanced problems can be investigated or skills tested • camps and intensive learning opportunities away from the school setting • use of ICT and virtual instruction to bring additional knowledge source into the classroom.	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, e.g.: • excursions • debates and public speaking • clubs or electives • guest speakers and outside experts • use of ICT and digital technologies, particularly for personal projects, such as media activities (see **CHAPTER 12**).

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 students with higher and advanced abilities? 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 implementation of a program specifically for students labelled 'gifted and talented'? How might these difficulties be overcome?

In summary, this relatively brief introduction to the provision of learning support in regular classrooms is intended to serve as both an information and awareness-raising resource for beginning teachers. It is clear in the brief survey of educational implications that considerable overlap exists in the implications and recommendations for most learners with additional educational needs. Furthermore, it is self-evident that many of the recommendations contribute to effective classroom practice for *all* learners. Hence, this survey of implications and teaching strategies reinforces the importance of non-categorical approaches and the avoidance of generalisations for students with specific diagnoses and labels.

10.3 Teaching and diverse needs

As you may have noticed in the previous section, many of the implications and recommendations for practice included simple, 'good sense' teaching practices. You may also reflect on the notion of a non-categorical approach and consider this in light of learning that no condition or medical diagnosis described in the previous section has the same learning support implications for every child with that condition. Rather, many conditions involve a syndrome of characteristics, which means every child will be affected differently and have different learning support needs. Therefore, any expectation of a 'recipe book' approach or precise instruction on 'how to teach' to a specific disability is unreasonable. Teachers should be critical and cautious when consulting textbooks or other resources that purport to provide a definitive guide to teaching students with one condition or another.

Rather it is recognised that good teaching practices, positive teacher attitudes and classroom-wide strategies, such as curriculum differentiation, in combination with individualised educational programming, can address the support needs of students in the classroom. This brief section is not intended to replace consultation with expert texts in programming and planning for inclusive education. Rather this section provides a brief introduction to the concepts of *differentiation* and *universal design* for learning, two prominent terms in learning support today.

Differentiation and universal design pedagogies

An international review of best practice and evidence in inclusive education found that most countries practising (or purporting to practise) inclusion employ curriculum modification and individualised education programming of some sort (Forlin et al., 2013). Best practices in Australian classrooms were characterised by use of differentiated and universal design principles alongside use of technologies, planning with the use of individual education programs and an overall focus on quality teaching for all students. As we saw in the case of learners with high ability in the previous section, curriculum differentiation in the form of extension and enrichment activities is particularly recommended.

individual education program (IEP)
A planned program of instruction for an individual student, based on assessed needs, strengths and interests

One approach to the practice of curriculum differentiation occurs at the level of the individual student and may involve the development of an **individual education program (IEP)** for learners who need additional support. An IEP identifies learning objectives for the individual student and the types of support the student will need to address their specific learning needs. For example, Carlson has an IEP that sets specific goals related to literacy and broader life goals relating to school-to-work transition, and planning and following routines. Carlson's English teachers differentiate his learning tasks by focusing on adapted reading materials and basic skill development in literacy (e.g. learning vocabulary). They try to always relate Carlson's tasks to the same themes or topics as the rest of the class and include Carlson in all general discussion topics.

These individualised approaches allow teachers to consider very specific and often high-level support needs of the individual child, rather than trying to make the child 'fit into' inappropriate

curriculum or learning approaches. They are especially useful for teaching complex skills or arranging for specialist teacher support (see **FIGURE 10.4**).

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FIGURE 10.4 An individual education plan would specify particular learning goals and the type of individual support the student needs to achieve those goals. This may include working with a specialist teacher to learn a specific skill

Classroom differentiation

Another approach is to think of differentiation at a whole-classroom level as a routine practice in diverse classrooms. Tomlinson (2014) suggests teachers adopt a mindset that the classroom is a naturally diverse place. This means we need to acknowledge that students come to the classroom in different states of readiness (and that readiness varies for all learners over time and contexts) and different levels of interest, understanding and skills for learning. This can stem from many factors, including diagnosed learning support needs, cultural differences or any other personal factors in the student's life.

Specifically, Tomlinson asserts that teachers who regularly and routinely plan for differentiation in their classrooms have attended to data and diagnostic assessment information about their students, alongside personal knowledge of students, and routinely use this information to plan for modifications to their instruction. Tomlinson outlines a model of classroom differentiation at four levels:

1 *Content* – what the teacher wants their students to learn in a particular sequence of instruction or unit of study. This also includes consideration of the materials or mechanisms that students will use to access this information.
2 *Process* – the actual activities the teacher has designed to ensure students employ specific skills to engage with, learn and apply their knowledge and understanding.
3 *Product* – how students can demonstrate what they have learnt and also extend and transfer their learning and understanding.
4 *Affect and environment* – condition, climate and affective (or emotional) tone of the classroom. We examined such factors in **CHAPTER 8** when we looked at the notion of motivational goal climates in classrooms, and in **CHAPTER 14** we return to this idea when we examine the creation of a positive classroom environment.

So far in this textbook we have demonstrated examples of interventions and teaching approaches that reflect the dimensions of differentiated instruction outlined here. In **CLASSROOM LINKS 4.1** we learnt about a classroom intervention to assist Caleb and his peers cope with the demands of public speaking. In **RESEARCH LINKS 10.1** we learnt of the use of a simple classroom technology to support self-monitoring in a way that subtly and discreetly differentiates the attentional climate for students with ADHD.

Universal design for learning

In recent years, the term **universal design for learning (UDL)** has also been adopted to describe principles of differentiation. As noted in Forlin et al. (2013), universal design approaches are a form of differentiation that occurs at a universal or class-wide level by considering the deliberate creation of lessons that allow all students to participate in the curriculum, and the design of customisable curriculum for all students (van Kraayenoord, 2007, as cited in Forlin et al., 2013). This is very similar to Tomlinson's philosophy of the differentiated classroom described

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

above. Like Tomlinson's approach, UDL approaches have been advocated for the management of learning needs of *all* students in both school and university settings. The UDL approach has a strong basis in the robust application of studies in educational psychology and applying understanding from cognitive neuroscience (see **CHAPTER 2**), and is based on the three key principles outlined below. The National Center on Universal Design for Learning in the USA provides numerous empirical and peer-reviewed sources of evidence to support each principle:

1 *Provide multiple means of representation* (*the 'what' of learning*) – there is no single mode of representation that will meet the needs of all learners, and no definitive idea of the 'best' way to represent knowledge. This principle closely applies a psychological understanding of learner differences in *perception* (e.g. learning and sensory disabilities), *linguistic and communicative understanding* (e.g. communication disorders and EAL/D backgrounds) and *cognitive understanding* (e.g. cognitive disabilities, high-ability learners).
2 *Provide multiple means of action and expression* (*the 'how' of learning*) – learners also differ in their ability to navigate the learning environment, and this can range from *physical actions* (e.g. learners with cerebral palsy) to *expression and communication* (i.e. learners with language or communication barriers who need to express themselves differently) and *executive function* (i.e. learners with a range of cognitive and learning disabilities that affect higher-order thinking skills and processing of information). There is no single means of expression and action that is suitable for all learners, and multiple options for action and expression are essential.
3 *Provide multiple means of engagement* (*the 'why' of learning*) – learners differ in affect (i.e. emotional responses) and reactions to learning, and the curriculum must *recruit learner interest*, have a means of *sustaining effort and persistence*, and develop learners' intrinsic abilities for *self-regulation* of their learning engagement. Some learners will be driven by high intrinsic interest, while others will need external or extrinsic supports from the learning environment; as discussed in **CHAPTER 8**, most learners will vary in their engagement and motivation across different subjects and learning environments. As such, no single method of engagement will be optimal for all learners in all contexts, and multiple options for engagement are essential (CAST, 2011).

As with any critical reflection on our teaching practices, important questions must be asked regarding any curricular approaches we adopt in our classrooms. What is the evidence base for my practice? Did I read about this or find out about this strategy from a reputable source? Is the practice actually inclusive? Can everyone in my classroom make a genuine attempt at this task? If I need to differentiate, or adapt, or set different learning outcomes, how can I do so inclusively and discreetly? Have I applied the concepts of extension, enrichment, diverse and interesting learning activities to *all* students in my classrooms? Have I planned an activity, excursion or a competition or game for students that may mean some students cannot participate?

The diversity of human needs and differences probably makes it very difficult to avoid the need for unique individual approaches in some circumstances, such as outlined above for the student Carlson. It is unlikely that any one curricular approach or philosophy of learning will suit every learning context. However, it is important to note that education has made dramatic progress towards inclusion of *some* learners with additional learning support needs in a relatively short space of time, probably because of curricular innovation and careful research. Nonetheless, it is important to recognise that rates of school exclusion and suspension remain high for some students, while disengagement and school dropout are a concern for a significant number of young people. In the next section we look at one approach to addressing the needs of such students.

Alternative schools

For some students who do not 'fit in' to regular schools, expulsions or suspensions are common and many of these students simply 'drop out' during the secondary years of schooling. Within this discussion of effective instruction, it must be acknowledged that alternative schools are sometimes sought for the education of students who do not 'fit' into the mainstream of educational service provision. In some cases, parents may select alternative school environments for their child, reflecting a view that one type of school does not suit all students.

Alternative schools, including those described in **CHAPTER 7**, may provide a more appropriate educational experience for some students, while McGregor and Mills (2011) suggest there is much that mainstream schools can learn from these alternative approaches to teaching. For example, alternative schools are usually small in size, student-centred (or more democratic) and non-traditional, with a higher staff–student ratio than other schools (i.e. fewer students per staff), more opportunities for individualised instruction, less structured organisation, and a more personal and caring environment.

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

Terminology in this area of alternative education is varied, with some people using phrases like 'second-chance' education or 're-engagement' programs (te Riele, 2014). Te Riele suggests that terms like 'alternative' or 'second-chance' education might serve to reinforce the idea that these students or schools are on the margins of educational provision. Alternatively, te Riele suggests there are many innovations in pedagogy and curricular approaches, and flexibility in such educational settings.

Three main types of these alternative or flexible education programs have been identified in Australia (te Riele, 2014):

1 those associated with mainstream schools and offering extracurricular activities or electives
2 TAFE or community colleges offering alternative certificates in education for work and training certificates to alternatives for formal school certificates, such as tertiary preparation programs
3 separate alternative schools and programs that are registered and accredited schools that operate in their own right; for example, Key College is run by a youth organisation called Youth Off The Streets and specifically serves the needs of homeless youth in Sydney.

These Australian programs have been found to be successful in their inclusion of young people who have been marginalised from other school settings, with outcomes including:

- better futures for students (credentials and career pathways)
- successful learning approaches (academic achievement and engagement with learning)
- personal growth of young people (social, emotional and behavioural growth)
- strong links to the community and contribution to the community (te Riele, 2014).

Similarly, in New Zealand it is acknowledged that many young people become alienated from school because of trauma or other factors, and alternative education is often provided by non-school organisations, such as churches or private training providers (New Zealand Education Review Office, 2011a). The effectiveness of these schools was recently evaluated and varying levels of effectiveness were identified across factors such as engagement of students. Effective schools had strong processes for overseeing the transition of the student between mainstream education and entering and leaving the alternative education setting. Some secondary schools, however, did not closely engage with the transition process and had little connection or contact with the student once they left the mainstream school. Schools that were more engaged in the alternative education process saw more students returning to mainstream education (New Zealand Education Review Office, 2011b).

THINK ABOUT

- Can you think of students you have known who would have benefited from attending an alternative school with more personalised programs, smaller class sizes and a structured school environment?
- What options are available for students who are not successful or at risk of dropping out of a traditional, academically oriented school?

home schooling
The education of children at home by parents or other adults who take primary responsibility for this education

Another form of non-traditional education that involves individualised instruction and a highly personal and caring environment is **home schooling**, or the education of children at home by parents or other adults who take primary responsibility for the education of their child (Barratt-Peacock, 2003; Home Education Australia, 2013). Home schooling gives parents the freedom to choose their own philosophy of education, the content of their child's educational program and the teaching strategies and resources to be used. The decision to educate a child at home often reflects parental dissatisfaction with the practices of schooling for their child and concern that the school cannot meet the needs of their child (Jackson & Allan, 2010; Jolly et al., 2013).

A recent review of home schooling in New South Wales found that there were 3228 students registered for home schooling in the state. Other estimates suggest there may be more than 10 000 unregistered children in home schooling in Australia. Parents' reasons for home schooling identified in the inquiry included personal philosophy (17%), special learning needs (14%), religious beliefs (5%), and bullying (3%). A large proportion of responders (24.5%) stated some other reason. However, the review noted that about half of the motivations for home schooling included some level of dissatisfaction with mainstream education, including factors such as class sizes, lack of flexibility, and lack of support for children who are gifted, have special learning needs or are subject to social factors, such as bullying. The report of one mother summarises some of these factors:

> ... he experienced quite severe and prolonged bullying by both children and a couple of teachers. He didn't fit the 'boy mould' expected of him. He wasn't into sport, was quiet and reflective, and preferred the performing arts to cars and rugby. Things came to a head in Year 5 when he would wake up in the morning and make himself throw up into a bucket to prove that he should be allowed to stay home from school for the day ... He refused to take food to school and wouldn't eat or drink for fear of having to use the school bathrooms. He came home exhausted each day from having to deal with the physical and psychological bullying he was experiencing ... Attempts to approach the school were met with denial and deaf ears.
>
> Source: Inquiry Into Home Schooling, Submission 14, Parliament of New South Wales, 08/07/2014.

10.4 Concluding comments

Today students like Carlson can enjoy greater participation in school with the positive support of teachers and peers. The provision of additional learning support to any student should aim to

address their specific educational needs in a non-categorical model of practice; this also requires understanding that 'disability' is now defined as a universal human condition arising from social and environmental factors alongside the diagnosed condition. This means that young people cannot be treated as a homogeneous group and that diversity in our classrooms is a natural reflection of human diversity. Curricular strategies, such as differentiation, offer many solutions to classroom programming for diverse student groups; in Australia this also tends to reflect best educational practice (Forlin et al., 2013). It remains a concern, however, that some young people do not have a positive experience of schooling and are vulnerable to dropping out and school exclusion. There is no doubt that this requires further research, reflection and solution seeking on behalf of the whole education community.

STUDY TOOLS

Chapter review

10.1 Learner diversity and schooling

- Inclusive education is concerned with the provision of programs and services for students with diverse learning needs in regular settings, regardless of the level or type of disability.
- Educational exclusion is more likely to be experienced by minority and indigenous youth, and those from poorer socioeconomic backgrounds.

10.2 Learning support needs in classroom settings

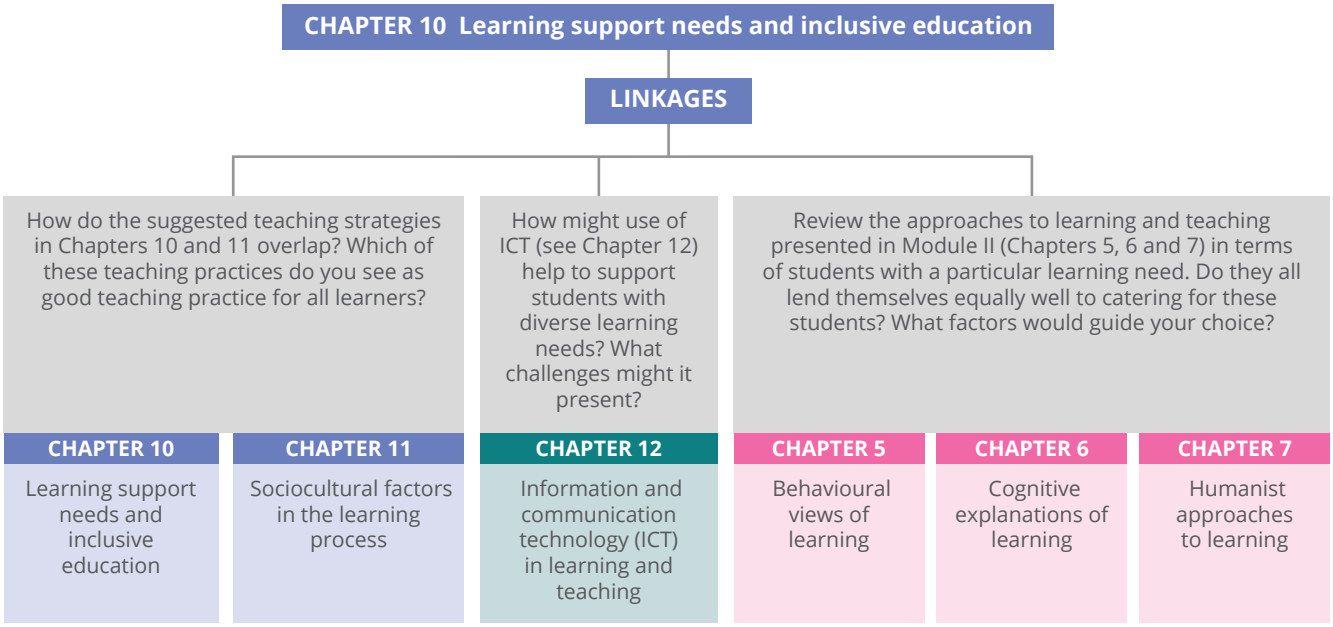
- The provision of learning support aims to help students who may be at risk of underachieving, including those high achievers, and offset any restrictions that may result from the interaction between their personal circumstances and the school environment.

10.3 Teaching and diverse needs

- A non-categorical approach to learning support seeks to identify solutions to educational needs rather than broad condition labels. Each child may experience very different educational support needs despite having a similar disability or condition label.

Putting it together

Making links between 'learning support needs and inclusive education' and material in other chapters



Questions and activities for self-assessment and discussion

1 Define the terms 'inclusive education', 'normalisation' and 'non-categorical'.

2 Correct the following newspaper headlines to avoid stereotyping and negative attitudes:

a 'Wheelchair girl fights school'

b 'Deaf to appeal judgement'

c 'Angry anorexic attacks authorities'

d 'Blind twins boycott Olympics'

e 'Blind school wins appeal'.

3 Which of the following statements reflects a non-categorical philosophy in providing educational services?
   a The program is designed for students with moderate intellectual impairments.
   b The curriculum is suited to the needs of each child.
   c Classroom activities are at the appropriate grade level.
   d The teacher is very sympathetic to the problems experienced by children with disabilities.
4 Do you know what types of programs and services are available in the school district where you live? How do they fit within the inclusion model?
5 Why is the term 'gifted and talented' considered problematic? List the myths and stereotypes associated with this label.

Further research

Recommended websites

Be You: https://beyou.edu.au

Be You Educators Handbooks: https://beyou.edu.au/get-started/educators

Children and Young People with Disability Australia: https://www.cyda.org.au

Council for Intellectual Disability: https://cid.org.au

New Zealand Ministry of Education: http://www.minedu.govt.nz

Recommended reading

Foreman, P., & Arthur-Kelly, M. (2017). *Inclusion in action.* Cengage Learning.

Tomlinson, C. A. (2014). The differentiated classroom: Responding to the needs of all learners. Association for Supervision and Curriculum Development.

The following journals are recommended:

- *Disability and Society*
- *Disability Studies Quarterly*
- *International Journal of Disability, Development and Education*
- *International Journal of Inclusive Education*
- *The Australasian Journal of Special Education.*

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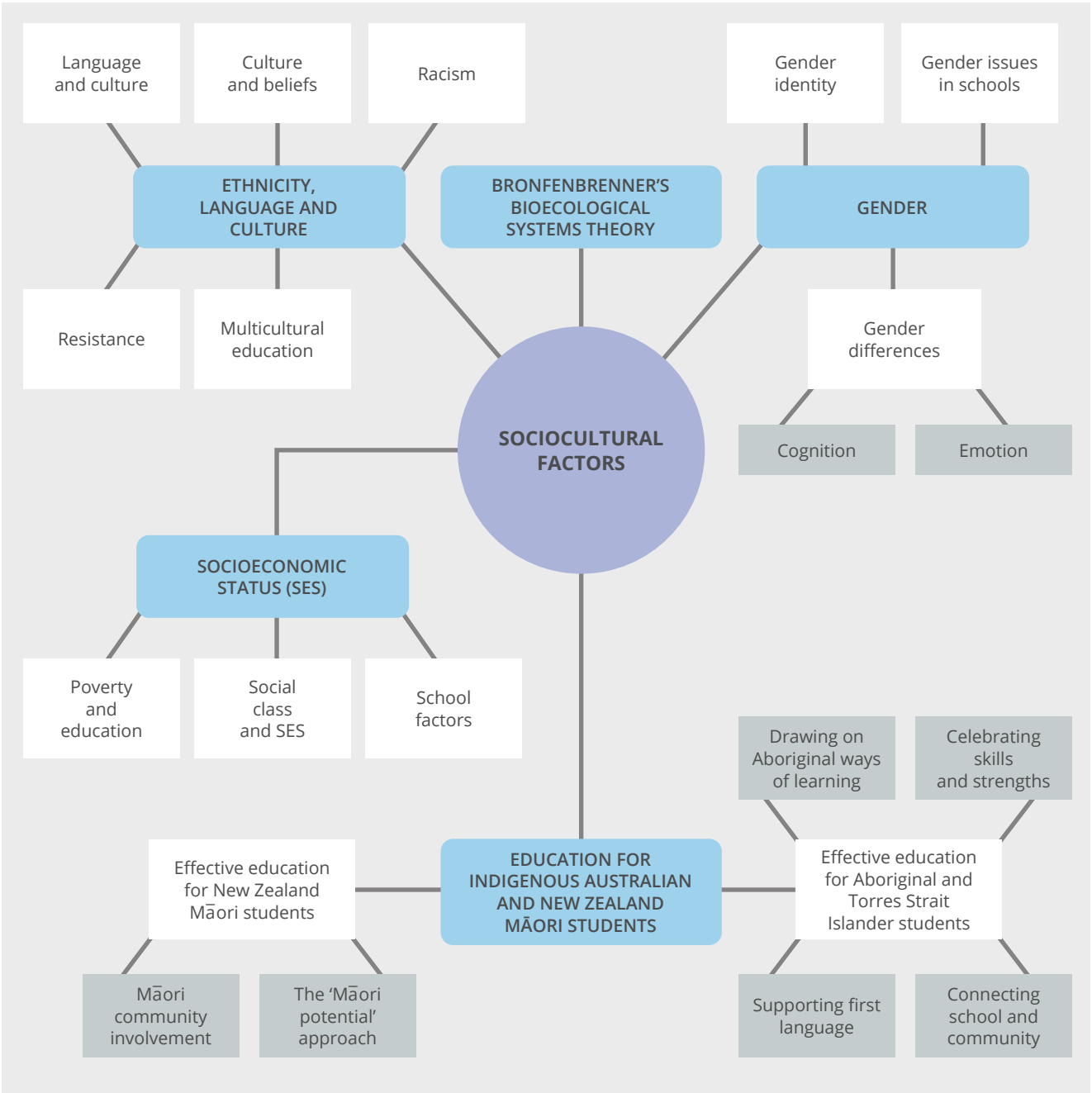
CHAPTER 11

Sociocultural factors in the learning process



Chapter 11 concept map

KEY QUESTIONS

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

- What are some examples of the interaction of person and environment influencing educational outcomes?
- Why is it important to consider differences within, as well as among, groups of students?
- How can poverty influence students' life chances? Give some examples.
- Why should teachers be aware of gender issues in their classrooms?
- How can Aboriginal and Torres Strait Islander students in Australia and Māori students in New Zealand be supported in their learning?

MR BROWN AND KINDER ROSELLAS

The Kindergarten Rosellas class is starting school in their rural town. In it are Kari, whose mother is a university lecturer and her father a teacher; Stephan, the son of a local builder, whose brothers are at the school; Jess and Jade, twins whose father is an Aboriginal education worker at the local high school; Sharif, whose parents have asked what extra programs are available for him to continue learning after school; Blaine, who will participate in the school's breakfast program to ensure that he has eaten sufficiently to be able to concentrate; Kirsty, who is silent throughout the first day; and Kade, who never seems to sit still. What experiences do these children bring to the school, and how will all of these children's backgrounds affect their experience at school? Their teacher Mr Brown is preparing for how he can best support them and their families, to ensure every child in the kindergarten class has opportunities to learn, and can make use of those opportunities. He is drawing on his ongoing relationships with the local community as he does this.

Introduction

Sociocultural factors are those factors that have a basis in society and culture. The previous chapters in this module focused on sources of difference that lie within the individual. In this chapter, we consider some of the social and cultural contexts in which we live, learn and develop, and the ways in which these can contribute to differences among individuals. These factors are particularly important to an understanding of equity and inclusion in education. How can we make sure that the home backgrounds of all students are recognised and supported at school? How can we ensure that all students have access to learning, irrespective of home language, family practices and past experience? We have discussed access for gifted students and students with educational support needs in other chapters in this module.

sociocultural factors
Factors contributing to individual difference, which have a basis in society and culture

In an egalitarian society, we expect that everyone should have the same opportunities. Yet, as we will see, some groups do not achieve equal outcomes in terms of achievement and participation in education, which suggests that opportunities are not equally available to all. Where these differences in outcomes have their basis in social or cultural aspects of society, we must ask what role teachers and schools can play in equalising individuals' ability to make use of the educational opportunities available to them. The importance of individuals' interactions with key others in their environment for development highlights the crucial role of parents, carers and educators as conduits through whom sociocultural factors influence the child and young person. Also important is for teachers and schools to connect with families and communities, to recognise and support these contexts and relationships that likewise influence those they teach (Darling-Hammond et al., 2020).

FIGURE 11.1 What experiences do these children bring to school, and how can the school best cater for their needs?

Fairfax Syndication/Peter Rae

In considering sociocultural sources of difference, we examine gender, culture, socioeconomic status (SES) and education for Aboriginal and Torres Strait Islander students in Australia and Māori students in New Zealand. Although this chapter deals with each topic in a separate section, it is important to recognise that the factors interact, and that individuals participate in a number of contexts that they influence and are influenced by. We will see examples of this interaction between factors in the different contexts in this chapter. Because of this complex interaction, which varies from individual to individual (see **FIGURE 11.1**), considerable variation exists in the experiences and outcomes of members of any group. Any one variable, such as gender, SES or culture, may influence development quite differently in different individuals. Hence developmental psychologists describe development in terms of *probabilities*, rather than certainties (Wachs, 2015).

11.1 Bronfenbrenner's bioecological model of development

Urie Bronfenbrenner's theory (1979, 1989, 2005; Bronfenbrenner & Morris, 1998, 2006) is one example of a developmental systems theory (as introduced in **CHAPTER 1**). It has shaped theory, research and practice in child development. Bronfenbrenner proposed a theory describing development as a function of the interaction of characteristics of the individual, the various contexts in which the individual exists, and the processes they experience in those contexts over time. While some theories of development you have studied restrict themselves to individuals or, at most, the individual's family context, Bronfenbrenner described a series of contexts that have an impact upon individuals and their experiences, and that, in turn, are influenced by them. It is not solely the contexts themselves, but the ways they influence the processes the individual experiences that affect development. We will see examples of this throughout this chapter.

The four elements influencing development, according to Bronfenbrenner, are:

1 *Process* – activities, relationships and practices. Processes are the engines of development, in Bronfenbrenner's theory. They describe particular ways individuals interact with people, objects or symbols in their immediate environments. Examples in the school context are

interactions between teacher and student; routines for reading and writing that are consistent and ongoing across the term; and students' interaction with social media.

2 *Person* – the characteristics of the individual, whether these be related to age, as discussed in Module I; dispositions, such as motivation (discussed in **CHAPTER 8**); abilities (discussed in **CHAPTER 9**); or aspects such as gender and culture that interact with context (see below).

3 *Context* – the human and non-human aspects of environments in which individuals are involved, as well as other contexts that affect them. We will see multiple examples of contexts and their effects in this chapter.

4 *Time* – stability and instability in individuals' experiences, as well as changes to individuals, processes and contexts over time.

The four elements all interact to influence an individual's development (see **FIGURE 11.2**). The person element has been discussed in most previous chapters as we focused on person characteristics, such as motivation and intelligence (in this module), or development (in Module I). In this chapter, we will look at some other characteristics of the individual that relate to their membership of certain gender, class or racial groups. In doing this, we consider the processes that different groups experience, ways that their personal characteristics influence those processes, and how contexts vary with membership of particular groups. As we focus on the interaction of the 'person' and 'context' dimensions, we will see the importance of 'proximal processes' to direct development and outcomes, as well as the role of time.

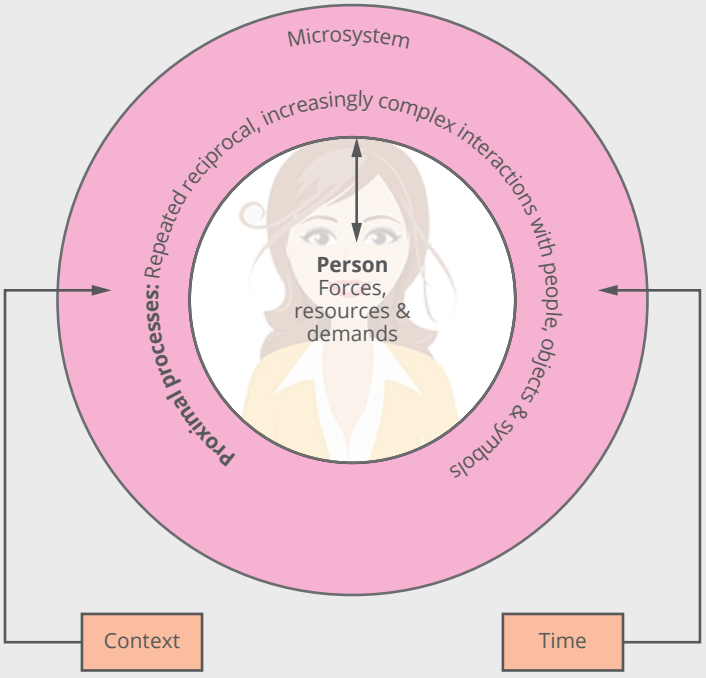


FIGURE 11.2 Proximal processes are the engines of development, influenced by and influencing person and context, and changing over time

Proximal processes

Not all interactions with the environment contribute positively to development. Some are incidental, while others may have negative impacts. Bronfenbrenner proposed a particular kind of interaction of individuals with their environment that is key to development called **proximal processes**. These are repeated interactions with people, objects and symbols in the environment

proximal processes Ongoing repeated, reciprocal and increasingly complex interactions between the child and people, objects and symbols in their environment

that are reciprocal and increasingly complex. The fact that they are reciprocal interactions indicates that the child or young person influences others, as well as being influenced by them in these processes (another example of the developmental principle of the child being active in development that was introduced in **CHAPTER 2**). Examples include the joint activity we described in **CHAPTER 2** as important to language development, when a parent may contribute by providing a label for something they are both looking at; and teachers' interactions with students discussed in **CHAPTER 3**, when teachers' questions stretch students' thinking. The keys here are the 'increasingly complex' nature of the interaction, that pushes the child's development forward; and the reciprocal nature, that ensures the child is engaged in the interaction. Other potential proximal processes are peers' collaborative learning described in **CHAPTER 6**; young people's interactions with others on social media, discussed in **CHAPTER 12**; and activities such as reading, or solving mathematics problems. In the latter two examples, 'reciprocity' occurs when these activities engage the interest and involvement of the learner (Bronfenbrenner & Morris, 1998). In an extension of the theory, Merçon-Vargas and colleagues (2020) proposed that inverse proximal processes likely also exist – interactions that reduce competency or increase dysfunction. Examples could be peer relationships with friends who are controlling, abusive parenting, or trolling in social media.

THINK ABOUT

What other examples of proximal processes can you identify? How are they reciprocal? Progressively complex? How do they influence development?

All of these (the positive and negative examples) influence and are influenced by the people involved in them and their characteristics, various contexts, and time. While process, person, context and time are interconnected in Bronfenbrenner's model, and together influence development, proximal processes are considered the 'engines of development', through which the other factors have their influence (Bronfenbrenner & Morris, 1998). We will see examples of this in each of the sociocultural topics in this chapter: gender, culture, SES and poverty, as well as in Aboriginal and Torres Strait Islander and Māori education.

Context

Bronfenbrenner suggested that the environment can be conceptualised in terms of a series of nested circles, each representing a different contextual system that interacts with features of the individual, and shapes particular processes to impact upon development. An important principle of the theory is that individuals' characteristics and behaviour can affect the environment; while at the same time, that the environment influences each individual's development. Consider a child with attention deficit hyperactivity disorder (ADHD; described in **CHAPTER 10**), which is associated with behaviour that can place considerable stress on the parents and teachers who care for the child. This will influence parenting and teaching behaviour, which in turn affects the child. In addition, each system influences the others; for example, what happens between a parent and child in the home (microsystem) influences what happens for parents at work (the exosystem); and what happens in neighbourhoods (mesosystem) influences family relations (microsystem).

Starting from the innermost circle and working outwards (see **FIGURE 11.3**), the systems making up the contexts are the:

microsystem
Interactions and activities in the child's immediate environment

1 **Microsystem** – interactions in the child's immediate environment and in which they are involved (i.e. parent–child, child–teacher, and peer or sibling interactions), as well as those between significant others (e.g. the quality of parent's marital relationships) that can affect and be affected by the child.

2 **Mesosystem** – connections between settings; an important example of which is the relationships between home and school. Later in this chapter, we argue that the home–school and school–community relationships are one key to effectively addressing sociocultural difference.

3 **Exosystem** – settings in which the child is not directly involved, but which nonetheless affect that child. Parents' work can affect children in terms of the amount of time and energy it leaves for parenting, and in shaping the goals parents hold for their children (Kohn, 1977). Parents' relationships with friends and family are another example: the support these relationships offer can have an impact on parental efficacy (Rubenstein, 2018).

4 **Macrosystem** – societal and cultural practices and norms that have an impact on children's development by setting expectations for parent and child behaviour, and by shaping the other settings. Some macrosystem influences are described in the discussion of ethnicity and culture that follows this section.

5 **Chronosystem** – influence of time on each of the settings and interactions in the system. Although the illustration in **FIGURE 11.3** is static, you can think of the effect of the chronosystem as transforming it into a hologram, with the size and shape of the circles shifting with time. As children develop, different settings and systems have differing effects, and impact in different ways.

mesosystem
Connections between settings involving the child

exosystem
Settings in which the child is not involved, but which nonetheless influence the child's development

macrosystem
Societal and cultural influences on development

chronosystem
Changes in environments and processes over time that influence development

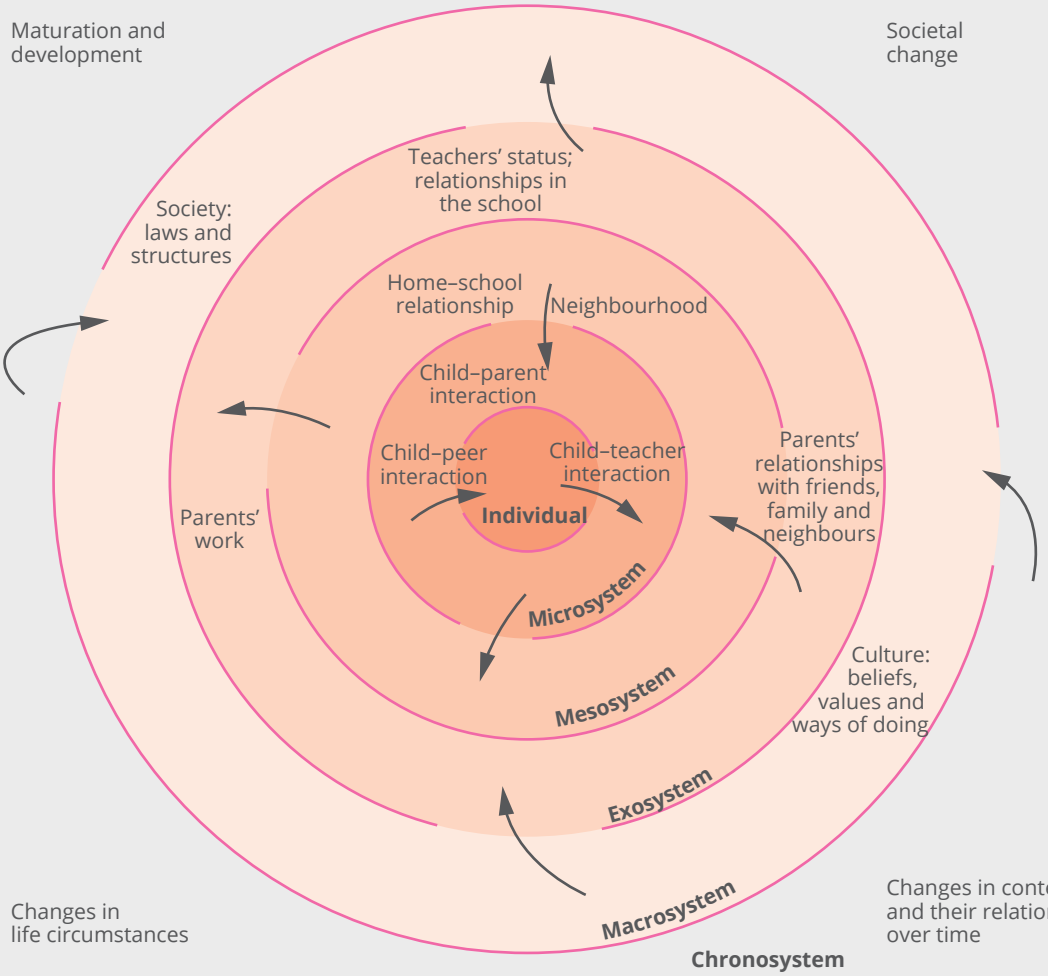


FIGURE 11.3 Bronfenbrenner's bioecological systems theory

Melbourne Declaration on educational goals for young Australians (MCEETYA, 2008), P. 7

CASE STUDY 11.1 describes one student's environment. See if you can identify each of the environmental systems that Bronfenbrenner describes. What are the proximal processes here? How are they influenced by Millie's characteristics and her contexts?

CASE STUDY 11.1

Millie

Millie is the youngest of four siblings. She has watched each of her brothers and her sister go to school and has gone with her mother, Jen, to readings in each of their classes from the time when she was a baby. At home, Millie's brothers and sister read to her and she has a workbook that she likes to complete while the others are doing their homework. Millie loves it when they stop at the library on the way home for a story.

Jen works at the school as an aide two days a week while Millie is at preschool. Jen knows the teachers well and has shared stories about Millie and her siblings as they have grown up. Several of the teachers have children the same age, and one will start school with Millie in the new year.

Their dad is no longer around, so the four siblings look after each other in the afternoons while Jen works at a second job at a nursing home. This has helped Millie to become very independent, and has contributed to her eldest brother's highly developed sense of responsibility. Neighbours also keep an eye on the children and are available if they need help. Jen expects to find things easier when all four children are at school, although in another year's time her eldest will start high school some distance away, and so will be less available to look after the younger ones in the afternoon.

ACTIVITIES

1. What do you think Millie's experience of school will be like?
2. Can you identify microsystem, mesosystem, exosystem, macrosystem and chronosystem influences on Millie's behaviour and approach to school?
3. How has Millie influenced her environment?

Compare the nature of the home–school relationship between early primary and secondary school. Parents make different use of the home–school relationship in response to difficulties their children experience, depending on the age of the student. In primary school, parents may go to the school to help in the classroom and work with the teacher, but in secondary school, a difficulty is more likely to be dealt with separately, at home and at school, with fewer connections between them. Over time, the systems and settings (i.e. the contexts for interaction) themselves also change. The discussion of risk and resilience later in this chapter (see the section on poverty) gives an example of this. Particular events – either large-scale societal events, such as the 2011 Christchurch earthquake, Australian 2020 summer bushfires, or coronavirus pandemic; or family events, such as birth of a new baby or changes to employment status – are also considered elements of the chronosystem that may influence how families interact with their children and how children respond, and therefore influence children's development.

Person

Person characteristics are not just outcomes of the proximal processes learners engage in. In Bronfenbrenner's model, they also influence those processes. We have looked at aspects of learners as persons that influence their learning. The *resources* students bring to learning through their existing knowledge, skills and experiences were addressed in Modules I and II. Their dispositions (motivation and engagement, which act as *forces* to enhance or disrupt development) were addressed in **CHAPTER 8**. In this chapter, our focus is both on ways these characteristics are influenced by the processes learners experience, and ways in which the characteristics themselves influence particular developmental processes. For example, as we will

see in the next section, gender schema theory proposes that children learn how to 'be' a boy or girl through their interactions with people and objects in their environment. They then choose particular activities, settings and behaviours that will influence the processes that shape their development.

Bronfenbrenner also identified another aspect of people that he termed 'demand' characteristics. He showed evidence of particular characteristics, such as gender or attractiveness, influencing the processes experienced by children during their development (Bronfenbrenner & Morris, 2006). Again, these characteristics can act positively or negatively on development. Racism is another example of how a person's ethnicity and presumed race can affect the ways others respond to them, influencing development through interactions that support or disrupt it. As we look at various aspects of identity in the following sections, consider how they might be operating as 'demands' on others to interact with children in developmentally supportive or disruptive ways. You might consider, too, how children themselves play a role in this via their choices that are guided by their identity, opportunities and experiences. We commence with gender, an important demand characteristic both influencing and influenced by others in the environment.

THINK ABOUT

How does Bronfenbrenner's theory demonstrate the principles of developmental systems theories in **CHAPTER 2**?

11.2 Gender

Look around you. If your education class is typical, there will be many more women than men (see **FIGURE 11.4**). Elsewhere in the university, there may be concern about the underrepresentation of women in science, technology, engineering and mathematics (STEM) courses. Why is it that women tend to choose education in larger numbers than men do? Why are there more women at university than men? Examining processes that shape beliefs can help us to understand what underpins the choices we make as men or women, as well as children's and young people's behaviour.

FIGURE 11.4 Why do more women than men go to university in Australia? Why are some courses full of men and others full of women?

Alamy Stock Photo/Imagedoc

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, and the question of a 'gender binary' whereby people are divided into two gender types, men and women, has itself been questioned (Hyde et al., 2019). 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

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 2** 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 **RESEARCH LINKS 11.1**). Interestingly, looking across nations, gender differences in personality are largest in countries that are 'gender equal', such as Australia and New Zealand, and smallest in countries whose policies and practices more strongly define gender roles (Schmitt et al., 2017). The reason for these findings is not known, and strongly debated.

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). Hirnstein and colleagues (2019) 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 (this is discussed further in **RESEARCH LINKS 11.1**). There is more variability in these scores for males than for females (Hirnstein et al., 2019), so it should not be assumed that all males are strong in spatial–visual thinking or all females in language. Most cognitive tasks show little or no difference between males and females, although the exception is spatial rotation, in which the difference is large, has remained constant over time and shows males outperforming females (Zell et al., 2015). Hyde (2014) reported that differences in spatial–visual abilities are amenable to change through training, and may be linked to activities such

RESEARCH LINKS 11.1

Are differences in boys' and girls' brains the reason for the gender differences we find in schools?

You may recall from **CHAPTER 2** that one of the neuromyths that persists in education is that boys' and girls' brains are structurally different, and that this is therefore the basis for fundamental differences between boys' and girls' educational outcomes in schools. However, although size and structural differences have been observed in neurological studies (Ingalhalikar et al., 2014), many similarities have also been found (Joel et al., 2015).

Hirnstein and colleagues (2019) reviewed research on one structural difference: the more strongly lateralised male brain, and whether it could explain the largest cognitive advantage reported in the literature – males' superior performance in spatial rotation tasks, as well as females' advantage in verbal tasks. They included studies using neurology (functional MRI), behaviour and EEG to assess lateralisation, and found very mixed results, with only two of 37 studies supporting a hypothesis that stronger lateralisation results in stronger spatial rotation, and/or weaker verbal skills. For each method of assessing lateralisation, a number of studies failed to find differences in hemispheric lateralisation, while gender differences in rotation or verbal skills were not consistently found either. Numerous studies found lateralisation differences but no difference in mental rotation or verbal skills, or vice versa. As Hirnstein et al. concluded, this would suggest that there is no relationship between the two. While some structural differences between the brains of males and females exist, there is variability and overlap, and the relationship of the differences to behaviour and cognition is yet to be clearly established.

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, and a possible role of testosterone, particularly for spatial rotation tasks (Archer, 2019).

Gender differences in emotion

For a combination of biological and sociological reasons, males are more likely to show aggression than females, although the kind of aggression is important – the largest difference is in physical violence towards others, yet there is no difference in anger (Archer, 2019). Hyde (2014) reported from a review of research that gender differences in aggression show strong contextual effects, and even disappear under some conditions, although Archer's (2019) meta-analysis showed a biological basis with a link to testosterone. It is likely that a combination of biological and contextual influences is involved.

Girls are more likely to experience anxiety than boys, although differences are small, and vary with age and context (Archer, 2019). 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, with 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.

THINK ABOUT

- How might these gender differences show up in students' classroom behaviour?
- How might they be influenced by school factors?

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

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** (Bem, 1981) 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).

FIGURE 11.5 Gender identity is formed through direct and indirect experiences. It is particularly strong and often stereotypic in the preschool years

Matthew Duchesne, © Milk and Honey Photography, 2010

Messages about gender role do not have to be spoken; many are implicit in the ways we do things. Kollmayer and colleagues (2018) described a series of studies showing ways parents reinforced gender stereotypic roles in their children, even when they expressed non-gender stereotyped views of gender roles. In one study, fathers of three- and four-year-old daughters more closely monitored their children navigating an obstacle course than did fathers of sons. The authors suggest this could encourage risk taking in boys, whereas girls may avoid more physically risky activities as a result. In another, parents of three- to six-year-olds who had identified their views of gender roles as egalitarian nonetheless preferred gender stereotyped toys (i.e. toys linked to competition, aggression and construction for boys; and nurturance, attractiveness and beauty for girls).

Gender stereotypes tend to be strongest in children at pre-school age, reducing by the end of primary school, at age 12 (Kanka et al., 2019). However, there is some evidence that gender stereotypes become more rigid again in early adolescence, as teens develop their identity (Matlin, 2004), and skills and attitudes developed in earlier years may influence choices individuals make later in their schooling. A third study asked parents of Year 8 (13–14-year-old) students to rate their ability to study various subjects. STEM subjects were likely to be rated as less suited to their daughter's skills, while languages and teacher training subjects tended to be seen as less suited to their son's skills (Kollmayer et al., 2018). Research on STEM choices is discussed further later in this section on gender.

At the same time, and in a reminder that very few characteristics have purely genetic or environmental origins, Hines (2015) reported a range of studies from Japan, the US and Europe that showed effects of androgen (a male hormone) on play preferences. These studies found that girls with a particular condition that resulted in high levels of androgen exposure before birth were reported by their parents, by themselves and/or by researchers' observations to engage in more male-typical play (e.g. preferring to play with cars, trucks and weapons rather than dolls and tea sets; to engage in rough-and-tumble play; and to play with boys).

The pressures of gender identity

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 (e.g. 'We're not going to play with the girls, are we?'), show prejudice against children of the other sex (e.g. '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. However, this pressure may be felt differently by boys and girls. In an Australian study, adolescent boys reported felt pressure from their peers, parents and selves to conform to same gender (i.e. stereotypically male) behaviour relating to appearance, activity and friend choice; and avoid other gender (i.e. stereotypically female) behaviours. Adolescent girls reported felt pressure to conform to other gender (i.e. stereotypically male) behaviour. Adolescents who identified with their gender group were more likely to report that they felt pressure to conform to its stereotypical behaviours, while those who identified less strongly with their gender group, or identified with the other gender group, reported higher levels of felt pressure to conform to other gender behaviour (Jackson & Bussey, 2020). This has implications for adolescent mental health, particularly for those who may be gender diverse, as is discussed in the next section. **CASE STUDY 11.2** is about a student who has experienced this kind of pressure to be 'normal' from his peers.

CASE STUDY 11.2

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[s] 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: Being normal is the only way to be: adolescent perspectives on gender and school by Wayne Martino and Maria Pallotta-Chiarolli, University of New South Wales Press, 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 behaviours were targeted? What impact did it have on the students' behaviour?

2 What role can teachers and schools play in minimising harassment, and broadening ideas of what is 'normal' for boys and girls?

Gender and sexual diversity

As **CASE STUDY 11.2** implies, students whose identity varies from that of the stereotypical male or female can be the targets of peer policing of behaviour, as they challenge ideas of what is 'normal'. As adolescents explore their gender identity, conflicts may also arise for those who are transgender or gender diverse, although some transgender and gender diverse students also report support from their peers as a protective factor in the face of verbal or physical abuse (Jones et al., 2016). Jones and colleagues (2016) found participating in activism for gender and sexual diversity to have positive effects on wellbeing for the transgender and gender diverse young people they surveyed, even when the activism was minimal, as in liking a Facebook post, or signing a petition.

Identifying as different to the norm can have effects on self-esteem and other aspects of mental health, involving distress, particularly in a homophobic setting (Willis, 2012). Responses of others are likely to form at least part of the cause of these emotional effects. Jones and colleagues' (2016) study found as many as 65 per cent of their respondents had experienced verbal abuse, and 21 per cent had been physically abused as a result of their gender identity. A large study of 14- to 25-year-olds in Australia who identified as trans or gender diverse found common experience of peer rejection (89%); issues at school, university or TAFE (79%); and bullying (74%). Those who had self-harmed, or who had attempted suicide, had a 95 per cent chance of having experienced issues within an education setting (Strauss et al., 2020). Support of the wellbeing and mental health of gender and sexually diverse young people at school is an important implication of these findings.

Gender issues in schools

Gender difference in schooling has been addressed in Australia, New Zealand and many other western countries since midway through the last century – with first girls' and then boys' underperformance the focus (Hadjar et al., 2014). However, with the emergence of more complex models of development such as Bronfenbrenner's, developmental psychologists increasingly caution that focusing on a single characteristic such as gender as an influence on education can be misleading (Overton & Molenaar, 2015). Instead, gender is recognised as one of several individual factors that interact with aspects of environment in development, resulting in different outcomes for particular groups of girls or boys, in specific areas. For example, Elder and colleagues (1985) found that economic difficulties during the Great Depression influenced fathers' behaviour towards their daughters more than towards their sons (with fathers more likely to reject daughters), but also, that attractive daughters were less harshly treated – so neither the economic difficulty nor gender alone was the influence.

Gender differences in mathematics and language skills

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 2015 PISA tests show that it varies from one country to another, with boys performing better than girls in 20 countries (and in most of these cases, the difference was small), girls performing better than boys in four countries, and no difference in 48 countries (Organisation for Economic Co-operation and Development [OECD], 2016b). In Australia there was no significant difference in boys' and girls' mathematical literacy scores, while in New Zealand, there was a small difference in favour of boys (ACER, 2016; May et al., 2016). This data, as well as findings from studies comparing testing or experimental conditions, suggests contextual effects on gender differences in mathematics performance.

In regard to language skills, a study by the OECD found that girls' average reading literacy scores in 2015 were significantly higher than boys' in all countries (OECD, 2016b). In Australia and New Zealand, there were quite large differences, with girls' reading literacy scores equivalent to being approximately one year of schooling ahead of boys' (ACER, 2016). An analysis of NAPLAN writing results in Australia over a seven-year period showed the average gender gap growing with students' age, from the equivalent of eight months difference in learning in Year 3, to two years difference in Year 9 (Thomas, 2020). Once again, these differences refer to averages, and there is considerable overlap in the distributions (see **FIGURE 11.6**).

Boys and girls are more alike than unalike in both reading and mathematics performance, although what contributes to that performance may vary. In Australian students' 2012 PISA results, for example, 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); these might be factors to consider if we are to address performance differences as well as the drops in performance that were observed in the 2012, 2015 and 2018 tests. We return to Bronfenbrenner's theory, and the importance of proximal processes in learning and development – ongoing, repeated interactions between students and their teachers, peers, as well as symbols like numbers and letters that happen in classrooms. Our learning and teaching processes are worth examining for how we can best turn around these gender gaps, and build the

skills of both boys and girls in varying sociocultural contexts. Darling-Hammond and colleagues (2020) have suggested some principles that provide guidelines from research.

STEM participation and gender

Participation in STEM education and occupations has shown stronger involvement of males than females across the world, with gender equality identified as one of the OECD's sustainable development goals (UNESCO, 2017). In Australia, young men were four times more likely than women to choose maths-intensive university degrees, which was related to expectation of having a maths-intensive career at age 15, confidence in mathematics ability at school, and Year 12 subject selection (Law, 2019). UNESCO (2017) reported research showing that these differences are not a result of ability differences, nor biological differences between boys and girls.

However, girls are not underrepresented in all STEM fields. Wegemer and Eccles (2019) cited a range of research showing that girls are well represented in health, biological and medical sciences, and less likely to participate in mathematics, physics, engineering and computer sciences. They have shown that differences in participation in various STEM courses and careers reflect differences in choices made in considering careers, as much as they do past achievement or self-concept about ability. Values of altruism, beliefs about various careers and gender identity that links femininity to working with people and masculinity to working with things underpin these choices for girls, so that the bases of people's choices are complex. Guo and colleagues (2018) suggested that STEM courses could be taken up by more girls and women by making the social benefits of mathematics, physics, engineering and computer science clear, as well as opportunities for collaboration and making a difference to society within such fields.

In another study highlighting the role of gender identity, Kessels and colleagues (2014) argued that the small ability differences between boys and girls in reading or mathematics mask larger effects on subject choices, motivation and engagement that may be influenced by gender identity. For example, they argued that mathematics and science being stereotyped as 'male' subjects may lead girls not to engage in these subjects as they don't see them as fitting their gender identity. In support of this theory, in the 2015 PISA tests, Australian boys were more likely than girls to be interested in and enjoy science, and to have self-efficacy in science. They were also four times more likely than girls to expect to work in a science-related field. This is despite no significant difference being found between boys' and girls' science literacy (ACER, 2016).

Similarly, Kessels et al. suggested that some boys may perceive that showing effort and engagement at school is feminine, and so does not fit with their male gender identity. Lam et al. (2016) reported similar gender differences in secondary school engagement in 12 countries in Asia, Europe and North America, with boys consistently showing lower levels of engagement than girls. A study by King (2016) provided a possible means by which this operates, that relates to Kessels and colleagues' theory. Surveying students in the Philippines, King found that boys were more likely to perceive their friends to have negative attitudes towards school, and that this was related to their own level of disaffection with school, which was greater in boys than in girls.

It is important in all of this to remember that such studies report on mean differences, and so do not reflect the broad differences that exist within groups of boys and girls (see **CLASSROOM LINKS 11.1** and discussion below).

CLASSROOM LINKS 11.1

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 achieve more highly in literacy than boys', are typically reporting a difference in the mean or average score. Note in **FIGURE 11.6**, however, the size of this difference between means (the black arrow) compared with the difference within each group (the blue and orange arrows). The overlap in the two curves also represents the large numbers of boys and girls who are alike on a particular measure.

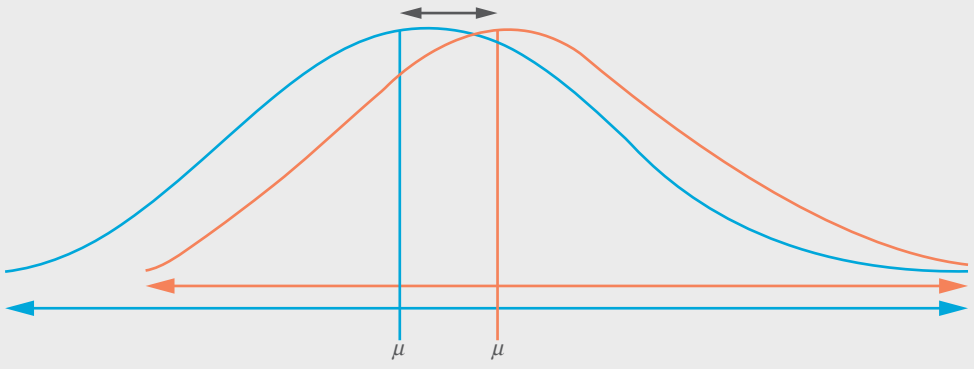


FIGURE 11.6 The difference within each group of boys or girls (the arrows at the base of the diagram) is greater than the difference between the groups' means (the arrow at the top of the diagram). What does this imply for our understanding of individual differences and group differences?

As well as means, it can be helpful to look at the variability in scores within a particular group. For example, 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, 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.

Another way to look at differences between groups is with effect size, which typically divides the mean difference by the spread of scores or standard deviation (this technique is known as Cohen's *d*; there are also alternative ways to calculate effect size. See Del Giudice [2019] for discussion of the various techniques in relation to sex differences). Effect size pays attention to the degree of overlap between the two groups. A large effect size, or *d*, of 1.6, as is found for men's and women's heights, for example, can be interpreted as being able to predict gender with 78 per cent accuracy from a person's height (Del Giudice et al., 2019). The sizes of differences reported above are typically considerably smaller than this, indicating greater overlap. Effect sizes are also discussed in relation to teaching and learning in **CHAPTER 1**, where we cited Hattie (2009), who reported an average effect size of 0.4 for any teaching intervention – but note that the meaning of effect sizes varies depending on the variable being studied, and the context of the study.

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. **IMPLICATIONS FOR EDUCATORS 11.1** gives some suggestions for inclusive teaching practices that are relevant to the gender issues discussed in this section.

IMPLICATIONS FOR EDUCATORS 11.1

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.

Particular groups of boys and girls appear to be especially 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.

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.

11.3 Ethnicity, language and culture

There are many different conceptions of the term 'culture', and its definition has been widely debated. The multicultural nature of Australian and New Zealand society means that people living in both countries are aware of others who have a cultural background different from their own, and so sometimes think of culture as something exotic. 'Culture', however, is something that defines all of us, shaping our view of the world and the ways in which we think and behave. It is much more than the visible, tangible signs we sometimes think of as cultural markers, such as dances, language, costumes and food. In fact, culture tends to reside in facets of ourselves of which we are largely unconscious, such as habitual ways of thinking, speaking and acting.

ethnicity
Membership of a group according to race, nationality or religious background

Ethnicity is a term sometimes used interchangeably with 'culture'; however, it is just one source of culture. It refers to a group of people with a common race, nationality or religious background. In Australia and New Zealand, people commonly refer to being of Aboriginal, Torres Strait Islander, Māori, Anglo-Australian, Samoan, Tongan, Lebanese, Chinese, Vietnamese, Greek or Sudanese background, among many others. These all refer to *ethnicity*.

culture
Systems of knowledge, beliefs, values and behaviour shared by a group of people

In this text, **culture** refers to the systems of knowledge, beliefs, values and behaviour shared by a group of people. It is shared by members of a group because of their shared history, and because they identify themselves as members of that group. Culture is a good example of ways that the macrosystem (i.e. cultural beliefs and practices), microsystem (i.e. interactions between individuals) and the individual are interrelated. Kitayama and Uskul (2011) argued that through our cultural practices, culture is 'embrained' as particular neural pathways are strengthened with regular use. This makes cultural 'ways of doing' automatic and seamless. The sharing of cultural understandings between members of a group is important because of the ways in which these understandings help group members to interpret one another's behaviour and decide how to behave. Here we see the importance of proximal processes once again – those regular, repeated interactions of an individual with other people, objects and symbols in their environment. Culture is learnt, transmitted and constructed by each of us. Just as in other aspects of development, we are active in making sense of the world around us (i.e. constructing culture) from our experiences.

socialisation
The passing of cultural beliefs, knowledge, values and behaviour among members of a group

Socialisation of individuals is the process of ensuring that cultural meanings are shared – passing down culture from one generation to the next, and passing culture among individuals. It is a constant process in which we are all involved, but education plays a particularly strong role. We are involved in the socialisation of one another (i.e. transmitting culture) by the ways in which we interact. For example, when I take a step back, I signal that the person I am speaking with is standing too close, thus socialising them in a cultural understanding about personal space. In school, encouraging children to ask questions socialises them in a cultural understanding about knowledge and the nature of learning. The constant process of socialisation means that culture is not static, but rather is dynamic and continually being reconstructed by its members. Hence culture is an example of the macrosystem influencing development through all the other context systems as it shapes 'ways of doing and being'.

Cultural differences can exist not only between people of different ethnic backgrounds, but also between those of different social classes and different genders. The culture of a school can differ from the home cultures of many of its students, presenting a challenge for students who have to move between cultures as they move from home to school and back again.

There is overlap, too, between various cultures within a society, partly because of the movement of people between cultural settings. This overlap means that cultural variation exists

within, as well as across, particular groups. In this chapter, we see numerous examples of such variation as we examine the large groupings of social class, gender and indigeneity in Australia and New Zealand.

Language and culture

One of the main ways in which culture is transmitted is through language. In **CHAPTER 3**, we discussed Vygotsky's description of language as a cultural tool, socialising children in the society's ways of thinking about the world. This happens through the words and phrases used, as well as in less obvious ways.

Like culture, any language has visible and hidden characteristics; the visible features are the vocabulary and grammar. Less visible are the **sociolinguistic features of language**; that is, conventions about language use, such as how and of whom questions are asked, use of eye contact, what can be spoken about, how adults and children interact, turn-taking in conversation, and how topics are organised. Both visible and invisible sets of language features are important to its task of expressing culture.

sociolinguistic features of language
Cultural conventions directing the use of language

The importance of language in culture has several implications in the classroom:

- Using and supporting students' first language in the classroom conveys respect for students' culture and ethnic identity. Two-way learning, described later in this chapter, is an approach seeking to integrate Aboriginal students' languages with Standard Australian English in the classroom. *Te reo* Māori immersion schools likewise support *te reo* Māori, either as the child's first language or as a bilingual language.
- Some students may share some or all of the visible features of English, while having very different rules about how it is used. Later in this chapter, we discuss Aboriginal English, which is an example of a dialect of English with quite different vocabulary, phonology, syntax and pragmatics to Standard Australian English.
- Teachers' and others' awareness of and, where possible, use of students' sociolinguistic conventions can minimise miscommunication in the classroom.
- Teaching English as an additional language or dialect (EAL/D) involves more than teaching the visible features of English; it is also important to make explicit the invisible rules for using English in western settings, such as schools.

As you read the remainder of this section, look for examples of sociolinguistic conventions that are linked to cultural beliefs about knowledge and learning, some of which can cause misunderstanding and even conflict in the classroom.

Culture and beliefs about knowledge and learning

As we saw in **CHAPTER 9**, cultures differ in their understanding of intelligence and what constitutes intelligent behaviour. Differences also exist in definitions of knowledge and learning. Such differences are more than ideas: they relate to ways of behaving, parents' goals for their children and child-rearing practices. Students arrive at school with understandings about knowledge and learning, and behaviours relating to these understandings, which may match the understandings of the school to varying degrees.

hidden curriculum
Understandings, values and attitudes that are implicit in school structures and in the way material is taught

Teachers and schools typically transmit the beliefs of the mainstream culture, in what is sometimes referred to as the **hidden curriculum**. This is transmitted in a number of ways. In a now classic study, Mehan (1979) described how teachers control classroom interaction, so that students' ability to communicate their knowledge appropriately (raising your hand if

FIGURE 11.7 Students understanding the implicit rules of the classroom, like raising their hand to answer a question, is an important aspect of academic success

iStock.com/OwenPrice

you want to give the answer; listening and not interrupting when the teacher is instructing) is just as important to academic success as the knowledge itself (see **FIGURE 11.7**). Students who do not know the implicit rules of interaction of the classroom, or whose own styles of interaction are not recognised by the teacher, may miss out.

Practices such as assessment and reporting influence students' and society's learning priorities and attitudes. Crouzevialle and Darnon (2019) showed how goals of competitive performance (i.e. wanting to out-do other students) favoured students of higher social class over lower-class students, whereas mastery goals (i.e. wanting to master the task) favoured students of lower social class. Social class is addressed later in this chapter; it often overlaps with particular ethnicities in Australia and New Zealand. Performance and mastery goals are addressed in **CHAPTER 8**.

Teaching resources, such as textbooks, also contain implicit and explicit messages. A history of Australia or New Zealand that gave a limited place to women and people not of Anglo-Celtic background would relay messages about the relative importance of women and men, and of particular ethnic groups in the society and in society's formation.

Individualism and collectivism

In cultural psychology, the concepts of *individualism* and *collectivism* are one way in which different cultural orientations have been described. Cultures that have *individualist* orientations tend to emphasise individual responsibility and choice, and independence as a goal of development. Valued traits may include creativity, curiosity, assertiveness and self-esteem. Western Anglo cultures tend to have this individualist orientation. Cultures described as *collectivist* tend to emphasise social relationships and responsibilities, and interdependence as a goal of development. Valued traits may include social responsibility, honesty, respect for elders and loyalty to family. Some Aboriginal and Torres Strait Islander groups, Māori and Polynesian groups, and some Asian groups are described as collectivist. It is important to recognise, however, that cultures are dynamic, and that, particularly in multicultural societies like Australia, there will be variability in the strength of individualist or collectivist orientations from one family to another, and from one individual to another within a family. For example, children may be more collectivist than their teachers, but more individualist than their parents. It appears that formal education contributes to the strengthening of individualism around the world (Greenfield, 2009). At the same time, as we saw in Module II, formal education in Australia and New Zealand has taken on more social pedagogies, such as cooperative and collaborative learning, and classrooms being viewed as communities of learners, which illustrates how boundaries between individualist and collectivist cultures are fluid rather than fixed, as is indicated by the dotted line in **TABLE 11.1**. Individuals may also show varying strength of individual or collective orientation at different times, or in different domains (Greenfield et al., 2006).

TABLE 11.1 Contrasting pathways of learning and development

Domain	Individualistic pathway	Collectivistic/sociocentric pathway
Ethnotheory	Independence, individual success	Interdependence, group or family success
Valued intelligence	Cognitive, academic, scientific	Social, relational
Valued knowledge	Physical world, factual knowledge	Social world, narrative knowledge
Models of learning	Independent, active participation, praise	Working in groups, observation, criticism
Communication	Speaking, self-expression	Comprehending, speech that is respectful to authority
Material world	Personal ownership, sharing by choice	Shared use, responsibility to share

Source: Rothstein-Fisch et al., 2010.

Nonetheless, these two concepts can be a helpful way to understand that others may see the world differently, and value things differently. Greenfield and colleagues (2006) highlighted some of the misunderstandings and conflicts that can arise in schools when people from individualist and collectivist cultures meet, and the difficulties that this can present for children trying to navigate two different orientations. See **TABLE 11.1** for an overview of the differences. Four possible sites of difference are:

- *Individual achievement* – emphasising or encouraging individual achievement may be seen as devaluing cooperation and responsibilities to the group. In a study of school conferences (i.e. parent–teacher meetings) between immigrant Latino parents and their children's schoolteachers, the parents were uncomfortable when teachers praised a child's individual achievement, but felt more comfortable when this achievement could be related to helping other family members, such as reading to siblings (Greenfield et al., 2000).
- *Written knowledge* – learning through written texts is a particularly western experience. In other societies, knowledge is seen as residing with people, and this is an important connector between people of different generations. To have knowledge based in an object, such as a book, may be seen as disrupting the fabric of society. In addition, differences in the value of writing may require school procedures to be reconsidered. Greenfield and colleagues (2006) give the example of a child asked to pass on a message to the school from his parents. As the message was given orally, it was not accepted by the school, who wanted a signed note from the parents.
- *Object knowledge* – western individualist cultures emphasise decontextualised object knowledge, while social relations and social knowledge are valued by collectivist cultures. Thus, children from these cultures may tend to think and talk about objects or events in the context of social interactions, whereas in western schools we tend to expect students to talk about an object or event in objective (i.e. scientific) terms. Consider how this might influence a science lesson, in which the teacher expects the students to discuss the features and habitat of Australian mammals, while the students discuss what they did when 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.

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 and colleagues (2003) described a number of ways in which this can happen for Aboriginal students in mainstream Australian classrooms. In western 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 a younger person is interacting with someone who is older or 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 western groups, asking questions is an important learning strategy, and is also interpreted by teachers as demonstrating curiosity and active engagement with the topic. However, in some other cultures, 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 whereby knowledge is 'owned' by individuals, and some kinds of knowledge should not be shared with certain groups (e.g. in mixed gender company), so asking questions is seen as 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 Aboriginal interaction. Malcolm and colleagues (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 (i.e. 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.

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 (e.g. 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 and Torres Strait Islander peoples 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, Torres Strait Islander or Māori 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 more than others. The Australian Human Rights Commission (n.d.) reports that one in five culturally and linguistically diverse **(CALD)** Australians have been the subject of 'race-hate talk' (e.g. being called names, racially slurred or verbally abused). It also reports that one in 20 CALD Australians have experienced physical violence related to their race. And three out of four Aboriginal and Torres Strait Islander Australians experience racism regularly (All Together Now, n.d.).

CALD
Culturally and linguistically diverse

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.

Racism affects child development directly and indirectly (Center on the Developing Child, 2020). It contributes to stress that builds up to influence the developing brain, with ongoing effects on learning, health and behaviour (see **CHAPTER 2** for a related discussion of epigenetics). Stress from everyday racism can also influence parenting through its effects on parents' mental health (Center on the Developing Child, 2020; Trent et al., 2019).

Strategies for teaching

Teachers can intervene by taking racist behaviour (e.g. 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?' Some resources for teaching about racism can be found in the online materials, appendix 11.1.

GO FURTHER
Appendix 11.1 Resources for addressing racism

As **FIGURE 11.8** illustrates (see page 460), 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.

Promoting equity

On their own, multicultural curriculum programs have not been shown to be particularly effective in reducing prejudice (Pfeifer et al., 2007). We also need to consider the makeup 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 and colleagues (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 (i.e. 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; whereas 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 Alice Springs (Mparntwe) Education Declaration (Council of Australian Governments, 2019) is that Australian schooling promotes equity and excellence, and it includes commitments to:

- provide all students with access to high-quality education that is inclusive and free from any form of discrimination
- ensure that learning is built on and includes local, regional and national cultural knowledge and experience of Aboriginal and Torres Strait Islander peoples and work in partnership with local communities
- ensure that schooling promotes and contributes to a socially cohesive society that values, respects and appreciates different points of view and cultural, social, linguistic and religious diversity.

Alice Springs (Mparntwe) Education Declaration by the Council of Australian Governments Education Council, © Education Services Australia 2019.

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 11.8** suggests a number of dimensions of effective multicultural education.

Culture, advantage and disadvantage

LBOTE
Language background other than English

The beliefs and practices of some cultural groups fit well with our schooling system, while those of other groups do not. In 2016, 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, 2017), and Ho reported the majority of these students to be of Asian backgrounds, such as China, Korea, India and South or South-east Asia. Ho pointed out that the majority of these students are in the top quarter of socioeconomic advantage, and so likely to have parents with educational experience and values. However, this success occurs despite considerable barriers to success that have been linked to poorer academic outcomes, such as CALD, difference in culture, and disrupted early education for those who were refugees. Other migrant groups do not show the same results, even though the barriers to success could be said to be similar. This is an example of the complex interconnections between the various contexts of development that were discussed in the section on Bronfenbrenner's theory. 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 in the following section.

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 US, 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 group
A group of people who have at some point been brought into a society against their will

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 a 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 US, Australia and New Zealand may even be seen as 'becoming White', and as rejecting indigenous culture and identity. The case study in **CASE STUDY 11.3** demonstrates one effect of this rejection. These beliefs can be reinforced by schools that communicate low expectations of indigenous students, either verbally or through their practices (Stronger Smarter Institute, 2014); particularly when the school is strongly tied to non-indigenous culture. Partington and Beresford (2012) 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. The Stronger Smarter Institute, which seeks to build high-expectations relationships in schools, and the Australian Indigenous Mentoring Experience (AIME) program, which has the motto 'Indigenous equals success', are two programs that seek to shift the mindset that succeeding at school is not possible for Aboriginal people without foregoing their culture. Ka Hikitia, the Māori educational strategy in New Zealand, also seeks to change ideas of Māori students as having a 'deficit' in relation to education (i.e. deficit discourses) that may be communicated through policy or media (Berryman & Eley, 2017). Further strategies for including Aboriginal, Torres Strait Islander and Māori students in school learning are discussed later in this chapter.

CASE STUDY 11.3

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,Y., Konigsberg, P., & Collard, G. (2005). PEN150, Teaching students who speak Aboriginal English, Primary English Teaching Association Australia (PETAA), Newtown.

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 (2015) proposed a model of multicultural education that identified the range of aspects to be considered (see **FIGURE 11.8**). Teaching style, implicit beliefs, content, students' attitudes, and the school culture and structure all must be addressed. **IMPLICATIONS FOR EDUCATORS 11.2** gives some strategies for educators to use in multicultural classrooms.

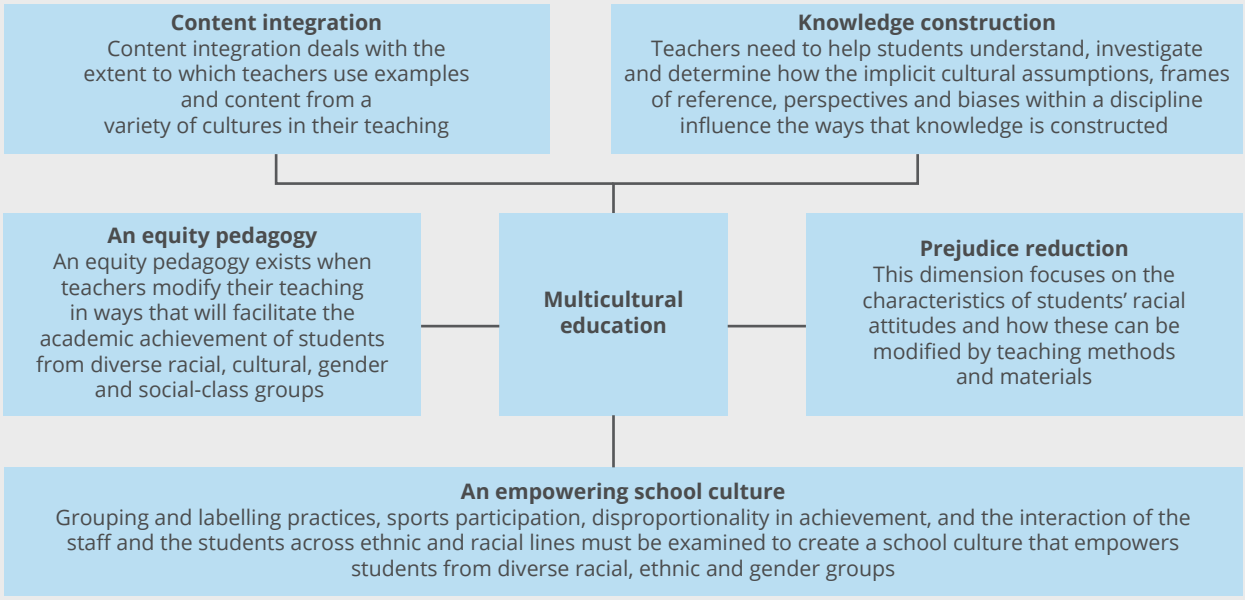


FIGURE 11.8 The dimensions of multicultural education

IMPLICATIONS FOR EDUCATORS 11.2

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; and 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.

11.4 Threatening environments

Residents in Australia and New Zealand experience natural disasters, such as fires, floods, cyclones 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, 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). There may also be uncertainty about the future, as well as stress response to 'triggering' events, such as smoke coming out of a powerplant following a bushfire, or a rain shower following a flood triggering feelings of panic. With multiple experiences of trauma, effects increase. Media can contribute to trauma as well, with children re-exposed to the situations they encountered, or exposed to continuing threats. Young children have difficulty realising that repeated broadcasts of an event are not new threats (Masten et al., 2015). As we saw above and in **CHAPTER 2**, experience of chronic stress can have long-term effects on children's brain development; response to stress later in life; their physical health, including the immune system; and on mental health and self-regulation of thoughts and behaviour. Externalising behaviours, such as aggression, may be seen, particularly if there is aggression in the community, school or family (Boxer et al., 2013). Other outcomes may be anxiety, depression, post-traumatic stress, developmental regression, and substance abuse in adolescents (Osofsky & Osofsky, 2018).

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 greater skills in cognitive and emotional regulation.

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 therefore important when disasters occur.
- *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 to play are among 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, principles of intervention, including promoting a sense of safety, self- and group efficacy, calm, connectedness and hope are agreed in the research to be of benefit in promoting resilience. Even though the care provided by parents is key to this, adults such as teachers or childcare providers also have important roles to play in the context of disaster.

Osofsky and Osofsky (2018) argued that strengthening community social supports is important to children's and adolescents' recovery from disasters. One example they suggest is to integrate mental health services into schools. Masten and colleagues (2015) reported that for refugee children, the quality of the environment in which children recover from trauma (remembering that environments include families and schools as well as wider communities and societies) is key to the ways that risk and resilience factors operate. The work on risk and resilience discussed in **CHAPTER 2**, and later in this chapter, is also relevant here.

11.5 Socioeconomic status (SES)

socioeconomic status (SES)
A measure of social and economic position in society; typically a combination of education, occupation and income

The education systems in Australia and New Zealand are based on equality of access for all, but there are differences in the educational outcomes of people from different social classes in Australia and New Zealand. The OECD reports a general association between **socioeconomic status (SES)** and educational outcomes in many, but not all OECD countries, with Australia and New Zealand among the countries that show this inequity. In both Australia and New Zealand the effect of SES on achievement is higher than the OECD average, although this has improved over time (May et al., 2016). In Australia, the difference between the scores of advantaged and disadvantaged students is equivalent to approximately three years of schooling, and appears at all age levels from the early years through to post school (Lamb et al., 2015). A New Zealand Education Review Office (ERO) report identified a number of schools with lower SES families whose students achieve strong outcomes (ERO, 2014a); refer to **RESEARCH LINKS 11.2** for a summary of the common features of these schools.

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. It is typically identified by individuals' rating of their own social position on a scale. A related term is SES – typically a combined measure of parents' education, occupation and income, though each of these factors contributes separately to children's outcomes (Duncan et al., 2015). This recognises that there are economic, social and educational factors affecting parenting, and that parents' situations affect children's outcomes. **RESEARCH LINKS 11.2** describes a research project that compared family life across class groups.

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, who

RESEARCH LINKS 11.2

How schools work with social class to shape culture and self

Stephens and colleagues (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 develops in response to middle-class contexts, and a 'hard-interdependent' self that develops in response to working-class contexts (see **FIGURE 11.9**). 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-interdependent 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 and colleagues described 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 need help, as they are less likely to ask for it; and they may not

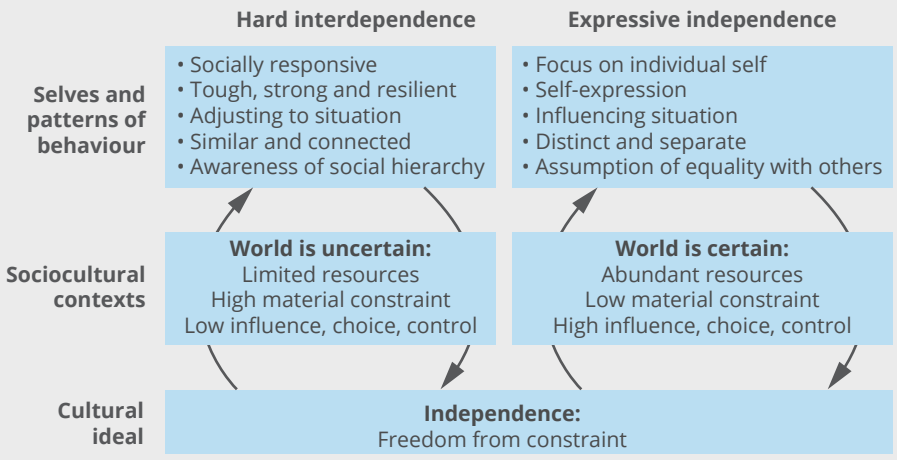


FIGURE 11.9 US social class culture cycles

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identify them as 'good students' as they do not 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 and colleagues report that working-class children experience more stress at school, and there is a link between SES and academic performance in the US (as well as in Australia and New Zealand). Working-class children who are educated in working-class schools may also have restricted avenues available for work.

Stephens and colleagues 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 and colleagues' theory is based on data from the US. 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. As described earlier, 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?

are likely to share your SES; 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. Schools can make a difference. A meta-analysis of studies examining effects of interventions on the reading and mathematics achievement of low SES students identified tutoring, 'feedback and progress monitoring' (i.e. providing teachers with feedback about their students' progress) and cooperative learning as interventions that had significant effects (Dietrichson et al., 2017).

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; for example, poor nutrition or multiple stressors 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 (Duncan et al., 2015).

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. In 2005 the Brotherhood of St Laurence reported that more than 10 per cent of Australian children lived in relative poverty (i.e. their family income was less than 50 per cent of the median income [OECD, 2019]). The Australian Council of Social Service, drawing on ABS data, reported that this figure

had risen to 17.5 per cent by 2017 (Davidson et al., 2020). The proportion in New Zealand is similar, with a figure of 17 per cent reported in an annual report to the children's commissioner, although the figure rises to 23 per cent after housing costs (Duncanson et al., 2019). Particular groups are disproportionately affected, with Aboriginal children in Australia, and Māori and Pasifika children in New Zealand more likely to live in poverty than other ethnic groups (Davidson et al., 2020; Duncanson et al., 2019). 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 and 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. 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 another important factor in the high rates of otitis media and associated deafness in Aboriginal children (DeLacy et al., 2020). Osher and colleagues (2020) showed how learning and health are connected in development, and that both are influenced by children's interactions with those in their microsystems, such as parents, carers and teachers. In fact, positive parenting can overcome negative environmental effects (Fishbein et al., 2019), although this solution is not simple. As we shall see below, environmental conditions associated with poverty affect parenting behaviour.

Parenting factors

The pathways by which poverty influences children's learning and development reflect the importance Bronfenbrenner placed on proximal processes, in the extent to which everyday interactions of parents with their children are able to support their development. In a review of research, Dreyer (2019) identified two pathways by which poverty influences children's outcomes. One is through parent investment – the resources of time or money that are available to the child. With limited income available, children may miss out on books, toys, trips to a stimulating place like a zoo or museum, and may not receive quality health or childcare. Parents may also not have the time available to play and talk with their children, or to take them to the library or a museum. The processes children experience are limited by their poverty. The second pathway focuses on parent stress and operates in combination with the first. Here, parental stresses linked to poverty may include financial stress, living in a dangerous neighbourhood, marital stress and insecure housing. These stressors influence parents' interactions with their children and directly affect children's health and learning, as we saw in the discussion of epigenetics in **CHAPTER 2**.

Adverse childhood experiences

Adverse childhood experiences (ACEs) include traumatic events such as childhood abuse, death of a parent and witnessing of domestic violence, as well as divorce, neighbourhood violence and racism. Parental mental health, drug and alcohol problems can also contribute to trauma for children. These events may be experienced by children irrespective of SES, but 40 per cent of children in poverty experience two or more ACEs in addition to poverty itself (Dreyer, 2019). Developmental trauma affects the child's development and health throughout their lives. As we saw in **CHAPTER 2**, chronic stress affects development of the brain, with children who have experienced threat showing structural neurological effects that influence emotional regulation. Children who experience adversity also have neurological effects, affecting emotional regulation

by a different neurological pathway (McLaughlin et al., 2019). The two can act together for children in poverty who also experience ACEs. Trauma does not only affect emotions, however; it influences all aspects of the child, including learning, memory, behaviour, health and relationships (Australian Childhood Foundation, 2010). For example, children from trauma backgrounds can be *hyperaroused*, constantly alert to potential threats, and may respond in extreme ways to relatively minor incidents. This can leave them unable to concentrate, attend, reason or remember complex instructions. Other children can be *hypoaroused*, withdrawn and disconnected from what is happening around them, with similar effects on memory and attention. Either of these situations affects learning, behaviour and relationships. The feeling of loss of control can be overwhelming and sometimes results in controlling behaviours, or refusal to follow directions (Fecser, 2015). While maintaining high expectations and clear and consistent boundaries for behaviour are important (as discussed in **CHAPTER 14**), understanding children's behaviour in terms of their trauma experiences is also important to supporting and including them in the classroom. Management approaches based on reward and punishment can heighten the sense of threat and escalate conflict, generating a fight-or-flight response (Fecser, 2015).

Fortunately, sensitive and responsive caring can assist in rewiring the brain. One acknowledgement of this has been development of principles of trauma-informed practice in schools and childcare settings (Thomas et al., 2019), discussed in **IMPLICATIONS FOR EDUCATORS 11.3**.

IMPLICATIONS FOR EDUCATORS 11.3

Trauma-informed practice in schools

The Australian Childhood Foundation (2010) developed a set of principles of trauma-informed practice in schools. Schools such as Berry Street in Victoria have also developed education models that are responsive to students with trauma backgrounds. Acknowledging the neurological effects of trauma and the chronic stress that can follow it, trauma-informed practice seeks to calm students and help them to regulate their responses to stress to a point where their frontal cortex is available for thinking, logic and learning. The principles are interconnected and use the acronym SPACE:

- Staged – just as development builds on previous growth and skills, teaching of skills for self-regulation and children's understanding need to build up in stages, with regular rehearsal to support their integration into children's everyday use.
- Predictable – safety can be provided through predictability. Providing visual cues for what is happening next can help build predictability into the classroom day as well as helping with memory difficulties. Routines and discussing what is coming up are helpful. Whole school consistent approaches help in unpredictable spaces, such as the playground, or when the regular teacher is away.
- Adaptive – being adaptable applies to teachers' understanding of children's behaviour, and to our responses to it, with multiple explanations of behaviour and variable behaviour plans particularly important for children from trauma backgrounds. Teaching self-regulation strategies, such as breathing, meditation and focusing, can help children to cope when the unexpected threatens their sense of safety.
- Connected – for children, safe relationships are an important context for being able to think clearly, and to learn social and emotional skills. Teachers' positive relationships with children support a sense of belonging, and are built by calm responses to misbehaviour, consistency, genuineness, warmth and empathy. Building skills for positive relationships is important to help children form and sustain peer relationships as well.
- Enabled – understanding self is important to identity, and talking about emotions helps students to identify, manage and respond to them. Therapeutic life story work (Rose, 2017) is used at Berry Street schools to help students to make sense of their past and how it is affecting the present, and then to move on constructively. These conversations happen over the long term, in planned and ad hoc ways. Times for working, playing, talking and listening one-to-one alongside a student can provide these opportunities.

Adapted from Australian Childhood Foundation, 2010; Centre for Education Statistics and Evaluation, NSW, 2020.

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 2**. 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. 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. **Resilience** was described in **CHAPTER 2** as positive adjustment despite the experience of significant risk or adversity. What provides an individual or a family with resilience can change over time, and exists in balance with risk factors, which can also vary over time. Adoption of developmental systems theories, introduced in **CHAPTER 2**, has led to theories of resilience that also describe interaction between multiple systems, such as the individual, family, school and community (Masten, 2018). Return to **CHAPTER 2** for discussion of various individual, family and community contributions to resilience, which work together. The online materials, appendix 11.2 contain a link to 'the resilience game', an interactive tool for thinking about risk and resilience.

risk factor
A factor associated with negative outcomes

resilience
Positive adjustment despite the experience of significant risk or adversity

GO FURTHER
Appendix 11.2 The resilience game

THINK ABOUT

How could schools contribute to resilience factors in students considered as being 'at risk'? Consider the interaction between individual, family and community protective contributions in your response.

Bronfenbrenner's theory at work

You may recall from the start of the chapter that Bronfenbrenner proposed that development occurs through the interaction of characteristics of person, process, context and time. We have seen in this section that the characteristics of the individual child and their environments may help particular children to be resilient to risk factors of poverty, and cause others to have heightened sensitivity to these risks. Poverty potentially influences parenting through the stresses that may arise from the neighbourhood (i.e. the mesosystem) and workplace (i.e. the exosystem). These then affect the processes the child encounters at home and at school (i.e. microsystems), and ultimately shape their development. The child's responses to stresses and trauma influence those microsystems as well, and parents' and carers' responses to them, so that the effect on their development is ongoing and recursive.

As the child develops over time, particular factors have greater or lesser impact; for example, increases in income show a strong impact in early childhood and a lesser impact in adolescence (Duncan et al., 2015). The cultures in which the child and family exist (i.e. the macrosystem) play a role in influencing both beliefs and behaviours, guiding responses to events and processes encountered by the child at home and at school, as we saw in **RESEARCH LINKS 11.2**. Hence simple correlations between SES and academic achievement such as are seen in Australia and New Zealand need to be interpreted as outcomes of complex interactions between these various systems, rather than as one thing influencing the other (i.e. SES influencing academic achievement). This also implies that there are multiple points at which educational disadvantage can be addressed; for example, the OECD (2016a) suggested school-, family- and community-based strategies, as well as strategies to support individual students as ways of addressing low performance, should be utilised. In the following section, we focus on school factors that can influence children's educational outcomes.

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.

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 **RESEARCH LINKS 11.3** indicates.

Amount of schooling is related to income, health, cognitive and social outcomes (Borgonovi & Pokropek, 2016). 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 found that children from disadvantaged families were indeed more likely to miss out on early childhood education, particularly Aboriginal and Torres Strait Islander children and those with language backgrounds other than English (Baxter & Hand, 2013). This unequal access was confirmed in a large study of the effectiveness of early childhood education and care programs (Tayler, 2016). In New Zealand, participation rates are higher overall, but still lower for Māori and Pasifika groups (New Zealand Ministry of Education, 2011). Worldwide, *quality* preschool experience has been linked to social and academic skills, and better school outcomes (e.g. McCoy et al., 2019).

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.

CLASSROOM LINKS 11.2 shows 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.

CLASSROOM LINKS 11.2

Home and school interactions that contribute to educational disadvantage

- *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 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.

Adapted from: Comber et al., 2005; Eckermann, 1994; Heath, 1983.

ACTIVITIES

Can you think of other ways in which differences between home and school could influence students' educational outcomes?

RESEARCH LINKS 11.3 summarises the findings of a New Zealand report of the practices of schools that achieve high academic outcomes for students from low-SES families.

RESEARCH LINKS 11.3

Towards equitable outcomes in secondary schools: good practice

New Zealand's Education Review Office 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 teenagers' learning.
- Responses to problems were solution-focused and restorative practices were used.

Students

- Students were confident young adults, and helped to take responsibility for themselves and their learning.
- Students were active members of their school community.

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Learning

- Carefully selected and adapted professional learning advanced the schools' strategic plans.
- 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.

Adapted from 'Towards equitable outcomes in secondary schools: Good practice', Education Review Office, May 2014, © Crown copyright 2014. Licensed under Creative Commons Attribution 3.0 New Zealand licence.

ACTIVITIES

1 Explore some of the school case studies presented in the Education Review Office 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?

11.6 Inclusive education for Aboriginal and Torres Strait Islander students in Australia, and Māori students in New Zealand

In this section we focus on First Nations people in Australia and in New Zealand, to examine how a number of sociocultural factors work together to influence educational outcomes. We will see influences at every level of Bronfenbrenner's systems, from the macrosystem (culture and society) to exosystem (e.g. parents' experiences of education), mesosystem (the important role of the school's interaction with the community) and microsystem (parent–child and teacher–child interactions), as well as important individual differences that interact with these systems. Aboriginal and Torres Strait Islander students in Australia and Māori students in New Zealand are in quite different educational contexts, yet some of the processes they experience, and strategies that have been employed to improve outcomes, have commonalities. A focus on students in these groups who have experienced success can both remind us of the variation within groups, and help to identify strategies that can be used in schools to support educational success for all students.

Aboriginal and Torres Strait Islanders: diversity and commonality

Aboriginal peoples 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 Aboriginal and Torres Strait Islander peoples. 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; and 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. Listening to the needs and concerns of a particular community is important in ensuring a match between community and school goals.

Notwithstanding the diversity among Aboriginal peoples and Torres Strait Islanders, there are commonalities among the different peoples in terms of values, ways of relating and ways of using language (Bourke et al., 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 (Australian Curriculum, Assessment and Reporting Authority, 2017). What makes the difference, and how can schools ensure that all students have an opportunity to succeed in school?

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 Aboriginal and Torres Strait Islander 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. Sarra (2011) described Aboriginal peoples as having ideas of pride, respect, strong sense of family, and multiple ways of connecting to people, Country (the land and sea) and spirituality, as well as to knowledge in their identity, and argued that teachers can usefully adopt these approaches with their students.

Holding high expectations of students is an important contributor to achievement (Centre for Education Statistics and Evaluation, NSW, 2020). The Stronger Smarter Institute (Sarra et al., 2018) argued that high expectations need to be not just held, but acted out in educational relationships. This includes relationships with other teachers as well as community, families and students, in which any 'deficit discourse' – ideas that Aboriginal and Torres Strait Islander students are somehow lacking, unable to achieve at the level of other students, or to blame for low outcomes – should be challenged. This does not mean ignoring difficulties, with 'firm and fair' dialogue described in the Stronger Smarter approach. It also calls for teachers to unpack and become aware of their unspoken assumptions, to engage in challenging conversations and to create spaces for dialogue. With this framework of trust as a background, it is argued that students can feel confident to be both strong in their culture, and smart in learning, disrupting any 'resistance' beliefs that may have arisen. The Stronger Smarter Institute's approach is outlined in **CLASSROOM LINKS 11.3**. Links to programs celebrating the success of First Nations peoples can be found in the online materials, in Appendix 11.3.

GO FURTHER

Appendix 11.3 Celebrating success of Aboriginal, Torres Strait Islander and Maori students

CLASSROOM LINKS 11.3

Stronger Smarter approach

The Stronger Smarter Institute, founded by Dr Chris Sarra, aims to support improved outcomes in Aboriginal and Torres Strait Islander education in Australia by transforming schools, and through them, the identities held and assigned to Aboriginal and Torres Strait Islander peoples. Starting at Cherbourg State School, Sarra demonstrated that Aboriginal students could be 'strong and smart', contesting deficit stereotypes of Aboriginality, and showing how schools can support positive Aboriginal identity (Sarra, 2018).

There are four key cornerstones underpinning the approach:

- educators take *responsibility for change* and challenge the status quo
- teachers use *strength-based approaches* that work with Aboriginal and Torres Strait Islander identities rather than ignoring or changing them; and offer a pathway to success
- embrace a positive Aboriginal and Torres Strait Islander student identity as *strong and smart*
- build *high expectations relationships*.

These cornerstones inform a number of metastrategies, as seen in the grey circle in **FIGURE 11.10**. Influences are felt in the interconnecting personal, school and community spheres.

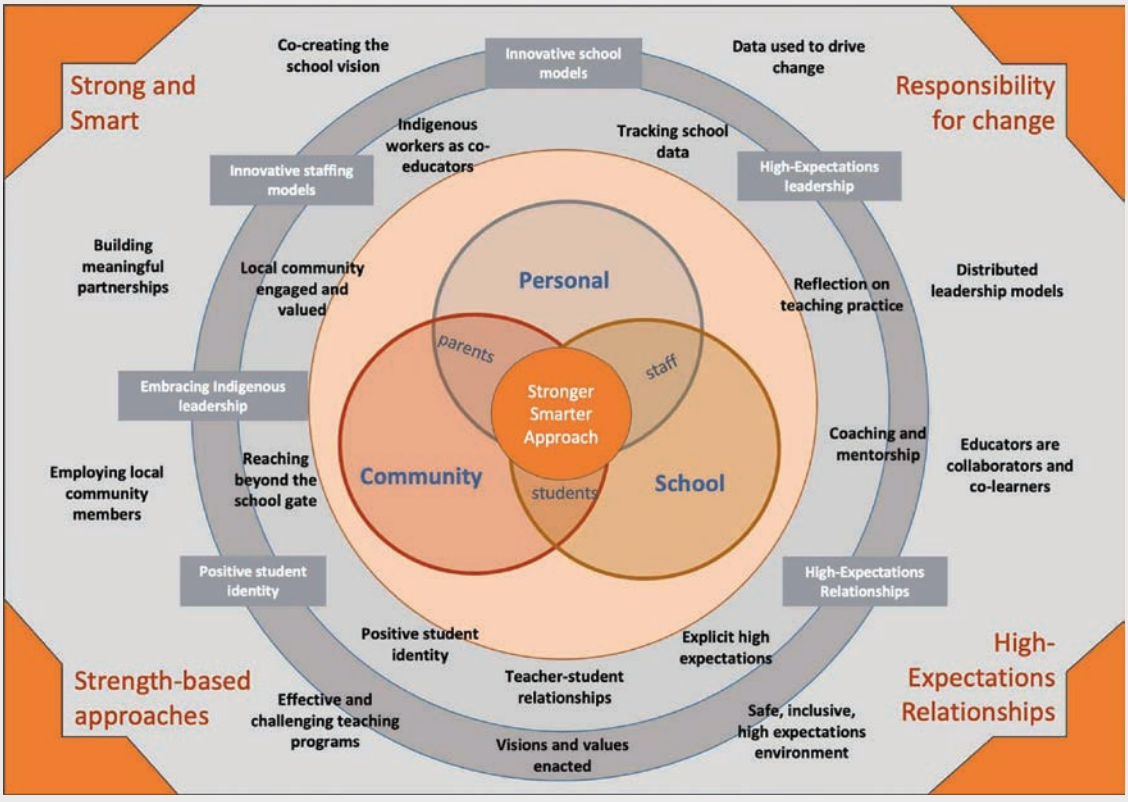


FIGURE 11.10 The Stronger Smarter Approach Framework

Source: Stronger Smarter Institute, 2020, https://strongersmarter.com.au/stronger-smarter-approach

ACTIVITIES

1 Explore the components of the approach through the position papers at the Stronger Smarter website.

2 What components of this approach could you take on at a school as a pre-service teacher? As a teacher?

Drawing on Aboriginal and Torres Strait Islander ways of learning

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.

Independence

The child-rearing style of many Aboriginal and Torres Strait Islander communities affords children greater independence and responsibility than that which typically results from western child-rearing practices (see **FIGURE 11.11**). Lohoar and colleagues (2014) reported that this develops important life skills, such as assessing risk, and caring for and protecting one another. 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 and colleagues (2003) suggested that teachers build on the child-caring role often taken by older children by involving these students in peer mentoring.

FIGURE 11.11 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

Interdependence

Lohoar and colleagues (2014) identified a number of characteristics of traditional Aboriginal and Torres Strait Islander culture that are protective of children's development, and recommended that these strengths could be drawn on by those working with these communities. In particular, interdependence and community involvement in childrearing are features of the Aboriginal kinship system that could be acknowledged and built on by schools. Western notions of family as parents and their children neglect these wider relationships that contribute to the development and care of Aboriginal children in traditional culture, and in many groups today. Through community ties, Lohoar et al. reported that children are kept safe and receive support, and parents receive support for parenting in practical, social and psychological ways. One parent they interviewed summarised this:

> My parents died young, so, I became my brother's mum and dad and I also brought up my own kids as well, but I didn't do that myself, I had my godparents, I had my Uncles and Aunties, so everything I did with them, it was screened before I could even set it out to them. It meant that if anything happened within the families, my Uncle would talk to this Auntie and say, this one needs some help. This person here would be best to talk to them, you know, there's certain people that would know who was best to talk to them and that word would go out. This is just what happened to my family to this day.
>
> Parent, Qld, in Lohoar et al., 2014, p. 5.

Supporting first language

Supporting learners' first language is important for their identity, learning of an additional language, such as Standard Australian English, and learning at school. As their first language, Aboriginal and Torres Strait Islanders may speak a traditional language; a creole, developed from mixing traditional language/s and English; a form of **Aboriginal English**, or **Standard Australian English (SAE)**. 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 SAE (Bourke et al., 2000).

Aboriginal English
A dialect distinct from Standard Australian English, and having many variants in different Aboriginal communities

Standard Australian English (SAE)
The English dialect of mainstream Australia, and 'standard' in the sense that it does not vary significantly across communities

Aboriginal and Torres Strait languages are under severe threat in Australia, with remote areas of Western Australia, South Australia, Northern Territory and Cape York the only places where children speak one of 13 traditional languages. This compares with over 300 languages spoken in 1788. Many more older people speak a wider variety of traditional Aboriginal and/or Torres Strait languages, but without these languages being learnt at home, they are severely endangered (Simpson et al., 2019). Nonetheless, Aboriginal and Torres Strait Islanders have been 'reawakening' their traditional languages, which has strengthened the use of these languages in urban and regional areas across Australia. The Australian Curriculum's framework for Aboriginal Languages and Torres Strait Islander Languages (ACARA, 2015) seeks to support this work in schools. It has pathways for first language learners, second language learners and language revival learners.

Distinguishing Aboriginal English from Standard Australian English (SAE)

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 worldview. 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 and colleagues (1999) described how students' use of Aboriginal English may not be accepted in the classroom. 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 Eagleson and colleagues:

> [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.
>
> Eagleson, R. D., Kaldor, S., & Malcolm, I. G. (1982). English and the Aboriginal child. Curriculum Development Centre. p. 237

The concern of Aboriginal parents about 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 as to 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 (Disbray, 2015).

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 do not know and need to master in SAE
- *cultivate* Aboriginal ways of learning, tapping into the strengths of Aboriginal learning preferences and culture.

See the Western Australian Department of Education's 'Tracks to Two-Way Learning' resource for more on this approach.

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 Country, 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

Ideally, Aboriginal and Torres Strait Islander children would be taught by members of their own communities. In practice, Australia has few fully trained Aboriginal and/or Torres Strait Islander teachers relative to the size of the Aboriginal and Torres Strait Islander school population. Inviting elders and other community members into the school to work alongside teachers has been an approach adopted by a number of schools. Some schools set up 'yarning circles' with community members to listen and learn about what is working well, what can be improved, and gain advice from the community for educators. Other schools invite Elders into the school to advise on educational programs, provide cultural expertise and build connections. This opportunity to draw upon lived experience avoids Aboriginal education being limited to stereotypes, or tokenistic links to Aboriginal and Torres Strait Islander culture (Turner et al., 2017). More informally, teachers can build positive relationships with their community in everyday ways at local netball or football games and cultural events, as well as when they encounter students and their family members in the local community (Stronger Smarter Institute, 2017).

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 and Torres Strait Islander children in the school. Listening to the local community is important for understanding the cultures students bring with them to school, and for developing partnerships with them.

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. Bat and colleagues (2014) described a 'both-ways' pedagogy developed at the Batchelor Institute of Indigenous Tertiary Education in the Northern Territory (see **FIGURE 11.12**). Important principles of the approach include a shared learning journey for all participants; student-centredness that grounds learning in students' actual life experiences; and strengthening of Indigenous identity by working with each learner's ways of learning and knowledge.

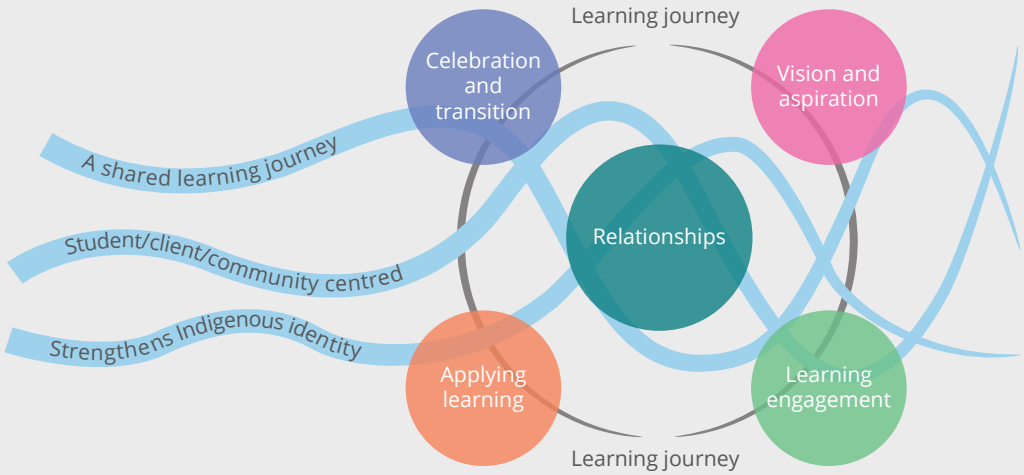


FIGURE 11.12 Both-ways learning journey map

Adapted with permission from Claire Kilgarriff

Cultural ways of learning

Harrison and colleagues (2019) reviewed literature on curriculum and learning in Aboriginal and Torres Strait Islander education and concluded that recognising Aboriginal and Torres Strait Islander knowledges and ways of learning is key to these students' engagement and achievement. Rather than taking an 'inclusion' approach, which aims to acknowledge First Nation views within the existing curriculum, they argued this would involve using the first language, ways of thinking about knowledge, and ways of seeing the world of the particular group being taught. For example, Harrison describes various ways of learning on, and from, Country that are linked to Aboriginal and Torres Strait Islander groups' beliefs and practices, contrasting this with learning (and being assessed) about a set curriculum in the western approach. One potential challenge is to assume that there is one dominant cultural group and language within the school or classroom, which may be the case in remote communities, but is less likely to be so in a city classroom. The both-ways pedagogy described above avoids this difficulty. **CLASSROOM LINKS 11.4** gives an example of how one region of NSW has adopted a pedagogy that fits local ways of knowing and doing.

CLASSROOM LINKS 11.4

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 continued 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 8Ways website:

> 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: 8ways, n.d., https://www.8ways.online/about

ACTIVITIES

1 Explore the 8ways pedagogy through links online. How has it been applied in different contexts?

2 See also Yunkaporta and Kirby (2011) for a discussion of the model by some of those involved in its development.

In another example of considering cultural ways of learning, 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).

A further 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 in these cultures.

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 beliefs about knowledge and learning approaches of the individual children in their classes and the communities where they teach.

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 and Torres Strait Islander peoples in Australia, and this difference flows through to the education system. Māori and Pacific students make up 30 per cent of all New Zealand students, and are forecast to make up as much as 48 per cent of the student population by the 2030s (New Zealand Ministry of Education, 2018). 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 was refreshed and extended in 2018 as part of the 30-year education vision. Committed to using and acting on evidence of what makes the greatest difference for and with Māori education, and increasing *whānau* (extended family) and *iwi* (tribe) authority and involvement in education, the current strategy has five focus areas:

1 Use of 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. The aim is to achieve this by engaging students in quality learning and teaching experiences, ensuring all stakeholders have high expectations for Māori learners, and all collaborate to achieve these outcomes.
4 In tertiary education, ensuring that Māori students succeed at higher levels.
5 Organisational success is needed to support Māori educational success, through leadership, evidence-based practice and effective action.

In addition, Tātaiako, 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 *whānau*, *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 *whānau* is affirmed.
- *Ako:* taking responsibility for their own learning and that of Māori learners.

New Zealand Ministry of Education. (2011). Ministry of Education position paper: Assessment. www.minedu.govt.nz/theMinistry/PublicationsAndResources/AssessmentPositionPaper.aspx

The approach has had some success in lifting Māori students' educational outcomes, although results such as the PISA reports (OECD, 2016b) show more work needs to be done to achieve equality (Berryman et al., 2016). This is what the third phase of Ka Hikitia seeks to do. While the first phase focused on classroom pedagogy, and the second phase on school leadership, in the third phase a still broader approach is planned that will involve system-wide change, introducing community-led, *iwi* (tribal)-led, and Māori-led models of education. Berryman and Eley (2017) argued that rather than focusing on 'gaps' between outcomes, which results in deficit discourses that accept failure as inevitable for some groups, schools can address 'critical contexts for change', using the Māori concept of '*ako*' as learners and teachers working together to construct new skills, knowledge and understandings, with:

1 culturally responsive and relational practices across the school
2 deliberate professional acts applied with adaptive expertise, and
3 powerful home–school collaborations.

Berryman, M., & Eley, E. (2017), pp. 99–112.

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).

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. Ongoing community involvement ensures that these elements are dynamic, adapt to changes in the aspirations, preferences and practices of the community, and resist stereotyping (**FIGURE 11.13**).

Alamy Stock Photo/David Hancock

FIGURE 11.13 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 et al. (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. **CLASSROOM LINKS 11.5** gives further details of the project.

CLASSROOM LINKS 11.5

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 and colleagues (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 and colleagues (2006) evaluated the effects of the program, and found that Māori students are able to thrive at school when they have good relationships with their teachers. 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, 49 schools were involved. Five of the seven successful schools identified in **RESEARCH LINKS 11.3** had been involved in this program, and named it as a significant factor in their students' success.

Adapted from Bishop et al., 2003; Bishop et al., 2014.

ACTIVITIES

1 Read about the current activities of the project and view videos of teacher and school stories at https://tekotahitanga.tki.org.nz.
2 Check the Effective Teaching Profile online 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?

Bishop et al. (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 the most important. Ka Hikitia, the Māori Education Strategy (New Zealand Ministry of Education, 2008), highlights a shift from 'It's their problem' approaches to a 'Māori potential' approach. 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 also apply to other groups. The full effective teacher profile can be found in the online materials, appendix 11.4.

GO FURTHER
Appendix 11.4 Effective Teaching Profile

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

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 **IMPLICATIONS FOR EDUCATORS 11.4**.

IMPLICATIONS FOR EDUCATORS 11.4

Strategies for enhancing Māori, Aboriginal and Torres Strait Islander 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. In addition:

- Know your students, and build on their strengths and learning preferences.
- Include Māori, Aboriginal and/or Torres Strait Islander perspectives in mainstream curricula.
- Teach students how to recognise and dismantle stereotypes.
- Consider using cooperative methods (e.g. '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.

11.7 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. Bronfenbrenner's theory, introduced early in the chapter, provided a picture of the complex interaction between individual, contextual, process and time factors that contribute to the differences we see in students' outcomes. Development and learning always occur within a context which influences them through that context's effects on relationships and practices (Goodnow & Lawrence, 2015). The proximal processes we introduced at the start of the chapter include teachers' relationships with students, and so awareness of your own context, the context of your students, and the effect of these on your relationships and practices is vitally important. 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. Successful programs that work with Aboriginal and Torres Strait Islander as well as Māori students (and we would argue, *all* students) focus on relationships.

STUDY TOOLS

Chapter review

11.1 Bronfenbrenner's bioecological model of development

- 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.

11.2 Gender

- 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.

11.3 Ethnicity, language and 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.

11.4 Threatening environments

- An example of Bronfenbrenner's notion of time affecting development is seen in the experience of threatening events such as fires, earthquakes or war. These can affect students directly and also indirectly through their impact on parenting quality or stress.
- Protective factors support a sense of safety and connectedness, control and agency, self regulation and optimistic thinking. Teachers and schools can play an important role in promoting psychological factors, relationships, acculturation and functional environments for children and families.

11.5 Socioeconomic status (SES)

- 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.

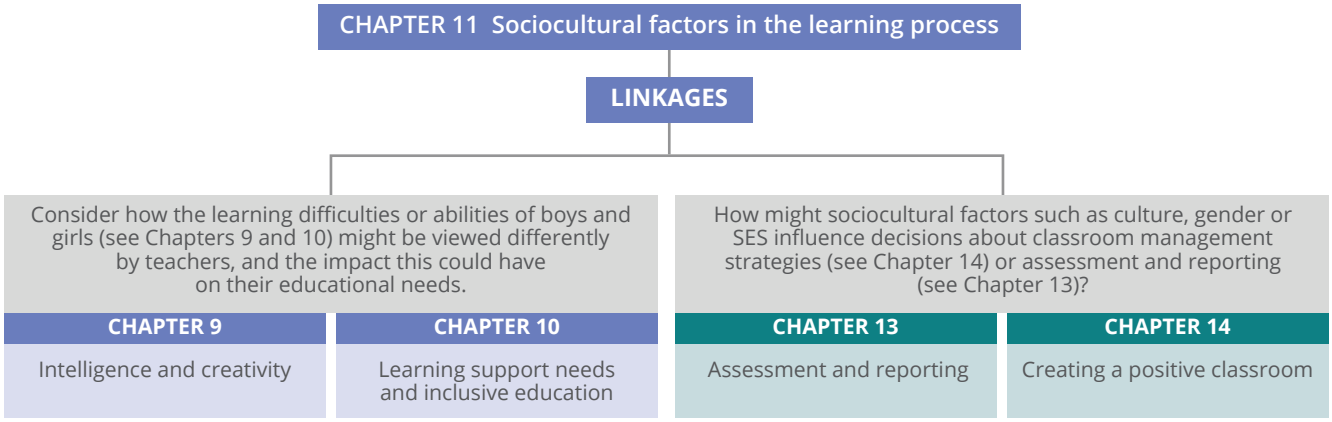
11.6 Inclusive education for Aboriginal and Torres Strait Islander students in Australia, and Māori students in New Zealand

- 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 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.

Putting it together

Making links between 'sociocultural factors in the learning process' and material in other chapters



Questions and activities for self-assessment and discussion

1 Reflect on your own schooling. Identify influences on your development from each of Bronfenbrenner's *process*, *person*, *context* and *time*. When considering context, try to describe examples of how the different contextual systems interacted to influence your experience.

2 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		

3 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?

4 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?

5 Consider a 'proximal process' you have observed or experienced. Describe how it was reciprocal, became progressively more complex, and how it contributed to development of the individual/s involved. Reflect on how you could ensure your interactions with students are 'proximal processes'.

6 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.
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 'high-expectations relationships'? How could you ensure that you hold them for *all* of your students, irrespective of background?
9 What are four key principles of effective practice for Aboriginal and Torres Strait Islander students? How are they the same and/or different from principles of effective practice for New Zealand Māori students? For other groups?
10 Identify three key insights you have gained from reading this chapter. How will they influence your practice as an educator?

Further research

Go further

The online appendices contain additional material that you should refer to when reading this chapter. The appendices available for this chapter are:

- Appendix 11.1 Resources for addressing racism
- Appendix 11.2 The resilience game
- Appendix 11.3 Celebrating success of Aboriginal, Torres Strait Islander and Māori students
- Appendix 11.4 Effective teacher profile.

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):

Asia Education Foundation, support for studies of Asia in Australian schools: https://www.asiaeducation.edu.au

Australian Government Department of Education Skills and Employment: https://www.dese.gov.au

Education Council, Australia: http://www.educationcouncil.edu.au

Face the Facts (Human Rights Commission): https://humanrights.gov.au/education/face-facts

Narragunnawali: Reconciliation in Education: https://www.narragunnawali.org.au

New Zealand Education Review Office: https://www.ero.govt.nz

New Zealand Ministry of Education: https://education.govt.nz

Racism. No way!: https://racismnoway.com.au/

The Australian Curriculum guidelines: https://www.australiancurriculum.edu.au

Recommended reading

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Putting it together

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, additional learning support needs, and sociocultural background. These topics are ones in which you will be challenged to consider how you will 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.

	Motivation	Intelligence and creativity	
Key ideas or topics	• Motivation • Engagement	• Models of intelligence • Measuring intelligence • Models of creativity • Measuring creativity	
Main theories and theorists	Behavioural approaches: • Reinforcement-praise and extrinsic rewards Social cognitive approaches: • Agency, self-regulation, self-efficacy, goal setting, self-evaluation and social comparison Human needs approaches: • Maslow's hierarchy of human needs and the drive for self-actualisation; Deci and Ryan's self-determination theory and the human need for competence, autonomy and relatedness Cognitive approaches: • Atkinson – achievement motivation; Dweck – implicit beliefs; Weiner – attribution theories • Martin – goal theories; Urdan – classroom goal structures	Intelligence models: • Spearman – *g* • Cattell-Horn-Carroll – general, broad and narrow abilities • Gardner – multiple intelligences • Sternberg – triarchic theory • Emotional intelligence • Measurement: Binet, Wechsler Creativity models: • Models of creative person, process, product, press • Systems models	
Catering for these differences in the inclusive classroom	Motivating students: • Encourage a sense of mastery, positive goal setting and intrinsic motivators • Avoid overuse of external reinforcement and use contingent rewards that are unexpected • Develop tasks that support student self-determination and autonomy • Use feedback that encourages an incremental rather than fixed view of ability (or a growth mindset) Engaging students: • Engagement is multidimensional and can vary from classroom to classroom or subject to subject • Support the cognitive, behavioural and emotional engagement of students with warm teacher–student relationships, firm but supportive and positive classroom discipline, and high expectations of achievement • Give students interesting, important and challenging tasks • Support positive peer relationships	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 Creativity: • Learning environments that are flexible • Learning relationships that are caring, and provide opportunities for collaboration • Activities that support risk taking, and have a balance of structure and freedom	

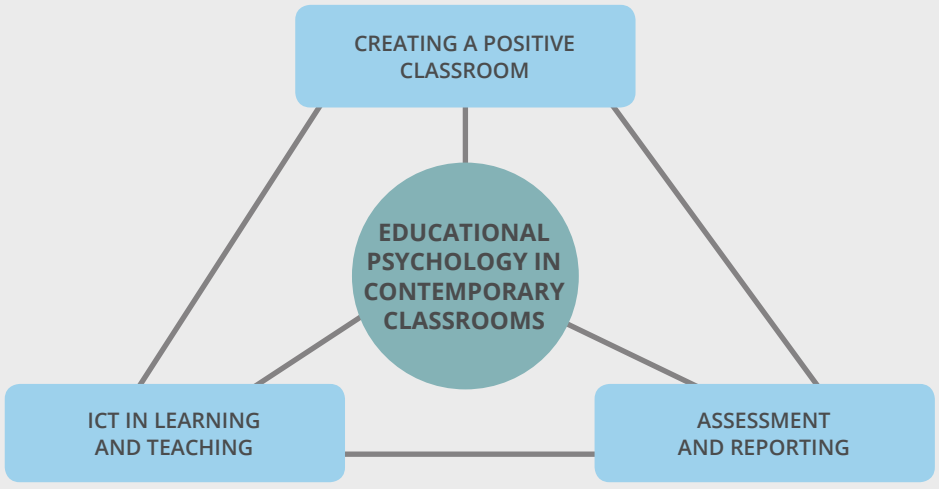
MODULE 11

	Learning support needs	Sociocultural factors
	• Learner diversity • Inclusive education • Disability • Learning support needs • Differentiation	• Culture, language • Gender • Socioeconomic status (SES), poverty • Threatening environments • Aboriginal and Torres Strait Islander students in Australia • Māori students in New Zealand
	Inclusive education: • Educational support provided to allow all students to have their learning needs met within regular school environments	• Bronfenbrenner's bioecological model of development • Explanations of gender difference based on male/female characteristics, culture and school factors
	Acknowledge learner diversity: • Inclusive education involves all learners as participants in the classroom community Learning support needs: • No two learners will have the same learning support needs • Consult and use educational assessments to determine learner support needs Differentiation: • 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 Person-first language: • Remember the child is a person first; they are not defined by their disability or condition; labels can be stigmatising	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 for all Socioeconomic status: • 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 • Develop trusting and egalitarian relationships in which learners and teachers can work together in constructing understandings

MODULE IV

Educational psychology in contemporary classrooms

MODULE CONTENTS



Module IV concept map

Core question: How can educational psychology help us address key learning and teaching issues?

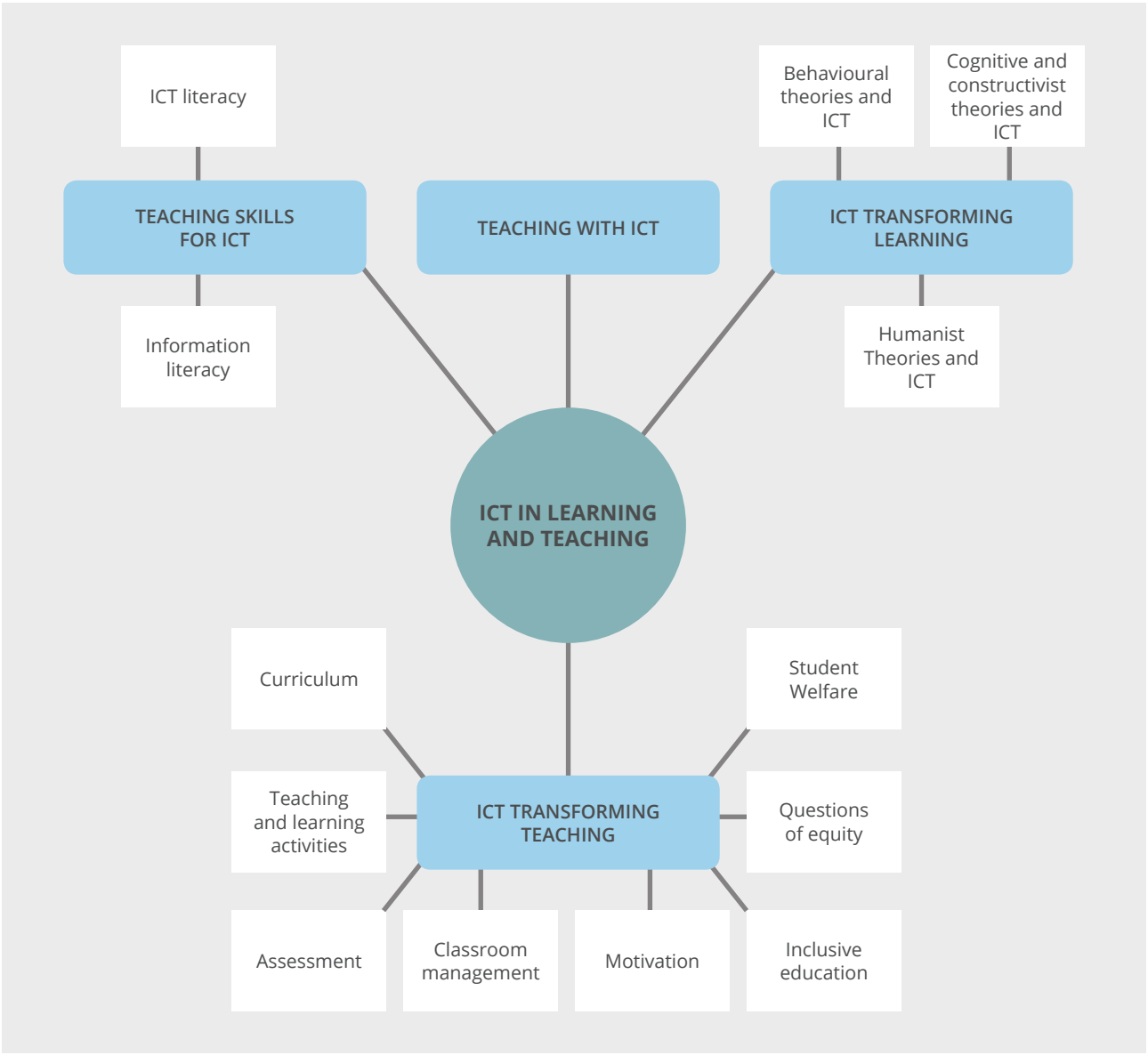
Educational psychology plays a central role in equipping educators to deal with the sorts of issues they confront in the learning environment. This final module considers how the theories and principles of educational psychology can help teachers in the 21st century address three significant areas:

- 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 creating positive learning environments, 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



Chapter 12 concept map

KEY QUESTIONS

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

- How are ICTs integral to learning and teaching in today's classrooms?
- What are some important issues to be aware of when using ICT for educational purposes?
- 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 can ICTs be used to assess and provide feedback to students?
- How can ICTs influence motivation and engagement?
- What are some of the positive and negative implications of ICTs for mental health? How can teachers most effectively support students who are experiencing cyberbullying?
- How could using ICTs contribute to inequities among learners? Share strategies for addressing these in your teaching.
- How can ICTs be used to support students with diverse learning needs?

BOTTLEBRUSH SCHOOL

In response to the COVID-19 pandemic, schools across Australia and New Zealand moved to remote learning for a period of several weeks. This move to remote learning was mandated by governments in an attempt to reduce community transmission of the virus. Teachers in primary and secondary school settings provided learning activities for students to complete at home, often with the assistance of their parents or carers. In most cases, teachers made use of a variety of technological tools in order to facilitate learning and maintain connection with their students. For example, learning programs and resources were distributed to parents and students via email or the schools' learning management system. Synchronous classes were conducted via virtual meeting platforms, such as Microsoft Teams or Zoom. Teachers also recorded video lessons for their students to view in asynchronous lessons. Email and learning management systems were used by students to submit work for their teachers to provide feedback on. During this period of remote learning, technological tools, such as social media and video chat, also allowed students to stay in touch with one another, satisfying their needs for connection with their peers.

For many teachers at Bottlebrush School, these uses of technology were quite different from their usual integration of technology when teaching face-to-face. The use of technology during this period was highly variable, reflecting different teacher ICT skill capacities, student access to ICT resources, and support for ICT use from parents and the wider community. It also became apparent that their students had highly variable technological skills, even within the same class or year group. Teachers found that these differing skill levels influenced the success of remote learning, as some students were unable to access learning resources or engage with them in the intended way. Other students flourished during this time, particularly if they were able to access learning resources or enjoyed learning in a quieter environment or self-directed way. Researchers in Australia and New Zealand are currently investigating the long-term ramifications of this period of remote learning on student learning outcomes.

Introduction

The opening case study highlights an important issue that is apparent when considering how ICT is used in schools – that ICT use in learning and teaching is highly variable. 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.

12.1 ICT in learning and teaching

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 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 97 per cent of Australian households with children under 15 reporting having access to the internet at home (Australian Bureau of Statistics [ABS], 2018). Just under 80 per cent of children in New Zealand also reported having access to the internet when they needed or wanted to, with 17-year-olds reporting greater access than 9-year-olds (Pacheco & Melhuish, 2019). The Alice Springs (Mparntwe) Education Declaration (Education Council, 2019) includes the goal that, as successful lifelong learners, all young Australians 'are productive and informed users of technology as a vehicle for information gathering and sharing, and are able to adapt to emerging technologies into the future' (p. 7). 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 (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2012). Further, ICT knowledge and skills are explicitly addressed in the Australian Curriculum: Digital Technologies (ACARA, 2015). New Zealand's National Curriculum also includes technology as a learning area, in which students develop an understanding of technological practice, technological knowledge and the nature of technology across Years 1 to 10 (New Zealand Ministry of Education, 2018).

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 New Zealand Standards for the Teaching Profession 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.
>
> Australian Institute for Teaching and School Leadership. (2014). Australian professional standards for teachers. www.aitsl.edu.au/australian-professionalstandards-for-teachers/standards/list

> Use an increasing repertoire of teaching strategies, approaches, learning activities, technologies and assessment for learning strategies and modify these in response to the needs of individuals and groups of learners.
>
> New Zealand Education Council. (2017). Our Code Our Standards: Code of Professional Responsibility and Standards for the Teaching Profession. www.educationcouncil.org.nz

Clearly, ICT is an integral aspect of teaching as well as learning, influencing what we teach, how it is taught and aspects of teaching practice, such as engaging students and classroom management.

CLASSROOM LINKS 12.1 describes some ICT applications currently used in e-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 social networking sites, such as Twitter or Facebook, or through your local education department.

CLASSROOM LINKS 12.1

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, ICT allows easy interaction and file sharing between students, and between students and teachers
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 National Digital Learning Resources Network (Australia) has a database of thousands of learning objects that can be accessed by teachers in Australia through Scootle (see links in Activities below) 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
File sharing and collaboration sites	Dropbox and Google Drive are two examples of sites that allow sharing of a range of file types Collaboration can happen both synchronously and asynchronously	Students can collaborate on files together online. The teacher can also contribute, as a member of a learning community. Individuals' contributions to a work can be tracked

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Application (and definition)	Example	Potential benefits
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
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 live interaction with other students or experts from other areas or countries
Blogs and vlogs (web logs and video logs)	Students keep a learning journal in blog form, tracking development of their ideas, and videos integrating work samples or videos 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
Apps	Smartphones and tablets that have a range of internet and other capabilities, such as location services, photography, video or audio recording and virtual or augmented reality, make them potentially powerful tools for learning. Their mobility means that they can be used outside the classroom, while their widespread adoption means they can also be used within it	Learning is integrated with other daily activity. Learning is mobile and accessible – can happen wherever the student is Learners can experience immersive and interactive learning activities

ACTIVITIES

1 Which of these have you used in your learning? Which have you seen used?
2 Add more examples and potential benefits by discussing with your peers their experiences.
3 For further examples, explore the technology-related resources at https://www.scootle.edu.au or https://technology.tki.org.nz.

12.2 Important issues in educational ICT use

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 smartphones. The widespread use of mobile phones and access to the internet 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.

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, 2012).

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 use of ICT and the false assumption that regular technology use is the same as effective use for learning. Patterns of student activity using laptops in classrooms, for example, suggest that students rapidly switch between multiple activities online (Leander, 2007), but doing so is not beneficial for learning (Kirschner & De Bruyckere, 2017). In support of this, Rosen and colleagues (2013) found that high school and university students who switched between tasks regularly were less focused and experienced poorer academic performance. 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 and to critically evaluate the information that they find (Ladbrook & Probert, 2011). 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 1876 teachers and principals in Australia showed that while many identified benefits of using technology in the classroom (e.g. enhancing inquiry-based learning, assessment and homework), these educators held a number of concerns about the impact of technology on student learning (Gonski Institute for Education, 2020). The majority (84%) were concerned about technology as a distractor from learning, and 80 per cent observed students multi-tasking when learning with technology. Further, some teachers reported that some students' technological skills were weak, identifying that many students were passive consumers of online content despite having access to technologies that support creation of content.

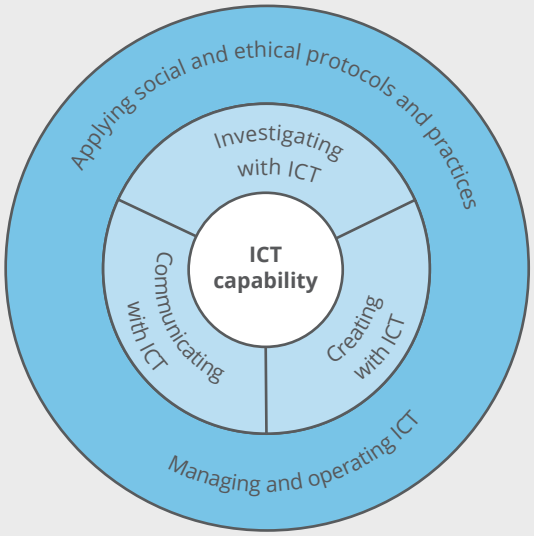

FIGURE 12.1 Elements for ICT capability

A large international study conducted in 2013 also found wide variability in the quality of use of ICT by students in Year 8, with some students showing critical and independent skills in using ICT, while many others did not (Fraillon et al., 2014).

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). 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**.

ICT literacy

The Australian Curriculum identifies ICT literacy 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, 2012). **FIGURE 12.1** 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 ICTs 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. **IMPLICATIONS FOR EDUCATORS 12.1** describes the proficiency levels and some data from the 2017 tests.

IMPLICATIONS FOR EDUCATORS 12.1

Assessment of ICT Literacy

Since 2005, six proficiency levels have been developed and utilised in the National Assessment Program to assess Australian students' ICT literacy. These proficiency levels are mapped to the Digital Technologies curriculum and the ICT general capability of the Australian Curriculum. The six proficiency levels are described below:

Level 6 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.

Level 5 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

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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.

Level 4 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.

Level 3 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.

Level 2 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.

Level 1 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.

Fraillon et al., 2018.

FIGURE 12.2 shows the percentages of Year 6 and 10 students who achieved each of the proficiency levels in the 2017 National Assessment Program. Approximately 54 per cent of Year 6 students achieved the proficient standard (Level 3) or higher for their year group. Similarly, 54 per cent of Year 10 students achieved the proficient standard (Level 4) or higher for their year group.

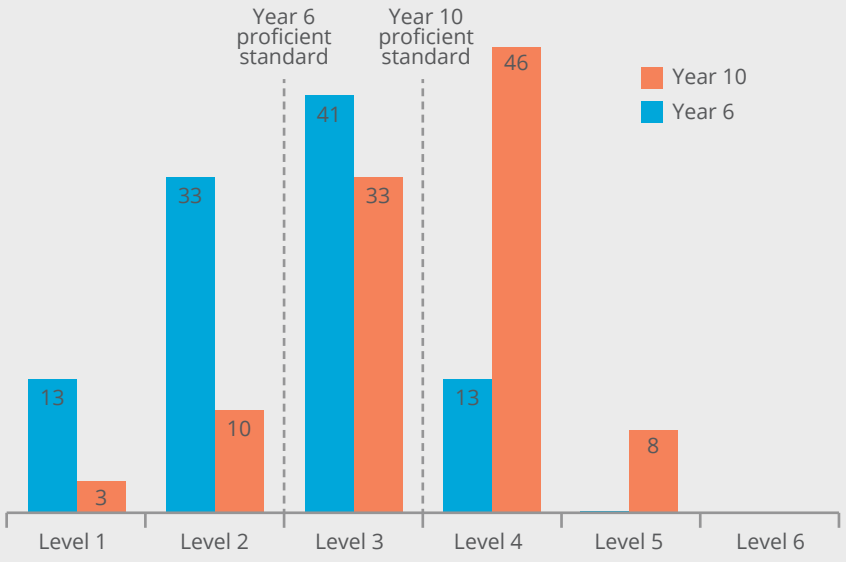


FIGURE 12.2 Percentages of students who achieved each ICT proficiency level in 2017

Source: Fraillon et al., 2018.

Information literacy and ICT literacy

information literacy
The ability to locate, evaluate and use information; it extends beyond technical skills

Information literacy is the ability to locate, evaluate and use information (Laubersheimer et al., 2016). Information literacy involves knowledge and skills; it also includes developing and communicating informed and balanced perspectives (Secker, 2018). 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**). Definitions of ICT literacy typically overlap with this, taking in many of these skills. For example, Fraillon and colleagues (2019) defined computer and information literacy as 'an individual's ability to use computers to investigate, create, and communicate in order to participate effectively at home, at school, in the workplace, and society' (p. 16). The difference is the focus in the latter definition on the use of ICT to achieve information literacy purposes.

THINK ABOUT

How could students' levels of proficiency in ICT be developed in your classroom? For example, what would you need to build into learning activities using ICT?

IMPLICATIONS FOR EDUCATORS 12.2 presents proficiency levels used in the National Assessment Program in Australia for ICT literacy, and the results for the 2017 tests. Levels range

IMPLICATIONS FOR EDUCATORS 12.2

ICT in the classroom

- *Information technologies are tools to enhance learning and teaching* – approach ICTs, such as computers, interactive whiteboards (IWBs), other devices and their apps, as vehicles to promote learning. Do not 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 smartphones 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. Whiteboards can be used powerfully to encourage student interaction. Have 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.

from basic tasks at Level 1, and dependence on the teacher to guide information searches, to quite sophisticated, independent skills such as those associated with Level 6. Many readers of this text, as university students, will recognise that they need skills at Level 6 of ICT literacy. Note that only 54 per cent of Year 6 students and 54 per cent of Year 10 students met or exceeded the proficient standard for their level, and that there was no change in the proportion of students who achieved the proficiency standard between 2017 and 2014 (the last time the National Assessment Program took place). Improvements in ICT literacy are anticipated in the next round of the National Assessment Program, following implementation of the Digital Technologies curriculum and increased integration of the ICT capability in all learning areas (Fraillon et al., 2018).

12.3 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 smartphones, 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. However, Bavelier and colleagues (2010) cautioned that 'technology' cannot be regarded as a single thing. Rather, researchers have looked at various types of technology, and people's particular purposes in using it, in seeking answers to this question.

Mills (2014) reviewed literature examining this question in relation to adolescent brain development, and the effects of use of the internet in particular. Citing longitudinal studies of MRI brain images, she reported that genes have a stronger effect than environmental or behavioural factors, such as internet use, at least in the period between middle childhood and adolescence.

Wilmer and colleagues (2017) reviewed research on smartphone use, and found that there is some evidence for effects of smartphone use on capacity for attention at the time of use; however, long-term effects are less supported by the evidence, with mixed results. There do appear to be effects on memory for events. When smartphones are used, people tend to learn and remember less from the experience. The authors noted that this research, like much of the research on these topics, is in its infancy.

Another hypothesis that has been explored has been the effect of playing video games on particular cognitive skills, and particularly those skills influencing learning, such as perception and attention. For example, Pujol et al. (2016) explored effects of playing action video games on learning capacity in children. Using fMRI images, they found that children who frequently played action video games exhibited improvements in the part of the brain that is associated with being able to acquire new skills with practice. Bediou et al. (2018) conducted a meta-analysis of this research, and found an average positive effect of 0.55 in studies examining the cognitive profile of regular action video players. Intervention studies showed a smaller, but still significant effect size of 0.34, suggesting that playing action video games can, indeed, shape cognition, although the authors caution that their findings show that not all games benefit cognition to the same degree.

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). Consistent with this, Cain and colleagues (2016) found that adolescents in their study who displayed higher levels of media multitasking, also showed weaker performance in working memory (discussed in **CHAPTER 3** as an aspect of executive function that influences cognition and learning), and in academic achievement.

THINK ABOUT

Do these research findings align with your experiences in using these technologies? What might explain any differences?

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 and 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 et al., 2009; Wood et al., 2011). Wood and colleagues (2014) 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 this hypothesis. The use of *textisms* (e.g. acronyms, dropping words and phonetic substitutions) in text messages has also been found to be positively associated with primary school children's grammar skills (van Dijk et al., 2016).

Building cognitive capacity

Johnson (2010) 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 previously, 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 causation, and suggested that there may be a reciprocal relationship between internet use and cognitive capacity; that is, 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 causation; Dye and colleagues (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 and colleagues (2012) developed a series of computer games for children with attention deficit hyperactivity disorder (ADHD) 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. In an experimental study, playing an action video game was shown to improve the reading skills of children with dyslexia (Franceschini et al., 2017). These improvements in reading speed were explained by action video games increasing processing speed, focused attention, and decision-making efficiency. These findings suggest that playing video games can indeed build cognitive capacity, although games in these studies were either explicitly designed or carefully selected to do this, unlike the majority of computer-based games.

12.4 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).

As discussed in the section on learning theories and ICTs that follow, 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.

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 knowledge of how ICT can be used to access and process subject matter, and how ICT can support and enhance learning, are both 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. **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.

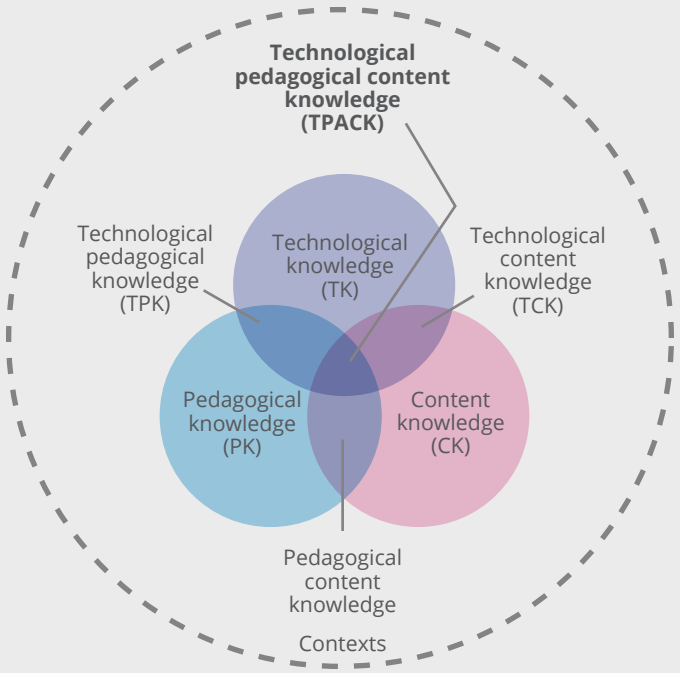


FIGURE 12.3 Technological pedagogical content knowledge

While many teachers use technology to teach subject-specific skills and to access information (Vassallo & Warren, 2018), technology can also be used to transform pedagogy by enabling student access to learning resources. One such approach is the *flipped classroom*, which

involves traditional homework activities being completed during class time while traditional class activities are set for homework (Muir & Geiger, 2016). For example, students are required to access new information before their lesson (e.g. view a video of their teacher explaining a new concept), which then allows class time to be focused on students applying the new information while their teacher is available to provide support and correct misunderstandings (Attard & Holmes, 2019). Technology plays a critical role in flipped classrooms, allowing teachers to record lessons and make these available for students to access outside the classroom.

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 (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 (2009) meta-analyses found that computer use is most effective when a range of teaching strategies is used, and when there are multiple opportunities for learning. While there is extensive variability in how teachers use technology in their classrooms (Attard & Holmes, 2019), research suggests that teachers use more student-centred teaching practices when students have access to ICTs (Inan et al., 2010; Maher & Twining, 2017). 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

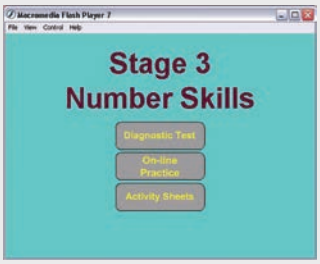
Behaviourists argue that learning takes place through the association of stimulus and response (see **CHAPTER 5**). Learning is defined as mastering subject matter and achieving behavioural objectives. Computers are particularly useful for this purpose. Before the era of personal computers, B. F. Skinner 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 later in this chapter.

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)

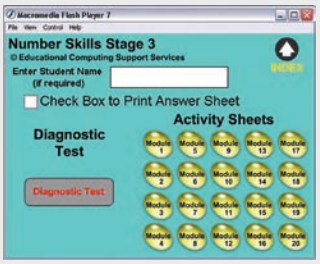
With the computer as tutor, the teaching process is computer-driven, using the following pattern of interaction (see **FIGURE 12.4** for an illustration of this process):

1 The computer presents information.
2 The user is asked to respond to a question or problem.
3 The computer evaluates the user's response using pre-programmed criteria.

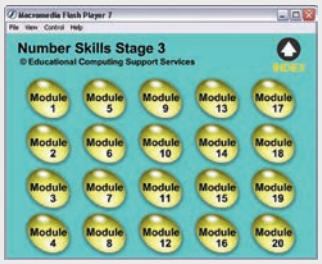
The computer responds to the user (e.g. if the user enters a correct response, the program allows them to move to the next stage – or equivalent – and if responses are inappropriate or incorrect, the computer program may take the user back to repeat an exercise until they are able to provide the correct response). Encouraging and immediate feedback like 'Not quite right, try that once more' helps to maintain learners' motivation and engagement.



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

Source: Krause, R. (2006).

Computer-as-tutor applications

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 12.5**, 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 12.5** illustrates some of the distinctive capabilities of CAI, including that 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

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

Shutterstock.com/Monkey Business Images

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.

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 Switch. 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, Reading Eggs and Mathletics, 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. Crompton and colleagues (2017) reported in a review of research that 40 per cent of mobile learning activities are designed using behavioural principles. They caution that the focus on acquiring knowledge rather than collaborating and creating knowledge makes limited use of the capacity of mobile technologies for supporting learning.

THINK ABOUT

- Can you see any benefits in using computers for drill-and-practice activities in your teaching area?
- What are some of the limitations of using drill-and-practice activities in your teaching area?

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 shares 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 for direct experience that students might not have otherwise.

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 help to engage students (Global Education Centre, 2005). For example, the 'Ollie Saves the Planet' online game is a 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.

VR and AR

Virtual reality (VR) and augmented reality (AR) are increasingly being used in schools to increase the authenticity of learning experiences. VR immerses users in locations and scenarios that would otherwise be inaccessible, such as outer space, underwater environments, landmarks in other countries and historical events. In contrast, AR superimposes a 3D image on the users' view through a smartphone or tablet, and allows them to explore 3D objects. AR is particularly useful for teaching about structures or processes; for example, secondary science students can use AR to investigate cell organelles or the structure of DNA in 3D. While the use of VR headsets in schools was initially restricted due to cost, there are now inexpensive cardboard VR viewers that transform a smartphone into a VR headset (see **FIGURE 12.7**).

Social media

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

FIGURE 12.6 Ollie Saves the Planet – simulation and problem-solving online

FIGURE 12.7 Cardboard virtual reality viewers are an inexpensive way to transform a smartphone into a virtual reality headset for classroom use

Shutterstock.com/Nataliya Dorokhina

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.

Gaming and learning

Computer games are an increasingly important part of the lives of many children, and are another kind of authentic learning, that also draws on other aspects of constructivism. 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 and were played on large video consoles in public game parlours, including Pac-Man, Donkey Kong and Space Invaders. Then the first home-based game machines arrived, such as Sony PlayStation, Nintendo Switch 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 (2008) linked 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 referred 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' – a visual representation of themselves; 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 VI and The Sims 4, 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).

Earlier in the chapter, we discussed research showing links between action video games and development of cognitive skills and learning capacity. Games have also been designed (or adapted) to develop skills and knowledge specific to particular curriculum areas, such as physics (Physics Playground), biology (Crystal Island), mathematics (Mathbreakers) and English (Mars Generation One: Argubot Academy). These are called '**serious games**' in the literature, because of their use for specific educational purposes (Jarvin, 2015).

serious games
Digital games that have been either designed or adapted for specific educational purposes

One assumption about the effectiveness of serious games to benefit students' learning has been their motivational aspect. However, in a meta-analysis of the literature, Wouters and colleagues (2013) found that while serious games were more effective for learning and retaining information than traditional instructional methods, they were not more motivating. It is likely that motivation depends on good game design (just as good pedagogy is required for other activities' motivational and teaching capacity), rather than the simple fact of being presented as a game. The researchers also found that games were most effective when players worked in groups, had multiple training sessions to learn the game, and when there were other pedagogies in addition to the game play.

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 and colleagues (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 (e.g. Ferguson, 2014; Strasburger et al., 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 12.1** outlines a range of implications arising from the use of games in the classroom.

TABLE 12.1 Benefits and barriers arising from the use of gaming in schools

Benefits	Barriers
• Can provide immersive and authentic learning experiences • Can allow students to learn in their own time and progress gradually through levels • Can be engaging and motivating • Collaborative and problem-based learning can be enhanced through game play • Games can provide learners with feedback on their learning	• Highly competitive games aren't appropriate for some students; can become an obsession • Cost of access can be prohibitive • An imbalance between fun and learning may hinder educational outcomes • May waste learners' time if not well-aligned with learning outcomes • Skills acquired through gameplay may not transfer to real-world contexts • Developing educational games to a level that matches commercial games is expensive and a highly specialised skill

Adapted from Tsekleves et al., 2016.

Collaboration and social interaction

Collaboration among learners is another defining characteristic of constructivist classrooms (see **CHAPTER 6**). Collaborative learning can take place through ICTs (e.g. when social interaction occurs via email or a learning management system) or around ICTs (e.g. when students are learning in the classroom but share a computer to solve problems or complete interactive activities; Jeong & Hmelo-Silver, 2016). ICTs provide opportunities for students to build shared meaning and to collaborate as they use technology. 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. Tools to guide structured interaction, such as scaffolds, prompts and collaboration scripts, have been suggested as strategies that can support students to more productively collaborate using ICTs (Jeong & Hmelo-Silver, 2016).

ICTs also 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 can become global citizens, develop understanding of other cultures and be challenged to change their ideas through new experiences (Lindsay, 2016).

Distributed learning

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

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 or New Zealand. Many students also engaged in distributed learning during the COVID-19 pandemic, as discussed at the start of the chapter (see **FIGURE 12.8**). 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 and teaching have a learner-centred focus and emphasise 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.

FIGURE 12.8 Online learning has become increasingly common and useful in remote areas of Australia and New Zealand, and also in the wake of the COVID-19 pandemic

Getty Images/Laura Olivas

Mobile learning (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
- learning content increasingly delivered from outside the school, through websites such as Kahn Academy (https://www.khanacademy.org), or resources to complement classroom learning, such as the Australian Mathematics teacher, Eddie Woo, with his 'misterwootube' channel (https://misterwootube.com).

mobile learning (mlearning)
Use of mobile devices for learning at any time or place

A meta-analysis of the effects of mobile devices on students' learning found higher achievement as a result of use of mobile devices than traditional teaching across science, mathematics and reading, in Kindergarten to Year 12 classes (Tingir et al., 2017).

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 and colleagues (2013) suggested that this capacity for distributed thinking also links to new media literacies that teachers can assist students to develop.

distributed cognition
The notion that cognition is shared by individuals who make up communities and who share cultural tools

Information technologies 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.

Cognitive theory of multimedia learning

As you will recall from **CHAPTER 6**, cognitive load theory explains and predicts how pedagogical methods and materials place different demands on learners' working memories. Cognitive load theory has also been extended to multimedia learning environments through the cognitive theory of multimedia learning (Mayer, 2005; Clark & Mayer, 2016). This theory draws on cognitive load theory and constructivist learning theory, and suggests that students can gain a deeper level of understanding and learn more effectively when they engage with words and pictures rather than words alone. As multimedia learning environments are comprised of pictures and words, they have the potential to be a powerful way to increase student understanding. The cognitive theory of multimedia learning is based on three assumptions:

1 *The dual-channel assumption* – the verbal and visual parts (or channels) of our working memory are separated and can be used for processing information at the same time. This enhances capacity for learning, because the brain is able to take in more information through visual and verbal channels.
2 *The limited capacity assumption* – this assumption states that the verbal and visual parts of our working memory have limited capacity, and can only hold limited amounts of information. Too much information can cause cognitive overload.
3 *The active-processing assumption* – learning is an active process of collecting, organising and integrating new information with other knowledge. This means that learning is more likely when students are engaged with the new material that is presented (Clark & Mayer, 2016).

FIGURE 12.9 summarises the cognitive theory of multimedia learning. A multimedia presentation incorporates pictures being displayed at the same time as words are spoken. The words that are spoken are picked up by our sense of hearing as auditory information, which forms a verbal model of the information being presented. At the same time, the picture, video or written text is picked up by our sense of sight as visual information. This forms a pictorial model of the same information. As each channel of working memory is limited in capacity (see **CHAPTER 6**), the theory is that more information can be held in working memory. While we are holding this information in our working memory, we also have information stored in our long-term memory. This can be elicited by activating relevant schemas. Finally, if the learner has been able to hold the verbal model and pictorial model in their working memory, the information in their long-term memory is merged with these models. This merging of information is called integration, and this information can then move into the long-term memory.

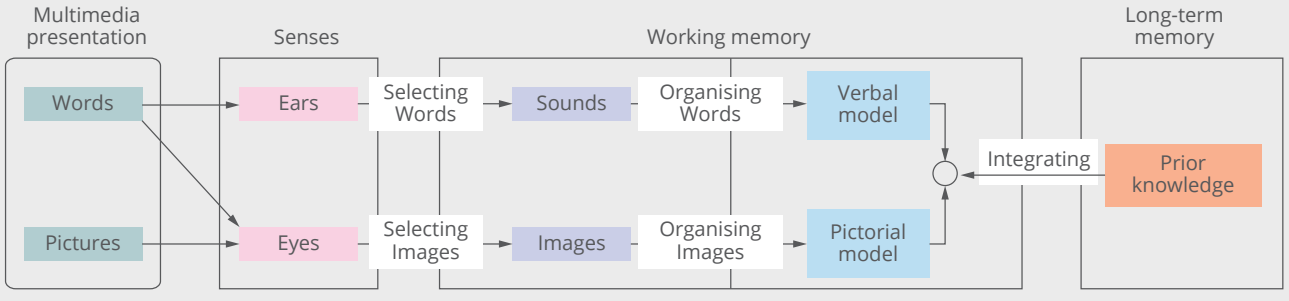


FIGURE 12.9 Cognitive theory of multimedia learning

Source: 'E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning' by Ruth C. Clark and Richard E. Mayer, Wiley, 2016.

What does all this mean for teachers who incorporate multimedia into their learning activities? The cognitive theory of multimedia learning suggests that students learn better:

- from words and pictures than from words alone
- from spoken words with pictures rather than from written text and pictures
- when corresponding words and pictures are presented simultaneously and close together
- when animation or text are broken down into smaller segments.

These are four of Mayer's (2009) 12 instructional design principles, which can be used by teachers when designing multimedia resources for students.

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 (Lindsay, 2016). 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

Information technologies 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 (e.g. 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 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 (2017) 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 (e.g. information storage and retrieval)?

connectivism
A theory of learning that considers connections between learners and connections to digital information as new avenues for learning

As an alternative, Siemens (2017) 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.

12.5 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 friends on social media? 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 et al., 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 to express their identity in new electronic spaces (Leu, Leu et al., 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 12.10**). 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, and attend to e-proficiency, e-credibility and e-design in discussing and assessing quality of text with their students. **TABLE 12.2** spells out the components of these criteria as described by Kimber and Wyatt-Smith.

FIGURE 12.10 Multimodal texts are changing our notions of grammar and the writing process

Australian Broadcasting Corporation

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?

New text formats have also changed the way in which a reader must process and comprehend a text. As Leu and colleagues (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. Leu and colleagues pointed out that 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.

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) advised 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.

literacies
The skills, strategies and dispositions for using and adapting to rapidly changing ICTs

TABLE 12.2 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 acknowledgement 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 (e.g. 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 (e.g. colours, fonts, spatial layout)

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, to collect and manage data, 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. Websites such as Geogebra and Desmos are popular examples of such interactive tools (Attard & Holmes, 2019). Robotics and programming can also be used to teach and apply mathematics concepts, such as measurement, geometry, algebra and numeracy (Benton et al., 2016; Highfield, 2014). **FIGURE 12.11** shows an example of how geometry can be taught using a programming activity.

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.

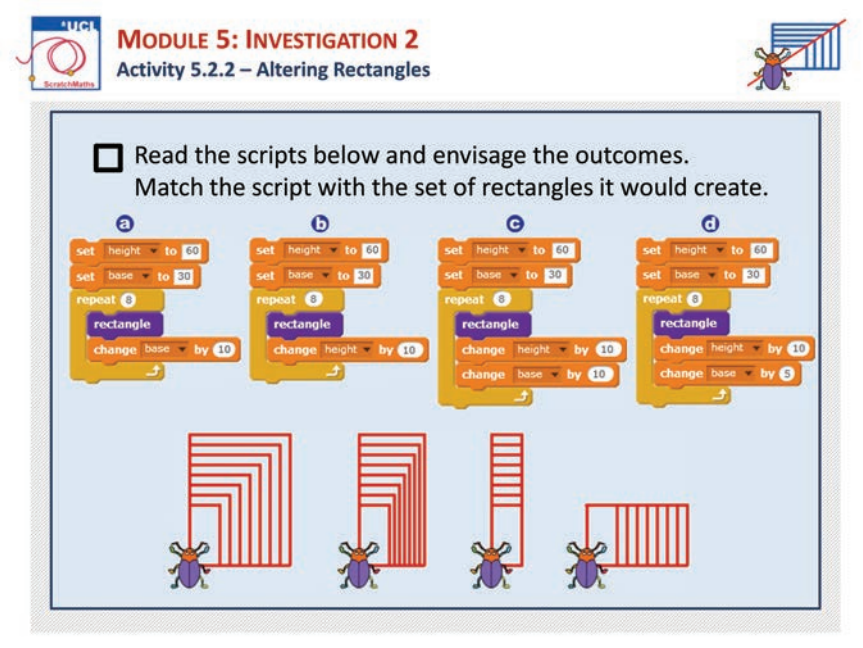


FIGURE 12.11 A screen shot of the materials available on the University College London Scratch Maths

UCL ScratchMaths

12.6 Transforming assessment

Information technology 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.

ICTs can be particularly useful for teachers interested in understanding learners' cognitive and thinking processes, since ICTs can make students' thinking processes visible for teachers in a way that other methods of learning cannot (Tempelaar et al., 2014). For instance, students' choices about how to use a particular 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. Screencasting allows students to verbalise their thinking while solving a problem (Attard & Holmes, 2019). Teachers can observe students working with technology, 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.

As technology advances, approaches to assessment become more sophisticated, and able to be integrated into daily learning activities. Shute and colleagues (Shute, 2015; Shute et al., 2016) reported on use of 'stealth assessments' that are embedded in games and simulations to assess complex 21st-century skills, such as problem-solving, creativity and communication, as well as metacognition and other learning skills. For example, they described use of a 'pedagogical agent' designed by Conati (2002) as part of a game, which identified not only the students' errors, but also their affective and physical responses while playing the game (using cues such as furrowing of the brow and heart rate), to determine whether to provide support or not. Thus they argue that stealth assessments can collect information, but also provide instruction when needed, and support engagement.

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. Online assessments that adapt to students' needs to provide questions at their ability level, as revealed by prior responses, are another example of dynamic assessment facilitated by technology.

ICTs can also facilitate self- and peer assessment, which are assessment approaches that help students to take responsibility for their own learning. Technology-enhanced approaches to self-assessment include asking students to write a blog to track their progress during project work, annotate work samples in an e-portfolio, or revise their work on a computer. Aside from the practicality of sharing student work using technology, the use of ICTs to provide peer feedback can also help students to feel more comfortable in providing honest feedback to their peers and allow students to give feedback on their peers' work in real time (Fu et al., 2019). It is important to support students to conduct self- and peer assessment effectively; for example, through the provision of scaffolds and rubrics.

Analysis and reporting of assessment

Analysis and reporting of assessment results can also be facilitated through ICT. e-asTTle (assessment tools for teaching and learning) was developed by the New Zealand Ministry of Education 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 12.12**. Learning management systems are also increasingly being used to report on student progress throughout the year, allowing parents to view their child's work and teacher

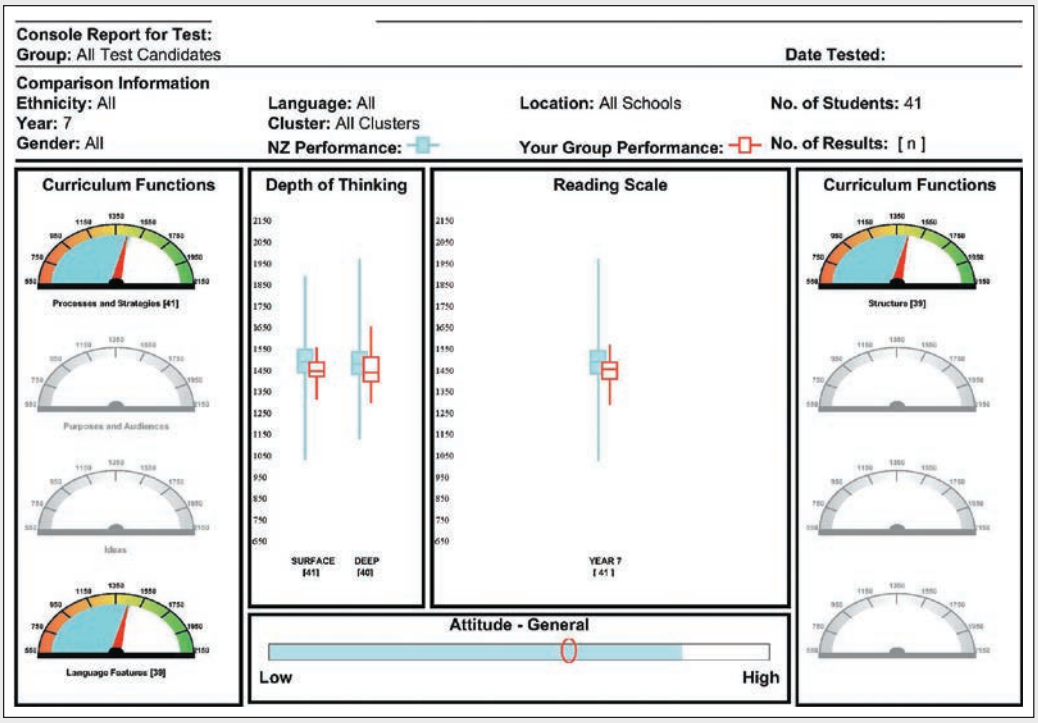


FIGURE 12.12 e-asTTle generates information comparing student test results with national norms, curriculum levels and objectives

Learning Media Limited

feedback regularly. The benefit of this approach is that parents receive information about their child's progress much earlier than in an end of semester report (Hollingsworth et al., 2019).

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**.

12.7 Transforming engagement

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.

Transforming classroom management

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 browse 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.

Technology can also be used as a tool for classroom management. ClassDojo is a popular software that allows teachers to reward or punish student behaviour through a point system. It has also been described as a program that gamifies discipline, as students can select avatars, earn badges and gain places on leader boards (Manolev et al., 2019). Teachers can also send reports of student behaviour to parents through the ClassDojo program. You may recognise that this method of classroom management is behaviourist in nature, and research evidence to support the use of ClassDojo is scant (Krach et al., 2017). Criticisms of this approach to classroom management focus on its controlling nature (Manolev et al., 2019), data privacy concerns, and the use of shaming to change behaviour (Krach et al., 2017).

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.

Information technologies may contribute to enhanced student motivation (see **FIGURE 12.13**), 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 help 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).

Information technologies are thought to promote student engagement through:

- opportunities for collaboration and co-construction of knowledge in social media applications (Henderson et al., 2013)
- personalised learning, with ready access to support as it is needed (Wright, 2010)
- tracking learner progress – for self and reporting to others
- providing access to authentic learning experiences
- 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.

FIGURE 12.13 ICTs may enhance motivation in students, improving their attendance and attitudes towards learning

Getty Images/Thomas Barwick

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 et al., 2013; Gurung & Rutledge, 2014; Nansen et al., 2012). This is supported by recent research that found that some secondary students use technology to disengage when a technology-enhanced lesson is perceived to be boring (Bergdahl et al., 2020).

12.8 Transforming student welfare

Information technologies 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 particular the issue of cyberbullying.

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 (e.g. using email and other forms of social media) 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

Importantly, Mills (2014) reported that social development in adolescence is not harmed by internet activity, with evidence that students who show moderate internet use are also involved in other social activities 'offline', such as sports and clubs (Romer et al., 2013). Adolescents largely use social media to cultivate existing friendships, and report feeling closer to their friends as a result of interacting online (Uhls et al., 2017). Romer and colleagues found links between heavy use of the internet, increased depression and withdrawal from sports and clubs, but suggested depression may have been the influencing factor here, rather than internet use.

Fullwood and Attrill-Smith (2018) argued that the internet plays a role in people's construction of self, as people explore different selves through avatars and other means online. They suggested that online and offline spaces are intertwined and interact with one another, with behaviour in each space influencing behaviour and perceptions of self in the other. ICTs can also increase people's social connectedness through social media as well as video apps, although the ABS (2018) reported that this is less the case for people in remote and outer regional areas of Australia, either through poor connectivity, or through financial stresses that make accessing the technology difficult. We discuss this below in the section on equity.

Mental health

Increases both in social media use and incidence of mental health issues in young people raise questions about whether there is a relationship. Robinson and colleagues (2017) summarised research showing both positive and negative effects of social media are possible. Effects seem to depend on the frequency of use, the type of use and whether there are pre-existing sensitivities to mental health problems:

- *Positive* – for moderate users, social media use contributes to self-esteem, feelings of closeness and connection, and social competence, as well as to empathy (Vossen & Valkenburg, 2016).
- *Negative* – viewing others' profiles and photographs can give an unrealistic picture of others' lives, and can result in depression, particularly if those profiles and images provoke envy (Tandoc et al., 2015). It appears that actively using social media sites to connect with others is positive, whereas passively viewing others' posts may link to depression. Young people at risk of mental health issues, such as self-harm, suicide or eating disorders, can be inspired by hearing about others' methods, or may feel that these maladaptive coping mechanisms are normal. Heavy use of social media also appears to be problematic if it prevents adolescents from getting sufficient sleep or physical activity (Viner et al., 2019).

Smartphone-based prevention programs, such as Headspace, Smiling Mind (apps with meditation and mindfulness activities) and Biteback (a positive psychology program designed by the Black Dog Institute), allow young people to build skills and resilience in mental health and have been shown to reduce depression, anxiety and stress (Manicavasagar et al., 2014; Spijkerman et al., 2016).

For people with mental illness, research likewise describes online activity as a 'double-edged sword' with both benefits and risks (Lewis & Seko, 2016). Benefits identified from a review of the literature included social connection or reduction of social isolation, encouragement of recovery, opportunity to disclose feelings and mental health issues, and curbing of harmful impulses. Risks included reinforcement and triggering of harmful impulses as well as stigmatisation.

Other benefits of technology for mental health care have been identified by the Black Dog Institute (2017) in Australia. They include treatments, such as Cognitive Behaviour Therapy, that can be delivered online via free apps, such as moodgym, providing access to those who are unable or unwilling to attend a treatment centre in person. Individuals can also assess their own mental health online, and access help via online apps or helplines.

For teachers, it is important that we are aware of the risks as well as the benefits of technology in relation to mental health, and of possible helpful programs, as we monitor and support the health of the young people we teach.

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 and colleagues (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. Being able to remain anonymous is also an important characteristic of cyberbullying (Barlett & Kowalewski, 2019). This feature allows adolescents who may not be able to retaliate to in-person bullying, due to social standing or physical size, the ability to either retaliate or become a cyberbully themselves (Walters & Espelage, 2020). Cyberbullying is also less prevalent than traditional bullying, although the two forms often overlap. Prevalence rates vary considerably, but a recent meta-analysis of Australian studies indicated that 7.02 per cent of children and adolescents reported being cyberbullied, while 25.13 per cent reported experiencing traditional bullying (Jadambaa et al., 2019).

Cyberbullying can take many different forms, such as exclusion, flaming, harassment, threats, attacks on reputation, impersonation, trolling or abuse and rumours, and its means expand 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 (Kowalski et al., 2019).

Tokunaga (2010) found that cyberbullying occurs throughout childhood and extends into adulthood, although it peaks in adolescence, at 13 to 15 years of age. A New Zealand study of bullying in schools found teachers reported awareness of cyberbullying from the preschool years (Green et al., 2013). Risk factors for being a victim of cyberbullying include spending time online, being bullied in person, having poor social skills, and identifying as a sexual minority group (Kowalski et al., 2019). While some studies report that girls are more likely to be involved in cyberbullying, a recent meta-analysis suggests that there are no gender differences in the prevalence of cyberbullying victimisation or perpetration in Australia (Jadambaa et al., 2019).

Challenges managing cyberbullying

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 bullies perceiving that they will not face the consequences of

their behaviour (Betts & Spenser, 2017). The aspect of anonymity also has consequences for the victim, who cannot be sure who it is who is attacking them, as evidenced by one student's comment in a research study: 'Someone verbally abused me and my friend ... The post was anonymous and did not show who posted the message. I didn't know who attacked us.' (Wang et al., 2019).

- *Widespread audience* – social networking technologies allow for rapid, 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* – the online nature of cyberbullying means that the victim can never be assured that they are safe or free from bullying. Cyberbullying has also been described as cyclical in nature, which refers to the ability of cyberbullying to start outside the school, then move into school grounds, and back again (Dennehy et al., 2020). This can also make cyberbullying harder to monitor or police in school environments.
- *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 losing social connection through the removal of their mobile phone (Kowalski et al., 2019). Adolescents also report feeling that disclosing cyberbullying incidences to adults will make the situation worse (Betts & Spenser, 2017).
- *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 (Dennehy et al., 2020).

FIGURE 12.14 How can you ensure that students do not use text messages, email or other forms of technology to hassle or bully other students?

Matthew Duchesne, © Milk and Honey Photography, 2010

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 12.14**). 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 (Kowalski et al., 2019). 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 (i.e. texts or calls) than the internet (Slonje et al., 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 other adults can use to help students, can be found on the Office of the eSafety Commissioner's website (see also **CLASSROOM LINKS 12.2**).

CLASSROOM LINKS 12.2

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. They include:

- decline in social interaction; having less to do with friends
- dislike and avoidance of school, and/or absenteeism
- decline in academic performance
- increased loneliness and/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
- suicidal thoughts – 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:

- Don't respond to any further messages/postings from the bully.
- Block further correspondence from them (block their mobile number or email address, and change privacy settings).
- Talk to others you trust about what is happening – a parent, older brother or sister, teacher, friend.
- Keep evidence of any bullying to assist with tracking down the bully and potentially reporting the matter to the service and police.
- Report any bullying concerns to the administrator of the service used.
- Remember it isn't your fault.
- Don't join in by commenting on or sharing posts that might be hurtful to others.
- 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.

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.

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?

Ethics and safety

The use of ICTs poses several ethical issues for educators. These include the potential for:

- plagiarism – software such as Turnitin 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
- sharing of personal information and data
- exposure to obscene or harmful materials (e.g. pornography) on the web
- exposure to online interactions that may prove harmful (e.g. with online stalkers or paedophiles).

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 and colleagues (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. Rather than avoiding online communication, children and adolescents should be supported to develop skills in managing online risks (Middaugh et al., 2017). The Office of the eSafety Commissioner's site (see the link in the 'Recommended websites' at the end of this chapter) contains resources for examining issues and strategies with children.

12.9 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* refers to inequitable differences in access and use of ICTs. Recent Programme for International Student Assessment (PISA) data suggests that the nature of the digital divide is changing over time. Disparity in access to ICTs appears to be narrowing, but stark differences remain in the digital skills of children from different socioeconomic backgrounds (OECD, 2016). While children may have access to a device and the internet at school, it is important to remember that children will have varying levels of access at home (Freeman, 2019). Two groups of students are particularly likely to suffer as a result of the

digital divide: students in remote rural or poor inner-urban areas where telecommunications are limited and/or expensive, and internet connections are weak; and students from low-SES homes that lack ICT resources. In making decisions about how to integrate ICT into the learning process, and to what extent, 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 the 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 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. Reductions in the cost of virtual and augmented reality technologies also mean that geographically isolated students can access these engaging learning experiences, and virtual field trips can allow students to visit museums and zoos without physically leaving their classrooms.

Not all children in rural and remote areas benefit from access to new technology and improved communications infrastructures, however. 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. While digital inclusion – measured by access, ability and affordability – is improving over time in Australia, there are still significantly lower levels of digital inclusion of people from rural compared with metropolitan areas, and of Aboriginal and Torres Strait Islanders (Thomas et al., 2019).

The Australian Government's Digital Education Revolution (2008–2012) sought to address inequities of access by ensuring that all students in Years 9 to 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 one-to-one-ratio availability of technology, and supportive infrastructure in schools that has led to greater engagement with technology for education. Low-socioeconomic status 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 (Australian Department of Education, Employment and Workplace Relations [DEEWR], 2013). Indeed, a survey of Australian school ICT coordinators found that those from schools with low socioeconomic backgrounds were more likely to report issues that affected the use of ICT in schools (Thomson, 2015). These issues included lack of ICT skills in teachers, lack of qualified people to support the use of ICT, lack of access to ICT professional learning, and insufficient internet speeds. Moreover, the results of the National Assessment Program reported in **IMPLICATIONS FOR EDUCATORS 12.2** earlier in this chapter suggest there is more to be done to achieve equity of access.

Gender and ICT use

While historically there were gender differences in general ICT use favouring males, these differences have disappeared as ICT use has become more ubiquitous (Gebhardt et al., 2019).

Studies show different patterns of computer use by boys and girls, with girls using the internet more for educational purposes and social networking, while boys are more likely than girls to use it for online gaming (Anderson & Jiang, 2018; Gebhardt et al., 2019). 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 (Fraillon et al., 2018) 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 (Cai et al., 2017). 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?

12.10 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. It can also 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 practise 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 (WA Department of Education and Training, 2004).

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 (e.g. after working hours as well as during school; Gross, 2005).

Information technologies are also used in a range of ways to support students with diverse learning needs and to assist learning. In developing online teaching and learning resources,

you are now required to apply international standards such as the Web Content Accessibility Guidelines produced by the World Wide Web Consortium (W3C.org) for enhancing accessibility of online materials for all students, including those with disabilities. 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 et al., 2005). In addition, some regular devices such as tablets and smartphones have settings that allow them to be adjusted for particular needs (e.g. voiceover and large fonts for vision impairments, autotext for literacy difficulties and assistive touch for motor difficulties). Apps and software can also be used to support students with executive functioning difficulties to plan and organise their work (Freeman, 2019).

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 et al., 2005). **CASE STUDY 12.1** 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. It promises a future that is faster, more exciting and better than anything that has gone before. But the mere presence of a computer, tablet or IWB in a classroom does not automatically guarantee improved learning and teaching. Information technology may have many positive benefits for students' learning, providing it is used well, but 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

Information technologies 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 (British Educational Communications and Technology Agency, 2008; Tingir et al., 2017). (See **IMPLICATIONS FOR EDUCATORS 12.3** for strategies for using ICT in classrooms.)

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
- 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; it is within these contexts 'that students are learning about, with and through technology'.

CASE STUDY 12.1

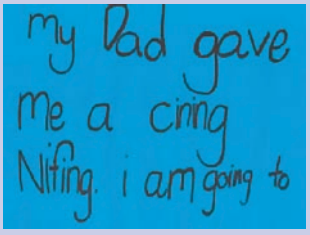
Working with Charlie: ICT improving the writing process for a student with learning difficulties

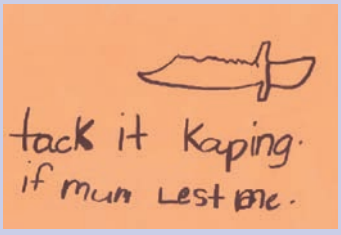
Charlie was a reluctant writer. He had difficulty with fine motor coordination, which made handwriting laborious and slow. Although he was in Year 6, his writing skills were still at an early level, with invented spelling and simple sentences. The sample below took him an hour to write. As a result, 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 keystrokes 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.

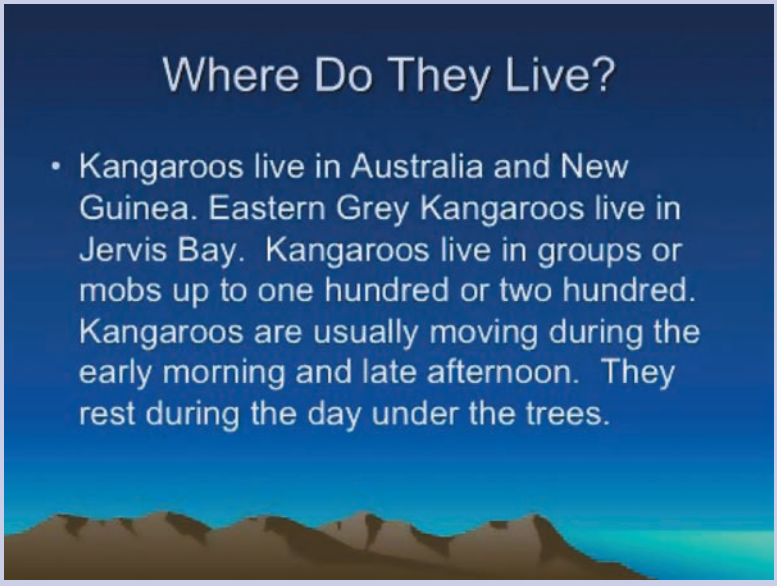
Charlie's writing, without the aid of assistive technology:





Adapted from a lecture by Alyson Whiteoak, 2012. 'Charlie' is a pseudonym.

A page of Charlie's PowerPoint presentation on kangaroos:



Adapted from a lecture by Alyson Whiteoak, 2012. 'Charlie' is a pseudonym.

IMPLICATIONS FOR EDUCATORS 12.3

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) suggested 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.

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. Teachers' 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?

12.11 Concluding comments

Information technologies 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. These technologies are already transforming learning and teaching through the issues they raise – welfare, equity, ethics and management – which teachers and learners must address 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.

STUDY TOOLS

Chapter review

12.1 ICT in learning and teaching

- 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.

12.2 Important issues in educational ICT use

- 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.

12.3 ICT transforming learning

- 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 technology and how it is used.

12.4 ICT transforming pedagogy

- 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.
- Teacher professional development is essential to the effective use of ICTs for learning and teaching.

12.5 Transforming curriculum

- ICTs have changed how people communicate, which has resulted in the creation of new literacies. These new literacies must be taught to students, for example, information literacy skills and skills for producing multimodal and collaborative texts.
- The teaching of mathematics can be enhanced with the use of ICTs, for example, for collecting and analysing data, and by using programming to teach and apply mathematical concepts.

12.6 Transforming assessment

- Sophisticated approaches to assessment are made possible with the use of ICTs, for example, allowing students to demonstrate their thinking processes via screencasting.
- ICTs also provide opportunities for self- and peer assessment, but these assessment practices must be scaffolded and supported by the teacher in order to maximise their benefit for student learning.

12.7 Transforming engagement

- The use of ICTs in education has the potential to produce benefits, including enhanced motivation, increased student engagement and improved learning outcomes. These benefits are influenced by individual learners and the way in which teachers use ICTs.
- ICT use in the classroom can pose additional classroom management concerns, but can also be used as a classroom management tool.

12.8 Transforming student welfare

- ICTs provide young people with opportunities to develop their sense of self by exploring different online identities, and can increase the strength of peer connections through regular online interaction.
- Research suggests that there are positive and negative implications of ICT and social media use for young people's mental health. Factors such as frequency of use, type of use, and the nature of feedback received online influence young people's mental health.
- ICTs provide an additional way in which bullying can occur (i.e. cyberbullying). Cyberbullying is challenging to address because perpetrators can remain anonymous on some platforms, while having a wider audience to witness the bullying and potentially constant access to victims. The reduced social cues of online platforms can also lead people to behave differently to how they usually would in person.

12.9 Transforming equity issues

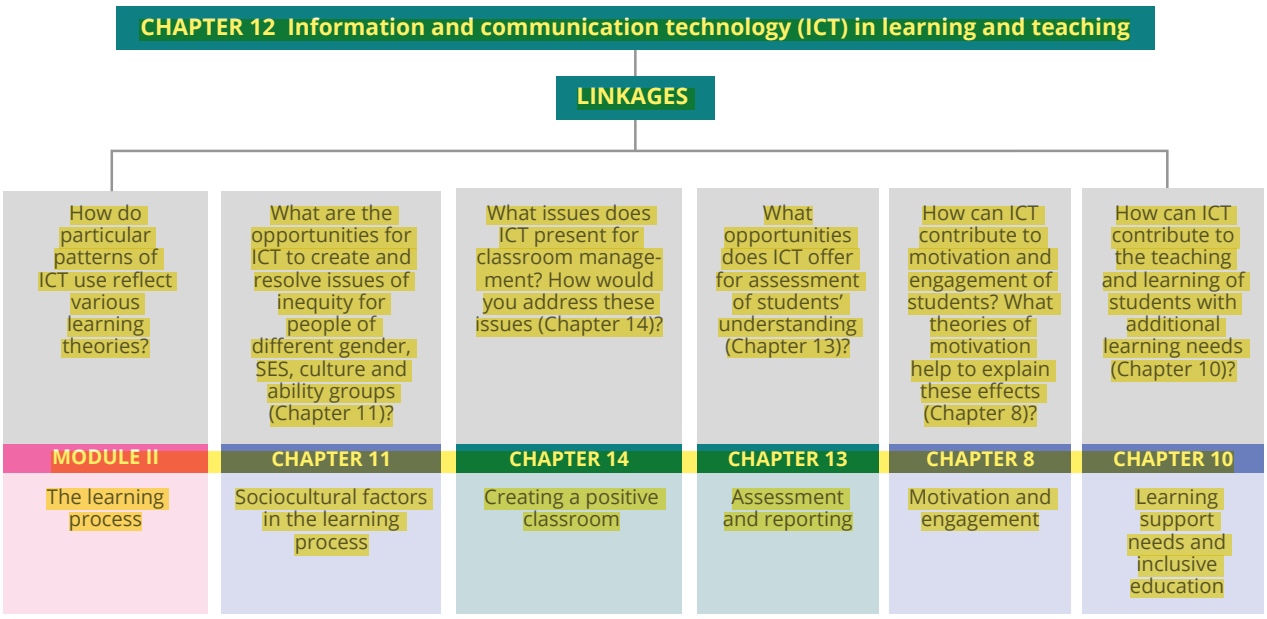
- The 'digital divide' refers to differences in access to and use of ICTs. Students in remote rural or poor inner-urban areas, and those from low-SES households, are more likely to be disadvantaged as a result of the digital divide.
- Teachers need to consider students' variable access to ICTs at home when integrating ICTs into their teaching.

12.10 Transforming inclusive education

- ICTs have the potential to assist teachers in addressing individual student needs in the classroom, including those with additional learning needs and those requiring extension.

Putting it together

Making links between 'ICT in learning and teaching' and material in other chapters



Questions and activities for self-assessment and discussion

1 List as many examples as you can of ICTs that you use and are aware of being used in schools. How have these 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 How can ICTs support students' mental health? What risks should teachers be mindful of in relation to technology use and mental health?
9 How is cyberbullying different to traditional forms of bullying? Why is cyberbullying difficult for schools to respond to and manage?
10 Critically evaluate the benefits and limitations of using ICTs in educational contexts.

Further research

Recommended websites

Australian Council for Computers in Education: https://acce.edu.au

Cyberpsychology: http://users.rider.edu/~suler/psycyber/decade.html

Edublogs – advice on constructing blogs: https://edublogs.org

Enabling eLearning: https://elearning.tki.org.nz

ICT school planning – Victorian Department of Education and Training: https://fuse.education.vic.gov.au/Resource/LandingPage?objectId=ebe9c76d-7bfe-4984-ad72-0909294380a5

Ministry of Education New Zealand *Te Kete Ipurangi* (TKI): https://technology.tki.org.nz

Misterwootube: https://misterwootube.com

National Digital Learning Resources Network (NDLRN) – develops digital curriculum resources for Australian and New Zealand schools: https://www.ndlrn.edu.au/default.asp

Nesta Innovation Growth Lab – research on ICTs in education: https://www.nesta.org.uk/project/innovation-growth-lab

Office of the eSafety Commissioner: https://esafety.gov.au/education-resources

Teaching Teachers for the Future: https://www.ttf.edu.au

Web 2.0 information from the Victorian Department of Education and Training: https://fuse.education.vic.gov.au/Resource/LandingPage?ObjectId=3355664a-b5a9-4f7e-864f-adb18f52a0bb&SearchScope=EarlyChildhood

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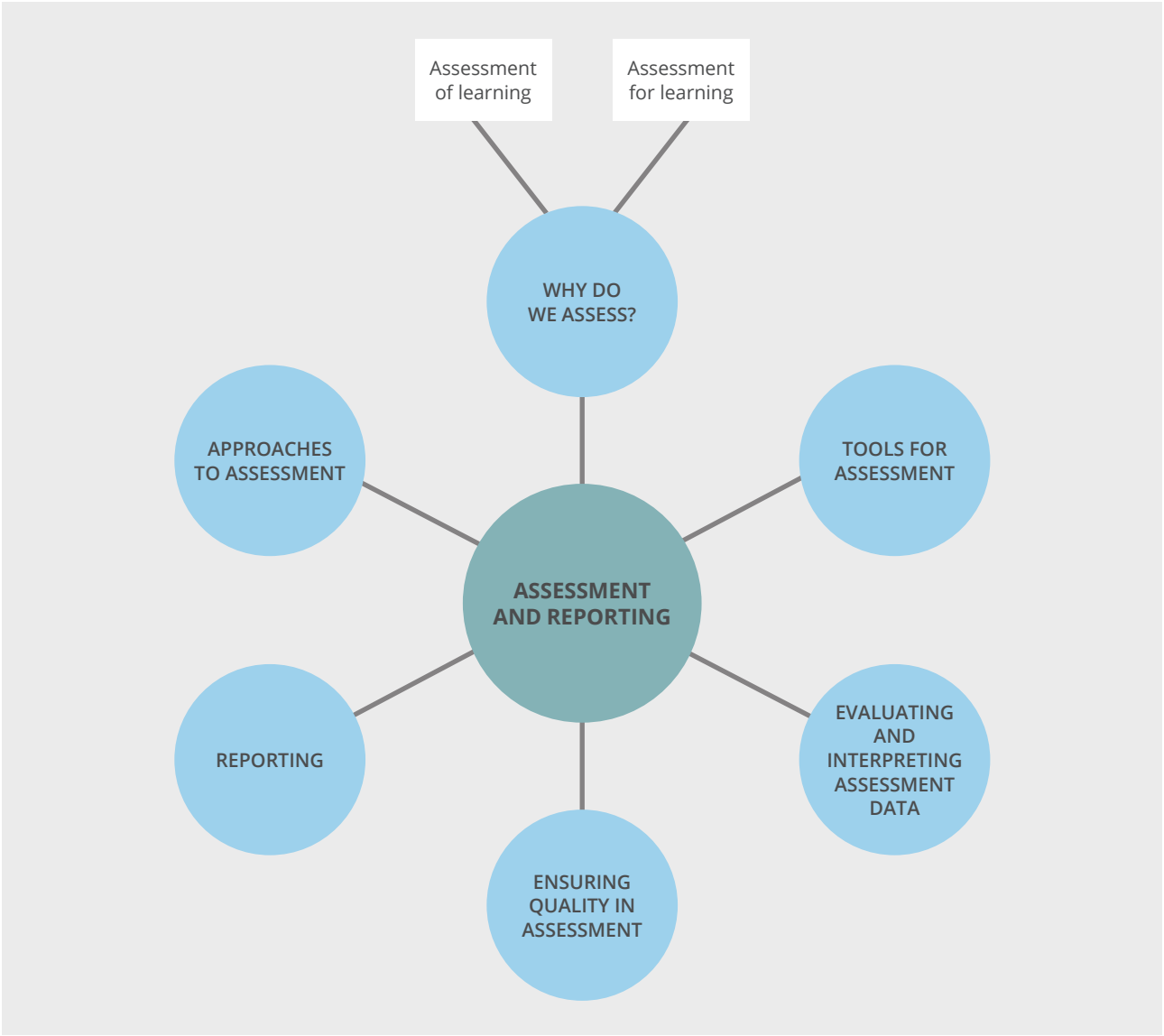
CHAPTER 13

Assessment and reporting



Chapter 13 concept map

KEY QUESTIONS

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

- Why do we assess?
- How do teachers, students, parents and governments use assessment information?
- What are some of the assessment tools that teachers use to assess student learning?
- How can teachers maximise assessment quality?
- 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?

RACHAEL

Rachael is an experienced primary school teacher who is teaching a kindergarten class this year. Like many kindergarten teachers, Rachael administers a standardised diagnostic assessment to her students prior to the beginning of the school year. The interview-style assessment provides her with information about the basic literacy and numeracy capabilities of her four- and five-year-old students as they enter formal schooling. The assessment data shows Rachael that the literacy and numeracy capabilities of her students are diverse, and she notes that several children will require additional support to develop their number skills. Others are already counting fluently to 100, and she considers the strategies she will use to help these children further progress their understanding of numbers. The literacy component of the assessment will enable Rachael to assign children to ability-level reading groups. As she administers the assessment, Rachael also observes the behaviour of her future students, for example, by noting those who find it difficult to separate from their parents. She makes a note to ensure she has support strategies in place on the first day of school to reduce the stress of these children (and their parents).

As the year progresses, Rachael uses a range of assessment strategies to evaluate the progress of each of her students. These range from informal classroom observation to formal assessments of their literacy and numeracy skills that allow comparisons to be made with the diagnostic assessment. She also begins to teach her students to self-assess their understanding by asking them to rate how well they understand new concepts by putting their thumbs up (I understand this), horizontally (I sort of understand this), or down (I need more help to understand this). Rachael uses these self-assessments to provide targeted support to the students who need extra help, and provides new learning activities for those who are ready to move on.

Throughout the year, Rachael communicates with her students' parents about their child's progress in a number of different ways. Parent–teacher interviews, emails and conversations with parents allow her to flag areas of concern early in the school year. In Term 2 and Term 4, Rachael also writes formal reports that focus on what each child is able to do, and what they should be working towards in each Key Learning Area. She also summarises her class's progress and shares this in staff meetings to guide future programming for the kindergarten cohort.

Introduction

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. The 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.

13.1 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
The purposeful gathering and analysis of information about student learning

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 (i.e. consisting of descriptions of what students know and can do) and quantitative (i.e. 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 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.

assessment literacy
Knowledge and skills for collecting, analysing and interpreting assessment data and evidence of learning, and for applying this information

Assessment literacy refers to the knowledge and skills involved in collecting, analysing and interpreting assessment data and evidence. Heitink and colleagues (2016) pointed out that assessment literacy involves teachers' effective use of this information to adapt their instruction, respond to learners' needs and give effective feedback. Assessment literacy also includes understanding the socio-emotional impacts of assessment, by managing the impact of assessment on student wellbeing, and teacher–student relationships (Pastore & Andrade, 2019). You will be building your assessment literacy in this chapter. The concept map at the beginning of the chapter might help you to monitor your understanding of the various elements involved.

Purposes of assessment

Assessment can have a number of purposes. **FIGURE 13.1** summarises the purposes of assessment for different stakeholders.

assessment for learning
Assessment with the goal of improving learning

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 by providing feedback to students while they are engaged in the learning process. Black and Wiliam (1998) called this **assessment for learning**, which is

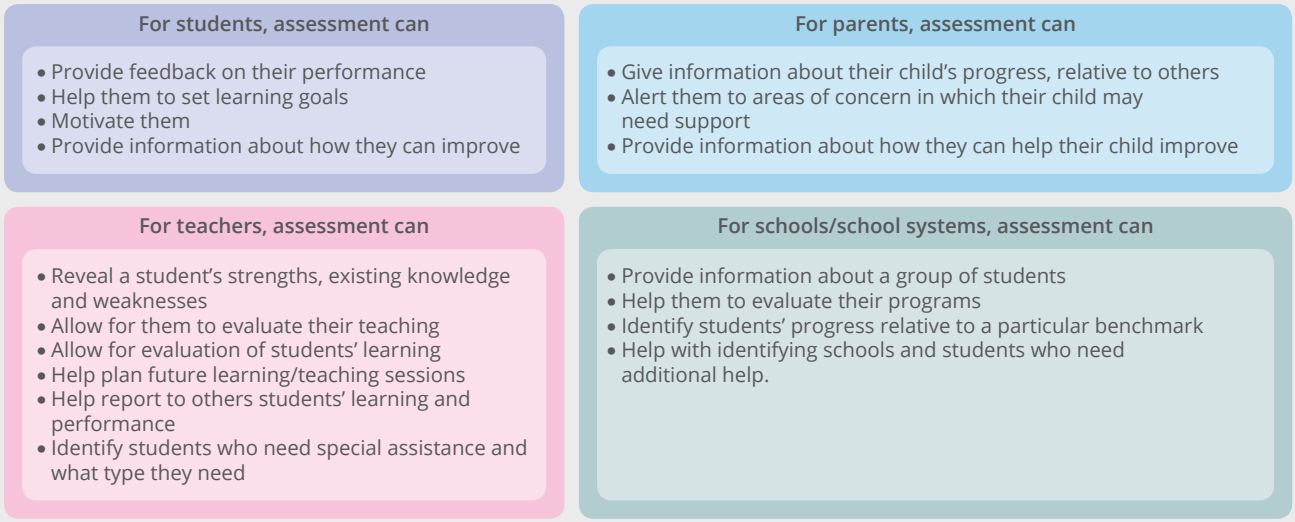


FIGURE 13.1 Purposes of assessment

also referred to as *formative* assessment (Black & Wiliam, 2018). 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 take responsibility for their own learning, which she called **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) suggested 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 **IMPLICATIONS FOR EDUCATORS 13.1**, two contrasting models of assessment are discussed.

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

IMPLICATIONS FOR EDUCATORS 13.1

Thinking critically about the purposes of assessment

Masters (2016) 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. Traditional approaches to assessment also grade students based on their ability to achieve common standards by the end of the school year, despite students starting from a range of different points.

Instead, Masters suggested that assessment should focus on monitoring learning. This would entail drawing on maps of the progression of understanding or skill

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in a particular learning domain, such as the example in **CLASSROOM LINKS 13.2**. 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
- success is measured by student progress
- students receive feedback on where they are now, where they are going and how to get there (Hattie & Timperley, 2007)
- it develops students' metacognitive skills
- it builds students' confidence in themselves as learners
- teachers and students develop a growth mindset (see **CHAPTER 8**).

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 have read about in previous chapters?

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?

13.2 Forms of assessment

formative assessment Information gathered while students are learning, to give information about their progress

summative assessment Information gathered to give information about students' achievements at a particular time

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*; and *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/as/of learning* occurred in order to shift attention to the purposes of assessment – to improve learning (assessment for/as learning), or to measure learning at a point in time (assessment of learning). In this chapter, as in other works you may read about assessment in schools, both assessment for/as learning and formative assessment will be used; and both assessment of learning and summative assessment will likewise be used depending on the context. The distinction is in whether the focus is on timing (formative/summative) or purpose (for/of learning).

Assessment for learning

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'. As we saw in the case study at the beginning of the chapter, a teacher may use a diagnostic assessment to find out what students already know

and can do in order to make plans for what to teach. Teachers can also use such assessments to ensure they 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.

Drawing on Black and Wiliam's (1998, 1999) original research, Glasson (2009) suggested five strategies that teachers can implement to ensure that assessment is effective for learning:

1 *sharing* with students what you want them to learn and what will demonstrate that the learning has occurred (the criteria)
2 *strategic questioning and discussion* 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*, which provides information that can be used for learning before, during and after the task (i.e. formatively).

These strategies underline how assessment is an integral part of the teaching–learning cycle. **CLASSROOM LINKS 13.1** provides some principles to further guide your classroom assessment practice.

Assessment as learning

Assessment *as* learning is a subset of assessment *for* learning, which is related to the process of metacognition discussed in **CHAPTER 6**. It is a primarily student-centred approach to assessment in which students are provided with opportunities to reflect on and assess their learning (Coombs et al., 2020). 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; setting learning goals; and reflecting on their learning both during and after the process. **FIGURE 13.2** (see page 553) represents this cycle of teaching and learning, and the place of assessment within it.

Assessment of learning

Assessment of learning, or summative assessment, 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. Summative assessments occur less frequently than formative assessment, and are focused on determining what a student knows or can do at a particular point in time. Assessments that are carried out at the end of a unit of work, yearly examinations and New Zealand's overall teacher judgements (OTJs) of student progress and achievement are examples of summative assessments that are developed by teachers. Summative assessments can also be completed by an external body as, for example,

CLASSROOM LINKS 13.1

Characteristics of effective assessment

The New Zealand Curriculum (New Zealand Ministry of Education, 2015) highlights two objectives of assessment: 'to improve students' learning and teachers' teaching' (p. 39). While the curriculum recognises that assessment information is used by many other stakeholders (e.g. parents, school leadership teams, the Ministry of Education), the key focus is the role of assessment in improving student learning. As such, assessment is considered to be effective when it:

- *benefits students* – assessment should give students feedback about what they are currently able to do and what they need to learn to progress their understanding. Assessments that help students to improve are more likely to influence student motivation and self-esteem in a positive way
- *involves students* – self- and peer assessment enables students to take responsibility for their learning and develop metacognitive skills
- *supports teaching and learning goals* – assessment must allow for teachers to provide students with feedback on how they can achieve the learning outcomes. Students also need to know what successful achievement of learning outcomes looks like. Assessment information should also be used by teachers to plan and adapt their future teaching
- *is planned and communicated* – assessment should be carefully planned for to ensure that students have been provided with opportunities to achieve the outcomes being assessed. Students should also know when they are being assessed, and what the criteria for success is
- *is suited to the purpose* – assessment should be aligned with learning outcomes and pedagogical techniques. Informal and formal approaches to assessment can be used to determine the extent of student progress
- *is valid and fair* – giving students a variety of opportunities to show what they know and ensuring that assessment measures what it is designed to measure will increase the validity and fairness of assessment. We will return to these concepts later in this chapter.

Source: New Zealand Ministry of Education. (2015). The New Zealand Curriculum for English-medium teaching and learning in years 1–13. Retrieved from http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum#assessment

ACTIVITIES

1 How are the characteristics of effective assessment similar to or different from what you are used to as assessment?

2 How important do you think it is to involve students in assessment? How might this look in your classroom?

3 Compare these characteristics with the view of assessment described by Masters in **IMPLICATIONS FOR EDUCATORS 13.1**. How are they similar, and how are they different?

the National Assessment Program in Literacy and Numeracy (NAPLAN) tests in Australia. Formative assessment information can also be gathered and used for the purpose of summative assessment, and summative assessment can be used formatively (Dixson & Worrell, 2016). It is particularly important to ensure that summative assessments are of a high quality, particularly if the assessment results will have an impact on the future of the students, as in final year results. Aspects of quality assessment are discussed later in the chapter.

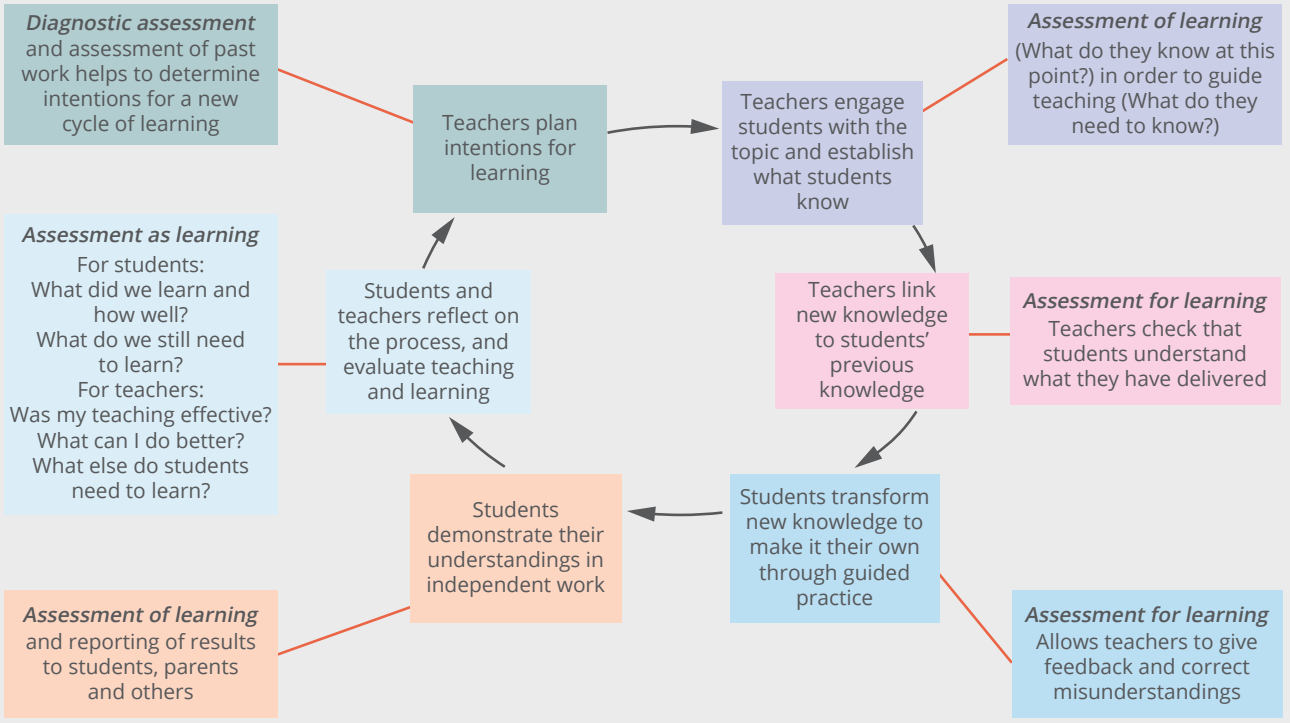

FIGURE 13.2 The place of assessment in the teaching–learning cycle

13.3 Approaches to assessment

Schools may choose from a number of different approaches to assessment of students' learning. Each of these approaches aligns with different views of the purpose of schooling, and of the roles of teachers and students.

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 learnt, 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.

Dynamic assessment

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 et al., 1979). It employs *interactive* assessment, as distinguished from *static* assessment,

dynamic assessment A form of interactive assessment that identifies potential for learning and interventions to help achieve this potential

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 a student can do, with and without assistance, when given tasks of increasing complexity. Dynamic assessment allows teachers to assess student ability as well as observe how they respond to challenges and the prompts or hints they receive (Elliott et al., 2018). It is based on the principle that we can learn more about a child's thinking by working with them 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. 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 (i.e. a predetermined set of hints) or individualised assistance provided immediately if the examinee encounters a problem, with the next item presented once the problem is resolved (Sternberg, 2013). Information communication technology is increasingly providing teachers and researchers with opportunities to use dynamic assessment approaches in classrooms; as such, technologies are able to efficiently record students' responses to tasks while adaptively providing individualised feedback (Resing et al., 2019).

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).

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, than can be observed in traditional assessment (see Sternberg [2013] and Lauchlan and Carrigan [2013] for reviews). Lauchlan and Carrigan (2013) also argued 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.

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, 2018). Yong (2018) argued that authentic assessments should be applicable to the real world, relevant to the lives of students and adhere to the conventions of the discipline in which the assessment is taking place.

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 (e.g. 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

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, designing and conducting an experiment, or solving a problem and explaining 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
A mode of assessment that requires a student to engage in a complex task

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 (see **FIGURE 13.3**). Such assessment tasks require students to use thinking and reasoning skills to solve realistic, complex problems (Darling-Hammond, 2017). 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.

FIGURE 13.3 In performance assessment, students are involved in real-world tasks, and may be given wider scope to define what their assessment performance will look like, compared with traditional assessment. What advantages do you see in this approach? How could you apply it in other areas of learning?

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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. Examples of formal performance assessments in secondary school include the PISA (Programme for International Student Assessment) tests that compare 15-year-olds across OECD (Organisation for Economic Cooperation and Development) countries, and the International Baccalaureate.

Darling-Hammond (2014) called for wider use of performance assessment to tap higher-order thinking and performance skills that are not readily assessed by traditional assessment. Other 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).

13.4 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; NZ Ministry of Education, 2011). The New Zealand Ministry of Education (2011) 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 progression or development map (see **CLASSROOM LINKS 13.2**).

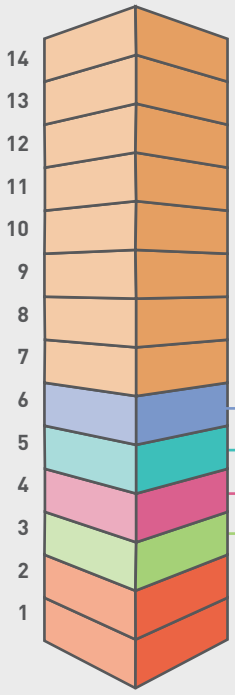
direct observation
Purposeful and focused looking and listening

Direct observation – or purposeful and focused looking and listening – is a most effective form of assessment. An example of this 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. 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 **CLASSROOM LINKS 13.3**).

CLASSROOM LINKS 13.2

Learning progressions

In 2018, the Australian government released a report of a review to achieve educational excellence in Australian schools (commonly referred to as Gonski 2.0) and committed to implement its recommendations. In the report, Gonski and colleagues (2018) picked up arguments by Masters (2013) for teachers to use developmental maps, or learning progressions, to pinpoint where students are in their learning, and where to take them next. Gonski et al. recommended that such an approach should replace year-based or stage-based approaches to assessment, reporting and planning, to promote 'growth-focused' thinking. Learning progressions have been developed for each of the general capabilities identified in the Australian Curriculum K–10 (literacy, numeracy, information and communication technology, critical and creative thinking, personal and social capability, ethical understanding and intercultural understanding) and New Zealand has developed learning progressions for reading, writing and mathematics (links are at the end of this chapter).



Level 6
- exchanges one letter in a word to make a new word (dip, tip)
- writes two-letter consonant blends in words correctly (sl in slip)
- writes common plurals formed with adding 'es' correctly (boxes)
- uses onset and rime to spell words (p-at)
- writes words with consonants doubled after a short vowel (shopping)

Level 5
- represents all phonemes when attempting to spell one-and-two-syllable words
- writes correctky a range of words from the hundred hugh-frequency words (class)
- spells less familiar words usinf regular phonemic graphemix patterns (sum for some)
- writes common plurals formed by adding 's' correctly (cats)
- writes words with common suffixes that indicate tense (play, played, playing)
- uses visual knowledge (my), phonic knowledge (can) and morphemic knowledge (plays = play + s) to attempt to spell words

Level 4
- writes letters to represent the dominant or first sounds (phonemes) in words, when attempting to spell words (apl for apple)
- writes some appropriate letter combinations to represent words (bis for because)
- writes correctly some common one-syllable words with regular phonic graphemic patterns (am)
- writes correctly some common high-frequency words with irregular phonic graphemic patterns (boy)

Level 3
- writes letters to the alphabet and says a common corresponding sound (phoneme)
- writes letters to correspond to a given sound

ACTIVITIES

1 Explore the learning progressions for Australia or New Zealand through the links at the end of this chapter.

2 Such progressions can be used as a basis for observation and review of work samples.

GO FURTHER

View a student's work sample in either writing or mathematics, and use the relevant progression to assess their progress. Where are they now? Where do they need to go next in their learning?

CLASSROOM LINKS 13.3

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.
- Mertler (2016) suggested that beginning teachers should carefully plan their use of observation in the classroom; for example, by thinking about the behaviours they should look for to determine whether students understand the concepts being taught, or what off-task behaviours might look like.
- 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**).

ACTIVITIES

Teachers often have difficulty in knowing how well children function in group 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. In this activity, you will develop a resource that will help you to observe and assess students' abilities to work in a group:

1 The Social Management element of the Personal and Social Capability Learning Continuum of the Australian Curriculum (https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities/personal-and-social-capability/learning-continuum/?element=Social%20management) includes five skills: communicate effectively, work collaboratively, make decisions, negotiate and resolve conflict, and develop leadership skills.

a Examine the indicators for each skill for a Level (Stage) of learners that you are likely to work with.

b Use these indicators to develop an observation sheet that could be used to assess students' social management skills while working in a group.

c Identify how you might use the information collected with your observation sheet to provide feedback to students and information to parents.

Anecdotal records

anecdotal record
Objective description of behaviour at a particular time and place, recorded as soon as possible after the behaviour has occurred

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 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 for 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. Work through an observational activity using Appendix 13.1 online.

GO FURTHER
Appendix 13.1
An additional observational activity

Checklists

A **checklist** comprises a list of descriptions of specific behaviours that can be systematically identified and tallied by observers as they occur (i.e. event sampling) or during a specified period (i.e. time sampling). Checklists are often used by teachers to collect information about easily observed behaviours, such as motor skills (e.g. can hop on one leg for five seconds), literacy skills (e.g. can find a word in a dictionary) or basic subject-specific skills (e.g. can light a Bunsen burner). Checklists are a simple and useful tool for recording observations of a range of behaviours with a number of students.

checklist
A set of descriptions of specific behaviours that an observer records as present or not present

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 (discussed in the following section). 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. Student work samples can also be used in professional conversations about student learning, and to clarify standards of achievement during assessment moderation (discussed later in this chapter).

Portfolios

A **portfolio** is a collection of samples of students' 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.

portfolio
A collection of samples of student work used to demonstrate achievement

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 (2018, p. 113) cite Mueller's (2016) classification of three types of portfolios:

1 the *showcase* portfolio containing examples of the student's best work
2 the *growth* portfolio that demonstrates the student's development over time
3 the *evaluation* portfolio that contains samples of marked work.

Portfolios have become a form of assessment as learning, as students negotiate with their teachers about the contents and reflect on their work samples. 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. Schools may also use apps or learning management systems (also known as e-portfolios or web-based portfolios) to allow students to share their work with teachers and parents.

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

rating scale
A procedure for recording the degree to which a specific behaviour or characteristic is present

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 (i.e. yes/no), a value judgement is also made about the behaviour as the record is compiled (e.g. 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 (e.g. 'simple argument–complex argument' or 'distracted–attentive') to indicate the relative strength of that characteristic in the individual or their performance being assessed (Osgood et al., 1957). Rating scales may also be a useful tool for self-assessment (see **CLASSROOM LINKS 13.4** on pages 567–68 for some examples) and peer assessment, allowing students to rate the extent to which their peers have achieved specified outcomes.

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 **CLASSROOM LINKS 13.4**. At the end of a unit, tests tend to be an *assessment of learning*, or summative in nature. However, this does not have to be the only function of an end-of-unit test; teachers can give students feedback from summative tests about how they could improve, to help them to set learning goals for the future (Dolin et al., 2018). Final-year exams, the NAPLAN tests in Australia or e-asTTle tests in New Zealand are examples of tests that are assessments of learning. Because the NAPLAN and e-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; that is, as *assessment for 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 (known as the testing effect; Bennett, 2011). Return to **CHAPTERS 3** and **6** to consider how these strategies work to improve memory and learning. Studies show that taking a test strengthens the retrieval of information in memory, and that more difficult tests have a greater effect on memory retrieval due to the greater mental effort required (Endres & Renkl, 2015; Rowland, 2014). You can try this yourself by using the review questions at the end of the chapter to help you remember key information about assessment.

FIGURE 13.4 Testing can have both positive and negative effects on learning. In what ways can negative effects be minimised and positive ones maximised?

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Morgan (2016) warned that overuse of tests, particularly 'high-stakes' tests, can have negative effects (see **FIGURE 13.4**). 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 (von der Embse et al., 2018). 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 varied 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.

THINK ABOUT

How could you give feedback on a summative test (perhaps a spelling, maths, science or history test) that would improve students' learning?

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 learning progression 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 e-asTTle in New Zealand. For the NAPLAN tests, results are reported to parents, usually along a scale, and schools receive an aggregated report of their students' results. For the e-asTTle 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. **RESEARCH LINKS 13.1** discusses further the implications and implementation of high-stakes testing in Australia and New Zealand.

Diagnostic assessment

'Diagnostic' is generally understood to be a medical term whereby 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 Schedule for Early Number Assessment (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.

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

RESEARCH LINKS 13.1

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 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. 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'. Final year exams may also be termed 'high stakes' as their results determine students' entry into university courses.

Polesel and colleagues (2012) reviewed the literature on impacts of high-stakes testing on students and families as part of a wider research project that investigated this in Australia. They found that international studies show 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. The broader study of NAPLAN testing in Australia interviewed principals, teachers, parents and students across 16 state and independent schools in NSW and Victoria, and found that while there were positive benefits of the testing program, there were also consequences of NAPLAN testing that affected a number of students' mental health and wellbeing, in line with the findings of the earlier literature review (Wyn et al., 2014).

Klenowski and Wyatt-Smith (2011) identified consequences of the Australian testing program due to the high-stakes nature, including:

- 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
- 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, avoiding high-stakes testing in favour of a range of evidence drawn upon to develop an overall teacher judgement (OTJ) (NZ Ministry of Education, 2011). Standardised tests are used in New Zealand, but they are combined with other forms of assessment. The score on an individual test has less impact; that is, 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?

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**).

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?

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 a range of assessment tools.

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 in the assessment process by actively monitoring their achievement and progress. 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.

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. Issues that might affect educators' decisions regarding modes of assessment are set out in **IMPLICATIONS FOR EDUCATORS 13.2**.

IMPLICATIONS FOR EDUCATORS 13.2

Deciding on assessment tools

When deciding on a mode of assessment, teachers should:

- have the appropriate tools for the particular teaching program
- use a range of assessment practices
- gather information from a variety of sources, ranging from formal examinations to direct observation of students engaged in an activity
- pre-plan the tools of assessment to be used in a unit of instruction
- prepare beforehand any resources required for specific assessment procedures.

Teachers should endeavour to develop the competencies required to document and interpret assessment results.

13.5 Student-focused approaches to assessment

Students (i.e. the learners) are at the centre of what happens in classrooms (i.e. 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* 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* should be at the centre of considerations when we design assessment tasks to engage students. The role of motivation and engagement in learning is discussed in detail in **CHAPTER 8**.
- *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.

Conversations with students around learning

Talking with students about their learning can have multiple benefits: providing teachers with insight into students' views about what they have learnt, and their self-concept; assisting students to take ownership of their own learning, by more clearly understanding where they currently are and where they are going; and building a sense of partnership between students and teachers in the learning process.

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 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. Teachers also use interviews with activities to assess the literacy and numeracy abilities of students as they enter formal schooling (e.g. the 'Best Start' assessment in NSW and the 'On-entry Assessment Program' in Western Australia). 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.

Discussions with students around learning can reveal to the teacher a student's misconceptions as well as their learning process (Heitink et al., 2016). In these discussions, guiding students to explain the reasons for their answers and their thinking is important for their assessment purpose. Being aware of common misconceptions can assist teachers in pinpointing them as they arise in discussions, as well as in providing helpful feedback. Being able to interpret this information as it arises (i.e. on the spot) is important to providing timely feedback and making changes to instruction as they are needed (Heitink et al., 2016).

Questioning

Questions form a large part of classroom practice. Their effectiveness varies, however. Drawing on research, Glasson (2009) identified 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 **CLASSROOM LINKS 6.1**). 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.
- Leave sufficient 'wait' or 'think' time before requiring an answer, and before responding to that answer. To allow students time to respond it is useful to wait for at least three to five seconds (Walsh & Sattes, 2015). 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.
- 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. It is important to ensure that all students have opportunities to answer to display what they know. One 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, but 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 may provide summative information, but they do not encourage learning when teachers' evaluations take centre stage, rather than students' thinking. For example:

- Teacher: 'What is four times four?'
- Student: '16'
- Teacher: 'Right, well done'

In this example, 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 (see **FIGURE 13.5**).

FIGURE 13.5 Dialogue between teacher and students can be powerful in assessment for learning. What are some of the benefits you can think of?

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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).

Teachers play a vital role in facilitating self-assessment. Panadero and colleagues (2016) provide the following recommendations for teachers to increase the impact of self-assessment in their classrooms:

- Give students clear criteria to use, and provide instruction about how to use the criteria.
- Provide feedback on students' self-assessments.
- Support students to develop strategies for improvement using their self-assessments.
- Give students time to implement these strategies (e.g. to revise their work).
- Avoid assigning marks to self-assessment for summative purposes because this can reduce students' focus on using self-assessment for learning. Work through an self-assessment activity using Appendix 13.2 online.

GO FURTHER

Appendix 13.2
Self-assessment

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 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 self-efficacy beliefs (see **CHAPTER 8**), teaching of thinking skills, and clear goals and success criteria to be made explicit in lessons as well as for assessment tasks (Earl, 2013).

Research has looked at the extent to which students' assessment of themself and their peers are accurate (Harris et al., 2015), finding this can vary, although generally students' assessments of their work correlate positively with other measures (Brown et al., 2015). Clearly communicated purpose, practice, scaffolding and training can improve the accuracy of self-assessment and peer assessment, as well as helpfulness of feedback comments (Gan & Hattie, 2014; Nicolaidou, 2013; Panadero et al., 2016). In a New Zealand study, school students' self- and peer-feedback comments were analysed to find out what kinds of feedback students tended to provide. Students' feedback mostly related to the task (e.g. 'good proofreading and writing of words and sentences') and process (e.g. 'I need to work on finding information in texts and understanding what I'm reading'). Feedback that mentioned goals (i.e. 'self-regulation feedback'; e.g. 'I think we were really successful today because we worked as a team') was rarely found in self-assessment, and never in peer assessment. The authors suggested that if teachers want to use self-assessment and peer assessment to support students' self-regulation of their learning, they need to support them with training and practice (Harris et al., 2015).

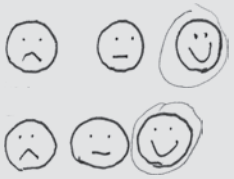
Participation in building up a portfolio is a form of self-assessment. This and examples of other forms of self-assessment are presented in **CLASSROOM LINKS 13.4**.

CLASSROOM LINKS 13.4

Self-assessment

Student self-assessment (and peer assessment) 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 shown here.

How do you feel about telling news?



How do you feel about listening to other people's news?

What do you need to remember when telling news?

1 to speek cleley.
2 to not put youre finges in youre math.
3 to shaw them youre news

What do you need to remember when listening to news?

1 to not talk.
2 to listen.
3 to look at them.

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 SQ_3R (Survey, Question, Read, Recite, Review)			✓	I have never heard of it before

>>

ACTIVITIES

1. The sample self-assessment sheet about telling news 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 Go Further self-assessment task. 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?

13.6 Ensuring quality in assessment

In a classroom situation, teachers need to ensure that the procedures they use are reliable, valid and fair (Brady & Kennedy, 2018). 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

reliability
The extent to which a test or measurement device obtains the same result when used on successive occasions

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.

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 (i.e. 'test–retest reliability'), but also if different people mark or score it (i.e. '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 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 (e.g. 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 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
- *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

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 (i.e. the planned outcomes) of that learning, and with the learning and teaching activities the students have experienced. This is an aspect of fairness; for example, if you have not been taught about calculus, it would be unfair to have it included in a test of your learning.

validity
The extent to which a test or measurement device measures what it purports to measure

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 (i.e. the 'constructs') that underlie the curriculum objectives.

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

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. Another form of validity is **consequential validity**, which refers to the intended and unintended consequences of interpreting assessment data, including the influence of assessment on teaching (Tiekstra et al., 2016). Some of the concerns about the effects of high-stakes testing (see **RESEARCH LINKS 13.1**) are about consequential validity. It may involve the interpretations made from assessment results (e.g. ranking schools on the basis of their results).

consequential validity
Intended and unintended consequences of assessment interpretation and use

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, or are other factors involved? For example, do the questions require literacy skills for students to understand what is asked? If so, then the test results may measure literacy rather than being a valid test of number skills.

Test bias

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; for example, the knowledge or skills required to do well on a test may be found more in particular groups (e.g. boys, children living in urban areas, or children from a particular religious background) than in others. Lack of bias is established if it can be shown that neither the test content nor the interpretation of its results disadvantages specific groups of students. For example, students with reading problems will be disadvantaged in text-based assessments, but not in assessments where no reading is required.

test bias
Where particular groups are disadvantaged by factors associated with a test's content and the interpretation of results

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 US. Subsequent use of the Stanford–Binet Intelligence Scale and similar tests of intelligence with children from other cultural backgrounds (e.g. 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

culture-sensitive or culture-fair test
A test that does not require culturally-based knowledge

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.

Mahuika and colleagues (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 they 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.

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 **IMPLICATIONS FOR EDUCATORS 13.3**.

THINK ABOUT

How will you check to make sure assessment methods are reliable, valid and fair in your classroom?

IMPLICATIONS FOR EDUCATORS 13.3

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.

Alignment and the use of standards

Assessment, learning goals and what is taught (i.e. curriculum) need to be aligned to ensure validity and fairness. Alignment of assessment with, and its integration in, classroom teaching ensures that assessment activities are not simply tacked onto the end of a unit of work, but form an integral part of it. Students gain a stronger appreciation of what is required and how it relates to what they have been learning. 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). Another approach to integration, associated with assessment for learning, and described by Heitink et al. (2016), is to partner with students in learning and assessment through use of self- and peer-assessment, as discussed above. This has the added benefit of contributing to learners' motivation for learning and their skills and knowledge for self-regulation of learning.

Judgements of assessment performance in Australia must also be aligned with the standards. This both ensures validity of judgements and provides opportunities for learning conversations with students around the quality of their work and their progress (Klenowski & Wyatt-Smith, 2014). Publication of exemplars of student work demonstrating the standards can assist teachers to align their judgements with the standards, and for judgement to be consistent across many teachers.

In a different approach, in 2018 New Zealand's Ministry of Education removed national standards from its requirements for assessment and reporting, encouraging teachers to focus rather on the progress and achievement of each child in relation to the New Zealand Curriculum. The change is intended to support teachers to base learning and teaching decisions on each child's current knowledge, skills and learning needs. Teachers will still assess and report on students' progress and achievement, linking to the curriculum, and drawing on a broad range of assessment approaches to suit the needs of their students and communities (New Zealand Ministry of Education, 2019). In Australia, the Gonski review (2018) recommended use of learning progressions rather than stage-based standards for assessment and reporting, which has a similar focus.

THINK ABOUT

How do each of these approaches support students' learning? Which approach fits best with your philosophy of learning and teaching?

Using rubrics to provide transparency

Transparency of judgement means that 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 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, although providing improvement feedback together with the rubric maximises its effectiveness. Wollenschläger et al. (2016) compared three ways of providing feedback using a rubric: giving the rubric alone, giving the rubric along with information about the student's task performance, and giving the rubric along with information about task performance and cues on how to improve. They found that the students provided with the improvement information showed higher achievement subsequently, had more positive evaluations of their competence, and were more accurate in evaluating their own performance.

rubric
A tool for marking and giving feedback about student work against particular criteria and standards

Moderation

As discussed earlier, teachers' judgements about the standard of work must be consistent for evaluation to be considered reliable. **Moderation** ensures consistency across teachers, schools, states and time. It can also contribute to teachers' practice – as they develop stronger

moderation
The process of teachers comparing and discussing judgements with each other in order to improve consistency of judgement

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 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 (e.g. organising the time sequence differently) and complex sentences	Successfully manipulates the standard features of the genre narrative to introduce interest (e.g. use of present tense to indicate the events are in a dream)

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

understandings of the standards and what progression through them looks like, they can guide students' progress more effectively (Klenowski & Wyatt-Smith, 2014).

It is critical that teachers use the same **criteria** and **standards** to judge student work. 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 (NZ Ministry of Education, 2011). Another example of the moderation processes that occur in high-stakes, summative assessments that occur at the end of secondary school is discussed in **IMPLICATIONS FOR EDUCATORS 13.4**. Use standards to judge student work samples in Appendix 13.3 online.

GO FURTHER
Appendix 13.3
Examine how standards are used to judge student work samples

IMPLICATIONS FOR EDUCATORS 13.4

External moderation

At the end of high school, many students in Australia receive an Australian Tertiary Admission Rank (ATAR), which is used by universities to select future students. As discussed earlier in this chapter, relying entirely on a summative external examination to rank students for entry to university poses several significant concerns for assessment reliability and fairness. For these reasons, the ATAR is calculated using a combination of school-based assessments and an external examination. Given the high-stakes nature of selecting students for university courses, it is important that the marks used to calculate the ATAR are comparable across schools.

Although external moderation processes vary from state to state, such processes aim to ensure that students are not advantaged or disadvantaged by any variation in difficulty of assessment tasks set in different schools. For example, a mark of 65 in one school may not be of the same standard as a mark of 65 in another school, due to differences in assessment task difficulty or marking. As the external examination is the same for all students taking the subject in each state, the marks students receive should be comparable (i.e. a mark of 65 in the external examination sat in one school will be equivalent to a mark of 65 in the external examination sat in a different school). It is for this reason that the marks a student receives in the external examination are used to moderate their school-based assessment marks.

ACTIVITIES

1 What are the benefits and limitations of using a combination of school-based assessment and an external examination to calculate the ATAR?

2 Find out about the external moderation processes that are used in your state on your state's education authority website. How could you explain this process to students and parents?

13.7 Use of assessment data

Assessment and evaluation are inseparable. When teachers gather information about students' achievements (i.e. assess), they also make judgements about (i.e. evaluate) 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.

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 in the form of a grade (e.g. 'A', 'B' and 'C'). This procedure compares student performances with one another (i.e. *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 (i.e. *criterion-referenced* assessment) is used,

as is comparison with a curriculum (i.e. *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 assessment** (or *normative*) assessment procedures whereby 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 are dependent on the performance of a class, a school, a school district or a wider area, which means that the standard of the norm can change from year to year.

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 or year group. 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; for example, 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 (i.e. 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 specified, uniform conditions; and have standard procedures for scoring and interpreting results and comparing these with the test norms. The main feature of norm-referenced assessment is that it provides information about individual students' level of achievement when compared with students of similar age and educational background in a specific area of learning. Graham and colleagues (2010) warned that norm-referenced assessments are not appropriate for Māori, Pasifika or many Aboriginal and Torres Strait Islander students because they emphasise competitive goals (i.e. doing better than the next person), which clashes with collectivist beliefs. **CHAPTER 11** 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**.

In the final decades of the 20th century, the growing democratisation of education in western societies culminated 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 has been 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 (Mertler, 2016). 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 progression. This has been described as **standards-referenced assessment**, with student achievement measured against a set of standards that describe levels of achievement of syllabus outcomes (NSW Education Standards Authority, 2019).

standards-referenced assessment
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 learnt what they have been taught. In order to do this, assessment will be based on curriculum objectives and content. Masters (2013, 2016; see **IMPLICATIONS FOR EDUCATORS 13.1**) 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, seeking to understand where learners are in their long-term learning journey. Assessments derived from the curriculum and carried out as part of the teaching process give vital information about what students have learnt 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.

Types of curriculum-based assessment and profiles

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 (e.g. '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 Literacy and Numeracy Learning Progressions in Australia and New Zealand (see **CLASSROOM LINKS 13.2**) and Western Australia's 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 (see **FIGURE 13.6**).

profile
An ordered sequence or progression of learning descriptors that can be used to chart progress

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.

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?

Source: Shutterstock.com/Monkey Business Images

Ipsative assessment

If the interest is in how much progress an individual student has made, then **ipsative assessment** (also known as self-referenced assessment) is used. Employed most often to assess performance skills outside a school setting (e.g. in sports such as swimming or skiing), it 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. As ipsative assessment does not involve competition with others, it may be a more motivating approach to assessment for students with additional learning needs or low self-esteem (Isaacs et al., 2013).

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. Students can also be involved in ipsative assessment by evaluating their progress across multiple self-assessments.

THINK ABOUT

- How and when will you make use of norm-referenced, criterion-referenced, curriculum-based and ipsative forms of assessment in your work as a 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 has 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 learnt 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 difficult, 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, and professional development for teachers in their use. See Alonzo (2018) for more on learning progressions and assessment.

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).

13.8 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.

TABLE 13.2 Stakeholders and their information needs

Stakeholders	Information needs	Assessment and reporting methods
Students	Feedback on what they did well, what they can improve on, and how	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	
Community	General information on operation of schools	Formal, impersonal, remote, summative, administrative

Source: Adapted from Griffin & Nix, 1991, p. 35.

Common reporting standards have been 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.

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. Brooks and colleagues (2019) argue that students are more likely to perceive feedback as being useful when it:

- identifies specific errors and poor strategies, with suggestions for how to improve
- is linked with the assessment criteria; for example, when feedback is focused on assessment requirements rather than presentation (unless presentation is an assessment requirement)
- is provided at a time that allows students to use the feedback to improve their performance.

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. 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 and colleagues (2004) found that giving grades and comments together was also ineffective – students looked at the grade and either did not 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 that follows), once again, purpose must be considered; if the intent is to provide feedback to improve learning, the most effective form should be selected. See **TABLE 13.1** 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.

Heitink et al. (2016) reported in their review of research on assessment for learning that focused, constructive feedback that makes errors clear and provides suggestions about how to improve can influence student motivation for learning. Gamlem and Smith's study (2013) highlighted the value of feedback that involves dialogue either between teacher and students, or between students. The most effective feedback was provided on the spot, and students were given time to respond to the feedback in working on a task (see **FIGURE 13.7**).

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?'

Alamy Stock Photo/Jim Wileman

RESEARCH LINKS 13.2 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 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. **CASE STUDY 13.1** outlines one teacher's reflections on the reporting process.

Methods of reporting to parents

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 and the school website
- regular student–teacher, parent–teacher and three-way (student–parent–teacher) interviews
- reports
- notes, telephone calls, emails and personal visits to the school

RESEARCH LINKS 13.2

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 the learning goal. Effective feedback can operate in terms of three key questions, and at four levels. The questions are:

1 *Where am I going?* 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?* At this level, effective feedback gives information about progress, and about how the student can improve. Information can compare students' current level to the goal, which can be done using a specific standard, such as an ideal performance or their own prior performance; it may also relate to success or failure on a particular component.
3 *Where to next?* Feedback relating to this question can lead to better understanding of the goal, to improved self-regulation, and to deeper understanding. Brooks and colleagues (2019) found that Australian Year 5 students perceived this as the most helpful type of feedback, highlighting the importance of using formative assessment in the classroom.

In answering these questions, teachers can direct feedback at four levels:

1 *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.'
2 *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.'
3 *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.'
4 *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 (2007) findings, the least effective of these forms is feedback about the self, while feedback about process and self-regulation are most effective for deep processing and mastery of tasks. In the aforementioned study, Brooks and colleagues (2019) also found that students rated self-regulation-directed feedback as being less helpful than other feedback types. This suggests that these students preferred to receive direct task- and process-related feedback about how to improve their performance, rather than being asked to think about how they could improve.

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 (2007) 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?

CASE STUDY 13.1

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 to 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 assessments 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?

- 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, 2018; Cuttance & Stokes, 2000).

Principles of good reporting

Following a review of reporting in Australian schools, Hollingsworth and colleagues (2019) identified the following recommendations for reporting student learning:

- Key terms used in reporting (e.g. A to E scale, performance, progress) need to be clearly explained and used consistently across schools and school systems to increase the clarity of reports for parents and other stakeholders. This also extends to explaining how grades are determined.
- Focus should be shifted from a summative report at the end of each semester to continuous reporting throughout the school year. You can read more about continuous reporting in **CASE STUDY 13.2**.
- Reports that focus on student progress over time, both in terms of student movement through learning progressions (see **IMPLICATIONS FOR EDUCATORS 13.5**) and smaller gains in skills and understanding, will provide valuable information to students and parents.
- Reports also need to show how the student's performance relates to the standards expected of their age and stage.
- Information in reports should be presented in an accessible manner, and may include visual ways of presenting student progress (e.g. using simple graphs).
- Students benefit from reports that tell them how they can improve, rather than feedback that only praises their achievement in a subject.
- Schools should use a range of methods to report on student learning, and the purpose of each method should be carefully considered to maximise the efficiency of reporting.

three-way reporting
Reporting that involves student, teacher and parent input

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 Te Kete Ipurangi 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 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.

THINK ABOUT

- In reporting to parents, should information on student progress be based on grades (i.e. norm-referenced tests), standards (i.e. criterion-referenced tests), lesson content (i.e. curriculum-based tests) or a student's previous results (i.e. ipsative assessment)?
- What type of data (i.e. 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 assessment results be compared across classes at each grade level in a school, across schools in a community, and/or across states/territories or nationally? Who should have access to this information? Why?

CASE STUDY 13.2

Comparing continuous and traditional reporting

Nathan, a high school science teacher, has been at his current school for three terms. He is reflecting on the differences in the two reporting processes used by his current and previous schools. His previous school used a traditional approach to reporting in which a summative report was sent home at the end of each semester. Nathan's current school uses a continuous reporting model in which teachers report on student progress regularly throughout the semester using the school's online learning management system. The system allowed Nathan to upload assessments and work samples for students and parents to view, along with the assessment criteria and Nathan's feedback on the tasks. Students were also involved in the assessment and reporting process, as they were also able to assess their own work.

While this process did take more time during the semester, Nathan could see a number of significant benefits of the continuous reporting model. First, parents were better informed about their child's progress earlier in the school year. At his previous school, many parents commented that it was too late to provide support to their child after receiving the report at the end of the semester. At his new school, parents were informed when their child needed assistance earlier in the year. The second major benefit Nathan identified was that he could provide parents and students with much more specific feedback about how the students could progress their learning. At his previous school, Nathan was only able to provide a few sentences about students' progress over the entire semester. Continuous reporting allowed Nathan to provide specific information on each work sample that students could use to improve their performance.

Government regulations mandated that parents were still to be provided with a report at the end of each semester. To compensate for the increased time continuous reporting took during the semester, Nathan's school opted for automated reports that were generated by the learning management system. These automated reports included graphical representations of data teachers had uploaded during the semester. Nathan noticed a substantial reduction in time pressure around reporting time. Continuous reporting also provided his faculty with more flexibility to schedule assessments when they were most useful for the teaching and learning process, rather than assessment scheduling being driven by reporting timelines.

ACTIVITIES

1. What might be some of the limitations or difficulties associated with implementing continuous reporting in a school?
2. How could continuous reporting be used to improve academic achievement?
3. Nathan's students were able to assess their own work during the continuous reporting process. What strategies would you implement to help students develop self-assessment skills?

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 learnt and how effective the teaching has been. Such data can be used to diagnose students' strengths and weaknesses, and to

FIGURE 13.8 Teachers use assessment data to plan future learning and often do so in collaboration with other teachers and school support staff

Shutterstock.com/Rawpixel.com

plan future teaching programs (as shown in **FIGURE 13.8**). 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. In New Zealand, e-asTTle was developed to develop a national assessment program based in classrooms, rather than on external tests (for more on this see the Assessment Online website: https://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 (i.e. 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, 5, 7 and 9 in Australian schools (Ministerial Council on Education, Employment, Training and Youth Affairs, 2008), and the assessment of essential learning areas and skills in a representative sample of 8-year-olds and 12-year-olds each year in New Zealand (National Monitoring Study of Student Achievement [NMSSA], 2018).

In Australia, 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. Comparison of school performance data are communicated to parents and the wider community through the MySchool website (https://myschool.edu.au). This 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.

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.

Reporting to government

What does the government want out of student assessment? Data from state-/territory-based or national assessments provide information about school standards in those specific regions. An example in Australia is the annual national collection of benchmark data in reading and writing literacy and numeracy by the Australian Curriculum, Assessment and Reporting Authority (ACARA) for the federal government. Such information may be used to decide funding priorities, 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, and the Trends in International Mathematics and Science Study (TIMSS) assesses mathematics and science skills and attitudes of students across 60 countries in Years 4 and 8 every four 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. Links to PISA, NAP, and NMSSA can be found in Appendix 13.4 online.

GO FURTHER

Appendix 13.4
Links to PISA, NAP and NMSSA

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, in opinion pieces (see Masters, 2019). Education is likely to figure most often during key times in the school year, such as at the start of a school year,

during the administration of NAPLAN tests, or following the release of results of large-scale assessments (e.g. PISA or TIMSS). 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).

IMPLICATIONS FOR EDUCATORS 13.5 discusses how stakeholders' assessment-information needs may impact on educators.

IMPLICATIONS FOR EDUCATORS 13.5

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 is 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.

13.9 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 student information 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 (i.e. **informed consent**) must be obtained. (See also the discussion of ethical issues in **CHAPTER 1**.)

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 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 **CASE STUDY 13.1**).

13.10 Concluding comments

Effective assessment and reporting are the key to promoting quality learning and teaching, and involve 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 improve 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).

STUDY TOOLS

Chapter review

13.1 What is assessment?

- Assessment is the gathering of information about students' learning or achievement.
- Evaluation is the judgements made about that information.

13.2 Forms of assessment

- The main two forms of assessment are formative assessment and summative assessment.
- The primary purposes of assessment are:
  - to improve learning: assessment *for* learning and assessment *as* learning (formative assessment)
  - to measure learning at a point in time: assessment *of* learning (summative assessment).

13.3 Approaches to assessment

- Teachers may choose from a number of different approaches to assess student learning
- Examples of different approaches to assessment include traditional assessment, performance assessment and dynamic assessment.

13.4 Assessment tools

- There are many examples of assessment tools and teachers should select assessment tools that provide useful information about the skill or knowledge being assessed.
- A range of assessment tools and practices should be used in educational settings.

13.5 Student-focused approaches to assessment

- Student-focused forms of assessment include conversations with students around learning (e.g. interviews, questioning), self-assessment, and peer assessment.
- These forms of assessment are beneficial because they directly involve students in the assessment process and provide opportunities for students to gain insight into their own learning.

13.6 Ensuring quality in assessment

- Teachers can increase the quality of assessment by ensuring that assessments are both valid and reliable.
- Assessment rubrics are a useful tool to provide transparency of judgement when grading student work.
- Moderation ensures that assessments of student work are consistent across teachers, time and schools.

13.7 Use of assessment data

- Assessment involves interpreting evidence of student learning and using it to adapt instruction.
- Assessment data can be interpreted in a variety of ways: by comparing performance to others, comparing current performance to previous performance, and by comparing performance to a particular curriculum goal or outcome.

13.8 Reporting the results of assessment

- Reporting of assessment results takes different forms depending on the particular audience.
- Information derived from the assessment process is of immediate interest to teachers, who want feedback on their teaching; students, who want feedback on their learning; and parents, who want to know how their children are progressing at school.

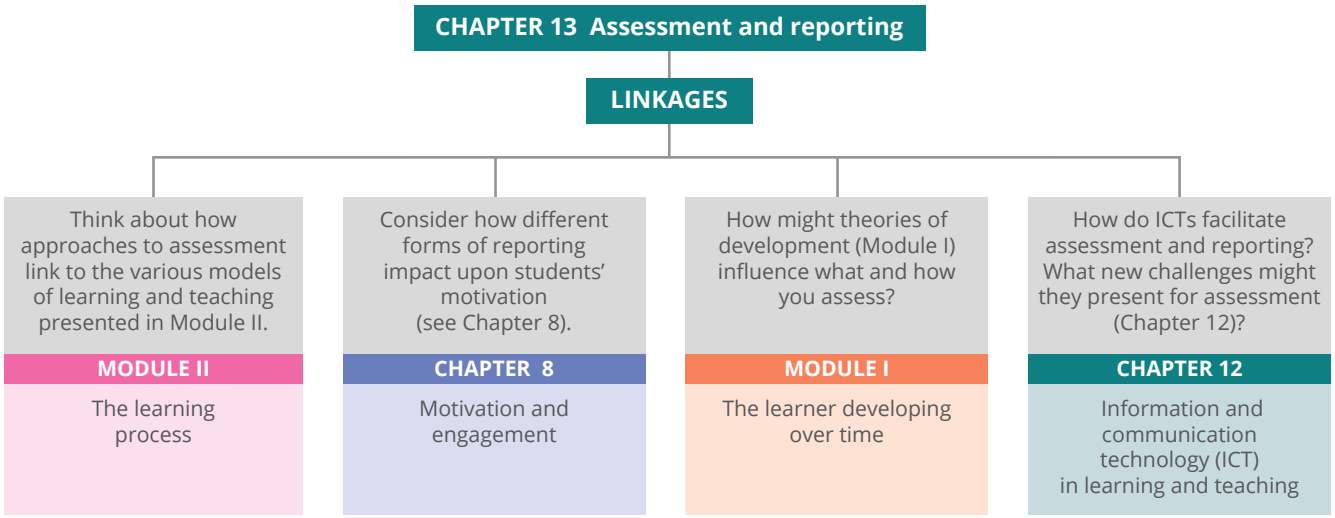
- School psychologists use assessment to make decisions about school placements and to assist teachers in developing classroom management plans.
- School principals and other administrators use this type of information for screening, selection, classification, placement, eligibility and certification.

13.9 Recording and reporting assessment results

- Privacy and consent should be considered in the collection of student information.

Putting it together

Making links between 'assessment and reporting' and material in other chapters



Questions and activities for self-assessment and discussion

1 Outline the different forms of assessment that are used in schools and describe the role of each in the teaching and learning cycle.
2 Find an assessment tool used in your teaching area. List the advantages and disadvantages of this 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 Identify the key skills and knowledge that you consider to be central to teachers' assessment literacy (skills and knowledge to collect, analyse, interpret and respond to assessment information) that supports student learning. What beliefs accompany these skills and knowledge?
6 How can teachers involve their students in the assessment process, and what are some of the benefits of this approach?
7 What are the benefits of continuous reporting? How can students and parents be supported to engage effectively with this style of reporting?
8 Identify the main groups who are interested in the outcomes of assessment in schools and discuss how they might use assessment information.

Further research

Go further

GO FURTHER

The online appendices contain additional material that you should refer to when reading this chapter. The appendices available for this chapter are:

- Appendix 13.1 An additional observational activity
- Appendix 13.2 Self-assessment
- Appendix 13.3 Examine how standards are used to judge student work samples
- Appendix 13.4 Links to PISA, NAP and NMSSA.

Recommended websites

View the National Literacy and Numeracy Learning Progressions (K-10) for Australia at: https://www.australiancurriculum.edu.au/resources/national-literacy-and-numeracy-learning-progressions or https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities

View the National Literacy and Numeracy Learning Progressions (K-10) for New Zealand at: https://curriculumprogresstools.education.govt.nz/lpf-tool

Investigate the approach to assessment and reporting at your local department of education.

Australian Council for Educational Research (ACER): https://www.acer.org/au

Australian Curriculum, Assessment and Reporting Authority (ACARA): https://www.acara.edu.au/assessment

Queensland Department of Education and Training: http://education.qld.gov.au

New Zealand Council for Educational Research (NZCER): https://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: https://arc.nesa.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.

South Australian Department for Education and Child Development: https://www.education.sa.gov.au

Tasmanian Department of Education: https://www.education.tas.gov.au

Victorian Curriculum and Assessment Authority: https://www.vcaa.vic.edu.au/Pages/HomePage.aspx

Western Australian Department of Education and Training: https://www.education.wa.edu.au

Recommended reading

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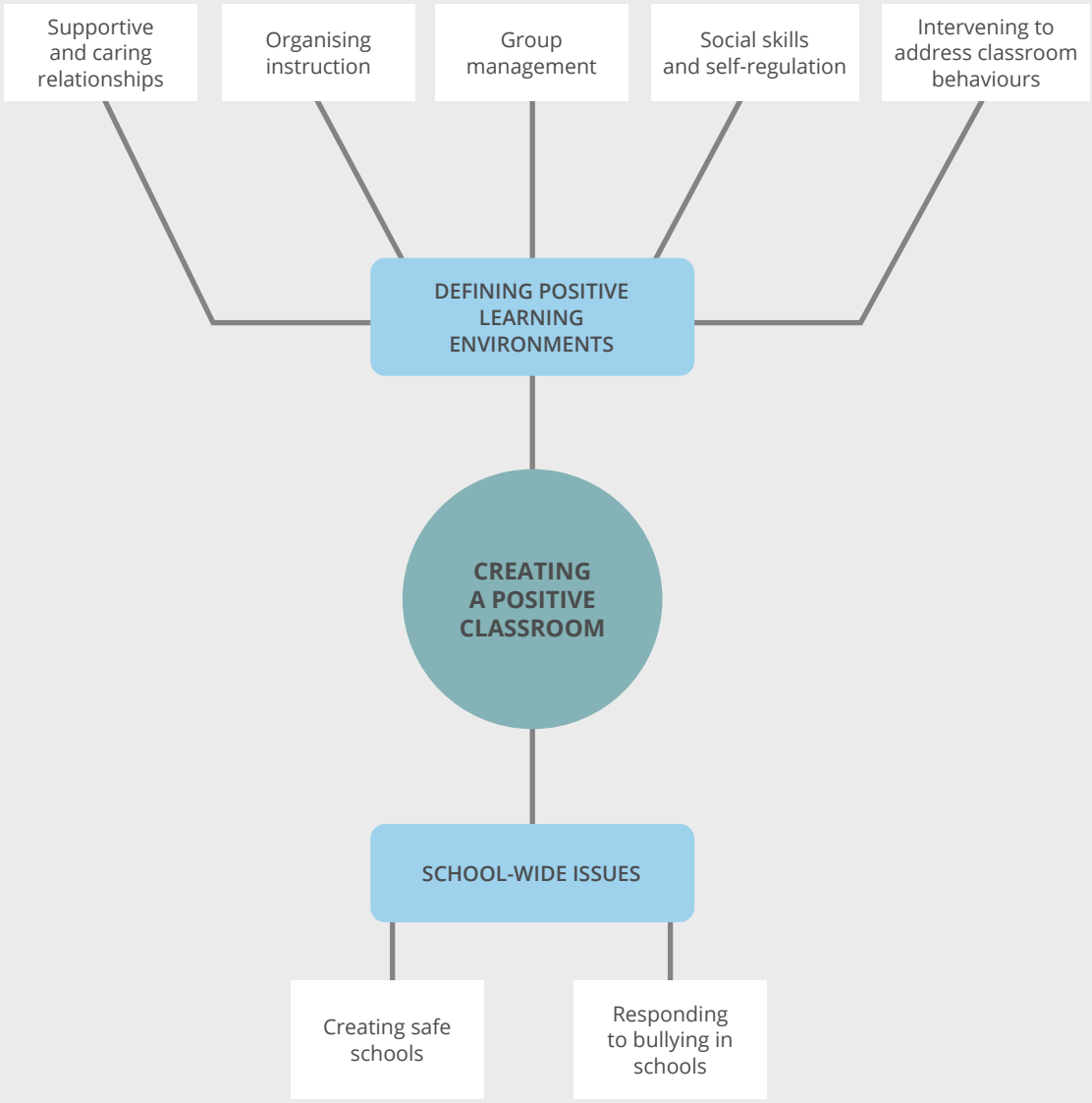
CHAPTER 14

Creating a positive classroom



Chapter 14 concept map

KEY QUESTIONS

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

- What is a positive learning environment (PLE)?
- What is classroom management?
- What are the different philosophies of classroom management?
- Can you describe your own philosophical approach to creating a positive classroom environment?
- Can you identify the five tasks of a comprehensive approach to creating PLEs and managing classrooms? What is the teacher's role in promoting a safe school?

TEACHERS JOHN AND TERRY

John teaches Year 4 and Terry teaches Year 8. Each teacher has created a unique classroom environment that in turn fosters student learning and engagement. Each teacher has their own view of how to respond to behaviours in their classroom. John and Terry have just taken part in a voluntary survey of teacher approaches to classroom climate and student behaviours. The students in each of their schools have also completed a survey in which they nominated the teachers they thought were the 'most effective classroom managers'. John is very surprised to learn he has the most controlling style of teacher behaviour in his classroom and students at his school did not nominate him as one of the most effective classroom managers. Terry, on the other hand, has a less controlling style and received high nominations from students as 'an effective classroom manager'. The results also indicate differences in the quality of the classroom environment of each teacher.

Introduction

When you think about a positive learning environment (PLE) what is it that comes to mind? How about the term 'classroom management'; what is it that comes to mind now? Often we think of managing student behaviour, but how often do we think about creating the most positive learning environment we can? Such PLEs are integral to both effective teaching and your ability to manage that positive learning environment productively (De Nobile et al., 2020). In this chapter, we consider the teacher's role in creating a positive learning environment and also managing classrooms for ensuring effective work with students. First, we examine the concepts of 'positive learning environments' and '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. Next we consider an integrated and comprehensive approach to the creation of a positive classroom environment and management within that environment, 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 environments.

14.1 Defining positive learning environments

positive classroom environment (PLE)
Defined as a place where students are engaged and learning

A **positive classroom environment** or **PLE** is simply explained as 'places where students are engaged and learning' (De Nobile et al., 2020, p. 4). In these classrooms the teacher strives to facilitate learning that is engaging and productive, where the teacher acknowledges more positive behaviours in students than corrects or admonishes students. This occurs because the teacher has a good relationship with students and knows each student well enough to address their learning needs (see also **CHAPTER 10**). As stated by De Nobile et al. (2020), this is not to say that the PLE will never experience inappropriate behaviours, but positive classrooms are generally also preventative spaces.

Defining classroom management

classroom management
The actions of teachers to create a planned and organised classroom environment that supports student learning and socioemotional needs

If you compare your definition of 'classroom management' with those of your peers or other teachers, you may find a wide variety of definitions, and for some it simply refers to controlling students' behaviour. However, 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 positive development of behaviours of the whole individual, including their cognitive and socioemotional needs.

Teachers' individual approaches to classroom management reflect different social, cultural and historical influences, and are also influenced by beliefs and philosophies about how children develop (Egeberg et al., 2016). These beliefs can provide a theoretical lens through which the teachers view their work. As such, it is important for teachers to recognise their existing beliefs about classroom management and to also explore other ways of thinking about and defining this important area of teacher practice.

Philosophies of classroom management

The way a teacher interacts with students in a classroom is believed to be related to their philosophies or beliefs about how children develop (Martin & Sass, 2010). Wolfgang (2001) originally identified three different philosophical orientations towards classroom management: the rules and consequences philosophy, the confronting–contracting philosophy, and the relationship–listening philosophy. More recently these philosophies have been termed the *interventionist*, *interactionalist* and *non-interventionist* approaches to classroom management (Martin & Sass, 2010). These philosophies reflect very different views about children and provide a useful framework for thinking about questions of the teacher's role in the PLE. How do we expect children to behave? How do we expect children to behave in schools? Why do we believe children should behave in certain ways? Why do some teachers believe they must exert control and hold all power in the classroom, whereas others do not?

Teachers subscribing to the **interventionist philosophy** believe that child learning and behaviour is influenced by the outer or external environment. This aligns with the behaviourist approach to learning we explored in **CHAPTER 5**; this is the most directive and controlling of the three approaches (as seen in John's approach).

Teachers who apply the **interactionalist philosophy** believe that disruptive behaviour results from the interaction between the child's ability to control their needs and the external demands of the classroom. The teacher would work with the child to develop a solution that is mutually agreeable; they may 'confront' the child about their behaviour and then allow the child to decide how they would change, effectively forming a 'contract' of understanding with the child. This is representative of teacher Terry's approach to the classroom.

Teachers who subscribe to the **non-interventionist philosophy** view discipline problems as arising from the inner needs of the child to find their own expression in the world. These teachers are the most humanist and least controlling; they view children as inherently good but in need of supportive adults who listen and provide empathy and understanding. These teachers help children balance their needs in relation to the wider needs of classroom life (Martin & Sass, 2010; Woolfolk Hoy & Weinstein, 2006).

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

A recent study in Australian classrooms applied these philosophies in a survey of teacher approaches to behavioural and classroom management (Egeberg et al., 2020). Students in these same classrooms had earlier been asked what it is that teachers do to effectively manage their classrooms. They were asked to nominate some teachers who did this well (Egeberg & McConney, 2017). Combining the results of these two studies, the researchers found that teachers nominated by students as most effective classroom managers adopted an *interactionalist* approach – similar to teacher Terry. In interviews these teachers often referred to building caring and supportive relationships with their students. In contrast, teachers who were not nominated by students responded with more statements indicating a concern for imposing and maintaining control, and reported more use of punitive strategies like detentions and time outs (Egeberg et al., 2020).The authors of these Australian studies concluded that the most effective classroom managers were those who seemed able to combine care and concern for students alongside their instructional and behavioural management practices. They believed that trust and encouragement were critical, but also held students accountable and held high expectations of these students. As you can see, beliefs and philosophies about children and young people do seem to be reflected in our approaches to classroom management, while teacher and student reports indicate these approaches are associated with different qualities of the classroom environment.

THINK ABOUT

- Which of these philosophical 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, constructivist or social learning theories in each perspective?

14.2 Creating a positive classroom

In adopting a broad and comprehensive perspective, we take the approach that the creation of a PLE requires more than simply attending to student behaviours or misbehaviours when they arise. This is also reflected in Evertson and Weinstein (2006, p. 5), who suggest that optimal and positive classroom management comprises 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 respond to classroom behaviours.

Source: Evertson, C. M., & Weinstein, C. S. (Eds). (2006). Handbook of classroom management: Research, practice, and contemporary issues. Erlbaum. P. 5

Clearly, the creation of a PLE and 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. In fact, recent research that asked Australian school students about their classrooms confirms the above points. According to students, the most effective classroom managers are those who can manage their classroom and are also teachers who establish warm and caring relationships with their students. As we discussed previously, they also develop a sense of responsibility in their students and have a high level of student engagement in learning (Egeberg & McConney, 2017). In the remainder of this chapter we explore Evertson and Weinstein's five tasks and illustrate linkages with the philosophical orientations we have discussed.

Development of supportive and caring relationships

John teaches in a Year 4 classroom with the usual diversity of students whom he fondly describes to his colleagues. There is Skye, 'she is my little star', who is sure to top the class this year, and Caleb, who 'just tries so hard' but still worries him. He describes other students less warmly. 'Amelia? I can't think of anything to say about her on parent–teacher night.' 'And Kyle? I was warned about him. He is a low achiever. He seems to misbehave a lot and constantly annoys me with the silliest questions.' Do you think that John's beliefs about his students are likely to influence his relationships with those students? What if John's positive hopes for Skye and negative beliefs about Kyle were known to other students? Could his beliefs actually influence the students' achievements or relationships with their peers?

Teacher–student relationship

In Hattie's (2009) meta-analysis of factors explaining academic outcomes of students, teacher–student relationships (TSRs) were ranked 11th of 138 factors, with a large effect size of 0.72. (See **CHAPTER 1** for more about effect sizes in educational research.) TSRs are characterised by the extent of warmth and rapport, or negativity and conflict, between the teacher and student. This can extend to qualities of teacher and student attitudes and behaviours and can include the climate and morale of the classroom environment as a whole.

An extensive meta-analysis by Roorda and colleagues (2011) confirmed that TSR quality has significant effects on both student engagement and academic achievement. The effects of positive TSRs are particularly strong for student engagement (see **CHAPTER 8**) and slightly less strong but still significant for student achievement. A gender effect is evident in these meta-analysis findings showing that negative TSRs have the greatest effect size for boys, whereas positive TSRs have the greatest effect size for girls. It was also found that in secondary school classrooms, positive TSRs had stronger effect sizes than negative TSRs. The opposite was found for younger students. In elementary or primary school classrooms, negative TSRs had stronger effect sizes compared to positive relationships. This does not mean that negative or positive relationships do not matter for either age group, rather it means that at certain ages, the positive and negative qualities of TSRs have greater significance for a student's achievement and engagement. Why do you think this may be so?

Later research by Allen et al. (2013) confirmed these findings for adolescent students, showing that academic achievement outcomes were highest in classrooms where adolescents experienced positive TSRs, and teachers demonstrated greater sensitivity to adolescent needs. In Australia, Martin and Collie (2016) claim that TSRs explain the bulk of variance in their studies of student motivation and engagement (see more on Martin's research in **CHAPTER 8**).

Differential interactions in the classroom

In the earliest studies of TSRs, researchers spent many hours observing teacher–student interactions in typical classrooms (Good & Brophy, 1972, 1974; Silberman, 1969). These observations revealed that teachers not only developed personal beliefs and attitudes about their students, but that relationships with these students also varied in quality. The researchers described this variation as **differential teacher–student interactions**.

differential teacher–student interactions Qualities of the interaction between 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 and rejection. The nature of these differential interactions can be matched to teacher John's descriptions of students in his classroom (see **TABLE 14.1**).

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 teacher John's idea of the 'model' student. Teachers may expend a lot of teacher time and energy in negative interactions with students like Kyle that are designed to manage their behaviour.

At this point we must also acknowledge that there is a difference between rational and deliberate classroom differentiations John might make if he recognises, for example, that Caleb or

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 conditions that influence their behaviour • 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

Kyle have a specific learning support need. As we saw in **CHAPTER 10**, classroom differentiation of this nature aims to adjust or adapt work in a way that supports and extends the learner to reach their full potential. Denneson and Douglas (2015) point out that these conscious practices are in contrast to 'reactive, unconscious, and intuitive differentiating teacher practices that are based on biased perceptions of students' needs' (p. 298).

Although it may be obvious that differential interactions matter in the classroom, the effects of these relationships can be difficult to tease out and often raise controversy. One area of concern relates to the way teacher interactions with students can influence the emotional or affective climate and morale of the classroom.

Differential affect in the classroom

An unfortunate consequence of differential 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).

FIGURE 14.1 Students are able to detect the different emotions and behaviours that teachers direct to more or less preferred students

Shutterstock.com/Iakov Filimonov

Across 25 years of research studies, Babad and colleagues have shown that both young students (Babad et al., 1991) and adolescents (Babad, 2005) can accurately detect differential teacher affect and behaviours, after viewing just 10 seconds of video footage of the teacher. These findings are even more remarkable considering that the video footage used in these studies has no audio and only showed 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 head and upper body. Students could accurately predict if the teacher was talking to a student whom they favoured or did not favour. They could also tell if the teacher was interacting with a low- or high-achieving student (see **FIGURE 14.1**).

In 2016, Babad revisited this vast body of research and summarised the following conclusions:

- Teacher differential behaviour is reliably perceived and reported by students of all ages.
- Although teachers do provide 'learning support' to students for whom they hold low expectations, they provide lower emotional support and more negative affect toward these students.
- Negative outcomes of teacher differential behaviour are most often detected in the affective or emotional domain in the form of negative classroom climate, and greater student anger toward their teachers. These effect sizes can be quite large (e.g. $r = -0.63$).
- Teacher differential behaviour research is not a laboratory research phenomenon but occurs in real classrooms and reflects teachers' socio/emotional/behavioural difficulty in dealing with student diversity in the classroom.
- The 'teacher's pet phenomenon' is the most extreme version of teacher differential behaviour and has a high potential for negative outcomes (Babad, 2016).

The teacher's pet phenomenon

Babad's study of the 'teacher's pet' phenomenon has generated particular interest among researchers. This phenomenon arises when a teacher favours a particular student and this is visible to other students in the classroom. In classrooms with teacher's pets, students' attitudes towards their teachers are more negative than no-pet classrooms (Trusz, 2017). Babad's early studies (Tal & Babad, 1990) as well as more recent research (Chiu et al., 2013) has shown that 'authoritarian' teachers (this is similar to the 'interventionist' teacher profile noted earlier) are

more likely to form teacher-pet relationships. This can result in awarding higher grades to these students (Tal & Babad, 1990) and increased classroom conflict (Chiu et al., 2013).

Recently Trusz (2017) replicated these earlier studies with over 2000 high school students in Poland. Students confirmed that the teacher's pet phenomenon could be found in most classrooms across all levels of high school. As might be predicted, the study also confirmed that students view this teacher behaviour negatively and reported preferential and unfair treatment of 'pets' by their teachers.

THINK ABOUT

- Do you recall examples of the teacher's pet phenomenon in your school classrooms? Did it cause any problems?
- Why might authoritarian teachers be more inclined to form 'pet' relationships?

Teacher behaviour as 'bullying'

Although it is a difficult field of research, a relatively smaller number of studies have also investigated teacher differential behaviour through the lens of bullying. One of the earliest studies conducted by Australian researchers described some forms of teacher behaviour as 'bullying' (Delfabbro et al., 2006). They compared the reports of South Australian Year 10 students on accounts of peer and teacher victimisation, finding that students could recognise and differentiate both forms of victimisation. Students victimised by teachers reported intentions to leave school earlier, had poorer mental health and lower self-esteem. In the US, another early investigative study with teachers identified 'bullying teachers' who engaged in acts of humiliating students, hurting students' feelings and being spiteful (Twemlow et al., 2006). In the same study, fellow teachers who reported their colleagues as bullies believed that teachers who bully students do so for a range of reasons: they may feel burnt out, be poorly trained, or even envious of 'smart students'. Some of the teachers in this study also admitted to 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).

In a recent study of more than 56 000 students in Year 7 and 8 in the US, researchers classified students into groups who reported not being bullied at all (87.2%), being bullied by peers (9.3%), bullied by teachers (1.2%) and bullied by both peers and teachers (1.5%) (Datta et al., 2017). They compared the levels of psychological distress and school adjustment of these students with their peers who reported no bullying. Students bullied by both teachers and peers experienced the highest levels of emotional distress, followed closely by students who reported bullying only by peers. Students who reported being bullied only by their teachers reported the worst school adjustment and lowest grade point averages. Specifically, the emotional and cognitive engagement of students who were bullied by teachers was worse than all other students (see **CHAPTER 8** for explanations of student engagement).

A recent study has closely examined the effect of TSRs on the quality of student–student relationships (SSRs) and these students' experiences of bullying (Dietrich & Cohen, 2019). This study was based on a sample of data collected from US students in Year 5 through 12 with a total sample size of 146 044 students from 7247 classrooms across 131 schools. As was expected, the researchers found that SSR have the greatest effect on bullying while TSR had a small and negative effect on student bullying. However, TSR had a positive and moderate effect (0.45) on the quality of SSRs (see **FIGURE 14.2**). What might this mean for student bullying?

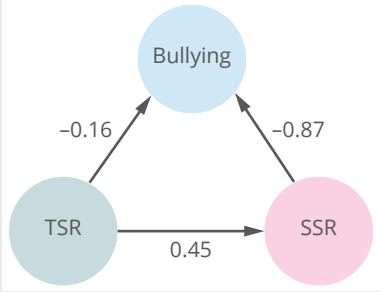


FIGURE 14.2 A model showing the effect sizes of teacher–student relationships (TSR), on student–student relationship (SSR) and bullying

Source: Dietrich & Cohen, 2019.

When we look at the conclusions from these two recent studies we can find some answers to questions such as why some teachers might resort to

bullying their students and how the quality of the TSR could affect the quality of SSRs. Some explanations offered by these authors include: teachers are more likely to bully when feeling greater stress, or if they hold a mistaken belief that being 'tough' on students will motivate them to work harder; or, on a positive note, when TSR are positive it bodes well for positive SSR. Alternatively, if the TSR is negative it might contribute to poorer SSR and the climate of bullying in a school.

In summary, it appears that teacher's beliefs and philosophies might influence their relationships with students and these relationships in turn influence the teacher's ability to create positive classroom environments that engage their students. Can you hypothesise which of the classroom management philosophies might be more associated with teacher bullying behaviours? We know, for example, that the more authoritarian style was associated with the 'teacher's pet' phenomenon.

Teacher expectations

Another quality of TSRs that has been closely investigated considers teacher expectations and their influence on student performance and the classroom climate. Teacher expectations are the beliefs teachers hold about students' ability to achieve expected outcomes; research in this field is chiefly concerned with the question of whether these expectations influence student achievement. This influence was famously demonstrated in the study of Rosenthal and Jacobson (1968) known as the Pygmalion study. These researchers experimentally manipulated the expectations of teachers by telling them students in their class were about to 'blossom' academically and they would make rapid intellectual improvements. This information was in fact made up – it was an experimental manipulation – the researchers had no real evidence of this nature. Nonetheless, across the school year these students did indeed improve. The researchers concluded that teachers had acted differently toward these students after having their expectations falsely raised, and hence the students benefited from this teacher effort and attention and improved their academic standing. This experiment was widely criticised on scientific merit and claims of researcher 'exaggeration' of the effect they reported (Rubie-Davies, 2016).

Subsequently, the field of research expanded dramatically – so many possibilities had been raised by the Pygmalion research study and this subsequently inspired the field of research about differential teacher–student interaction as well as researchers like Good and Brophy. Now, there is extensive is extensive 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). In **TABLE 14.2** we provide a summary of 60 years of research that has documented these differential behaviours (Good, 2014).

TABLE 14.2 Teacher differential behaviours for high and low expectation students

High expectations	Low expectations
Teacher gives more opportunities for responses to the teacher's questions	Fewer opportunities to respond to the teacher's questions
Teacher provides more follow-up questions; e.g. 'Go on, tell me more.'	Fewer follow-up questions; e.g. 'That's not right, anybody else got an idea?'
Given more time to respond	Given less time to respond
More 'stay with' behaviours; e.g. teacher prompts and supports with clues	More 'give up' behaviours e.g. teacher provides the answer or calls on another student
More teacher praise	More teacher criticism and behavioural corrections
More choice	Less opportunity to make choices

Adapted from Good, 2014

Rubie-Davies (2016) has identified teachers whom she describes as 'high' and 'low' expectations teachers. By closely studying teacher practices, Rubie-Davies has consistently demonstrated that high and low expectations teachers behave differently in the classroom and produce different student outcomes. For example, the students of high expectations teachers make more academic gains in a school year compared to students of low expectations teachers. These teachers differ in their instructional practices in the following ways:

- *Grouping and student learning activities:* High expectations teachers engage in more flexible grouping practices rather than separating students into streamed ability groups; class activities are available to all students with no discrimination.

- *Class climate:* Low expectations teachers often manage classrooms with negative and controlling strategies, such as frequent reminders, and there is a lack of positive student relationships. High expectations manage their classrooms with greater warmth and teachers pre-empt and manage student behaviour with positivity. They encourage positive student relationships by mixing up seating, changing group work settings and encouraging collaborative learning.

- *Goal setting and motivation:* High expectation teachers engage in strategies like setting individual goals with students; allowing autonomy and choice of work and activities; closely monitoring student performance and resetting goals and strategies accordingly. There is little evidence of goal setting or motivational strategies in low expectation teacher classrooms.

Rubie-Davies, C. M. (2015). Expecting more: Teacher differences as moderators of expectancy effects. In C. M. Rubie-Davies, J. M. Stephens, & P. Watson. (Eds). Routledge International Handbook of Social Psychology of the Classroom (Vol. 25; pp. 316–326). Taylor and Francis.

Evidence suggests that the expectations teachers hold for students can be reflected in students' achievement. This may be because more favourable treatment meted out to students who are valued more positively may actually enhance their achievement. In contrast, if the teacher expectation is based on unfavourable bias then this may create a **sustaining expectation effect** (Rubie-Davies, 2008). This means that teacher John, having been forewarned about Kyle, may actually have developed expectations about his learning potential before starting to teach this Year 4 class. He may plan work for Kyle at what he thinks is an appropriate level despite noticing that Kyle is often bored or seems to have finished the work quickly. Thus the sustaining expectation effect means that Kyle's performance or achievement stays the same and the teacher's expectation is sustained because the teacher's planning and pedagogy have thwarted the potential for change (Rubie-Davies, 2008).

sustaining expectation effect Expectations that teachers have for their students, which may influence students' achievement or wellbeing in the classroom

Despite this extensive research and evidence about teacher expectations, questions have been asked about whether or not these teacher expectations really influence student achievement. 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 mostly correct (Good & Brophy, 2003). For example, teacher John's concern for Caleb (see **TABLE 14.1**) may be well justified and may reflect concern for Caleb's learning difficulty or other learning support need (see **CHAPTER 10**).

In a meta-analysis of research findings, Jussim and Harber (2005) concluded that these self-fulfilling prophecies do indeed exist. The effect of these self-fulfilling prophecies does not, however, affect all students in the same way. Jussim and Harber (2005) found that teacher expectations for student achievement were more likely to be accurate and effects on achievement may be small for most students. However, these researchers pointed out that some students may

still feel stigmatised and harshly treated. Troublingly, the potential for teacher expectancies to create a self-fulfilling prophecy appears to be stronger for students who are already stigmatised. This includes students from certain racial backgrounds and low socioeconomic class. 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 (McIntosh et al., 2020). If you look at school suspension and exclusion data for Australian and New Zealand students, you will find similar disproportionate experiences of exclusions for minority and indigenous students in these countries. As Jussim and Harber (2005) concluded, much more research is needed to tease out the interactions between teacher expectancies and student outcomes. The recent research of Rubie-Davies (2016) has significantly added to this body of knowledge.

Conclusions about teacher expectations

What conclusions should we draw from this research? First, the evidence that teacher expectation 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-expectation 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 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? If there are low expectations for a student *and* the teacher does little to assist them, then the student is doubly disadvantaged in the classroom.

Organising and implementing instruction to support learning

Organising and implementing 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 14.3** outlines the six ecological features that Doyle (2006) believes are in place in

TABLE 14.3 Features of the classroom environment

Features of the classroom environment	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 (e.g. Brouwers & 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 is not working as expected • Respond appropriately when the unexpected occurs – if necessary, stop a lesson, reteach 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 (e.g. 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

Adapted from Doyle, 1986, pp. 394–5; 2006, pp. 98–9.

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 the 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 TSR and, as shown in **CASE STUDY 14.1**, students actually prefer teachers who set clear directions but who also show warmth and support. Evertson and Emmer (2017) 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 teachers can take to establish such a sense of belonging, as outlined in **FIGURE 14.3**.

Speak politely and calmly	Students need to hear teachers using polite language such as 'please' and 'thank you'. A calm voice reassures 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
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
Use positive statements often	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
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

FIGURE 14.3 Establishing a sense of belonging in the classroom

Adapted from Evertson & Emmer, 2017

Establishing routines and procedures

Effective teachers spend a great deal of time on setting careful expectations and standards in their classrooms, and this includes the establishment of procedures and routines for classroom life. Bear (2014) explains that researchers who take the holistic ecological approach to classroom management emphasise the need for predictable and efficient procedures and routines along with clear, fair rules and consequences. As we will examine below, establishing fair rules and consequences supports classroom management. Students who perceive rules to be very clear and fair exhibit more compliance and fewer misbehaviours. The establishment of routines and procedures includes ensuring relevant and engaging academic tasks are set for students, that the classroom is set up for smooth transitions (i.e. a smooth flow between activities and classrooms), and that the physical space is organised and ready for productive learning.

Clear rules, routines and procedures are particularly important for creating inclusive classrooms in which *all* students can access learning. Clear guidelines, 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 attention deficit hyperactivity disorder (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 (see **CHAPTER 11**). Some differences in social behaviours may surprise teachers who adopt a traditional orientation towards classroom management, but it is important not to assume that students are 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 support students' cultural backgrounds in the classroom.

Classroom rules or behaviour standards

Regardless of which orientation you adopt towards classroom management, there is great agreement among teachers that classrooms need 'rules'. De Nobile and colleagues (2020) position rules as 'behaviour standards' (or expectations). These provide students with clear guidance as to what is expected from them and should guide behaviour positively and clearly. Although there are different approaches and theories about developing rules, Evertson and Emmer (2017) offer the following strategies for planning and developing classroom rules:

- *Keep rules few in number* (4–8 should be sufficient) and state them positively in terms of the expected behaviour, while taking into account the child's age and stage of cognitive and moral reasoning. This will influence their understanding and the type of examples you need to give of what is considered appropriate and expected behaviours.
- *Rules can be stated quite generally but clearly in terms of the expectation*, for example, 'Respect and be polite to all people'. Note that the positive and expected form of the behaviour is emphasised. Negative words and phrases like 'Don't run' do not actually specify the desired behaviour.
- *Rules must be taught and constantly reinforced*. If we use a rule like 'Be prompt and prepared', we could explain and discuss multiple examples of the occasions when the rule could apply (e.g. bring homework to school, have your books and materials ready for transitions to group work, moving to another classroom or getting ready for sports classes). The first few weeks of school are going to be a period of reinforcement until these rules become routine.
- *Develop and teach procedures associated with these rules*; for example, 'Listen quietly when others are speaking': what are some of the procedures that this rule might apply to? Here you could discuss the procedure for getting attention in class; how students could indicate they are ready to contribute. A rule like 'Respect and be polite to all people' could lead to a discussion of places in the school where more respect is needed, such as using corridors during transitions between classes; keeping the bathrooms clean; and using polite language, such as 'thanks' and 'please'.
- *Student participation* – should students participate in rule setting? If you believe in a democratic and interactionist style of classroom management, or simply believe that students develop greater understanding when they participate in the construction of knowledge (a constructivist perspective), you are probably more likely to agree that students should participate in rule setting. Evertson and Emmer suggest this could take many forms, including the discussion of examples of behaviours, compiling student suggestions into summarised and simpler lists; for example, 'Don't talk over people' and 'Don't call out', might be summarised as 'Listen quietly' and 'Respect others'. Role plays or small enacted scenes where students can see examples of positive behaviours can be useful.

Here we have focused on several principles of rule development at the classroom level, but also note that your school will also have school-level rules and procedures. These may interact with your classroom rules and should be studied closely as soon as you enter a new school environment. These may specify rules and procedures for things that you do not need to readdress in your classroom rules; for example, the use of technology and mobile phones may be specified in school-level rules.

Setting relevant tasks

The relevance of tasks is associated with the level of interest and meaningfulness of the task to students. 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. When students are not interested and engaged in the task, they can easily become distracted and go 'off task'. De Nobile and colleagues (2020) suggest two key strategies for ensuring relevance (see **CASE STUDY 14.1** for an example of both of these strategies in use):

- *Real-world problems* – include content and materials such as objects, brochures, stories that reflect real-world problems. For example, to teach math concepts, such as area and perimeter, you could choose house design plans available from real-estate agents or housing companies that show layout and area of houses. How much space and what room in the house would teacher John's Year 4 students need for all their stuff? This could emerge as quite a measurement project!
- *Integrate curriculum areas* – common themes can be used to form multiple connections across curriculum areas; this creates meaning and application for students. While it will require more awareness of cross-curriculum activities and themes in secondary school, it will be relatively easy to achieve in primary schools.

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. 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.

CASE STUDY 14.1

Cricket is relevant, isn't it Miss?

Teacher Terry, introduced to you at the beginning of this chapter, is a real teacher and a recent graduate from teacher education (with her name changed to a pseudonym). Terry found herself in the first year of teaching in the maths classroom of the lowest streamed class of Year 8 boys. The class list was handed to Terry by the Head Teacher with a wry smile and a warning that 'these are challenging kids'. Terry rapidly learnt that the school was renowned for its cricketing prowess and the Year 8 boys were cricket enthusiasts with several on the representative team and all learning to be umpires. Suddenly Terry realised she had a way to make her lessons more relevant to 'real life' and she could integrate some math learning with their activities in the physical education and health curriculum. In the math classroom Terry explored ways to integrate player statistics, batting averages and match predictions into Year 8 math while students had optional choice activities to gather their health and fitness data in physical education classes and analyse it with some software in the maths class. Students could also choose a math project focusing on the international team of their choice. It was fun, and considering the school was located right next to an historical cricketing oval, they even had a class excursion. Students met the head cricket scorer and ground keeper at the local oval who surprised them with examples of math and statistics that featured strongly in their jobs.

Smooth transitions

As we saw in Doyle's analysis of classroom ecology (**TABLE 14.3**), 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 each school day. Unfortunately, inappropriate behaviours are also more likely to occur at these times because students move away from teacher supervision or simply take the opportunity to relax and 'muck around' between classes. Research suggests that the efficiency of these transitions is critical

to classroom life (De Nobile et al., 2020). Teachers can 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 please 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, R. (2004). Learning to teach. McGraw Hill.

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 et al., 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 teacher's 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 14.4**. 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 14.4**, 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.

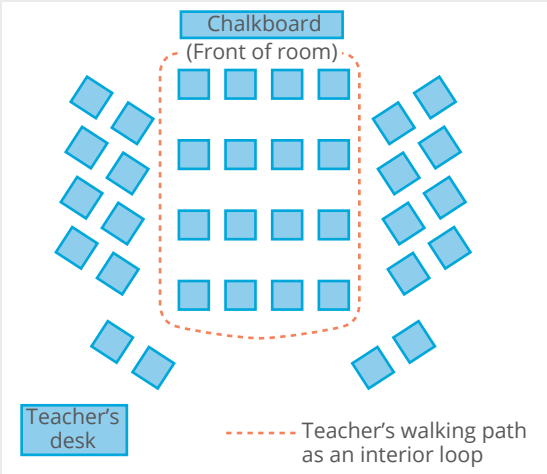


FIGURE 14.4 The teacher's walking path as an interior loop

Source: Wolfgang, C.H., 1995. Figure 8.4.

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.

Evertson and Emmer's five keys to good classroom layout

Evertson and Emmer (2017) provide five keys to good classroom layout. Each of these keys has clear instructional implications.

1 *Use a room layout that matches your pedagogical goals and activities* – think about the types of activities and materials you will need for the class. If students need to work in groups, the room layout should be planned ahead of time so you can provide simple and quick instructions for students. Think also about materials and technology – how much space will they need; do they need to plug in devices; where will you store completed work afterwards?
2 *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.
3 *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.
4 *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.
5 *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.

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.

- *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.

Teachers are likely to use a variety of grouping approaches in their classrooms and these add to student interest and engagement. It is likely that transitions will also be evident in the use of different groups – a teacher may start the class with whole class direct instruction to explain a concept (recitation) and may ask students to then commence seatwork or move to work in 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. Fortunately for us there is a history of very useful research to guide our practice. 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.

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 (see **TABLE 14.4**). 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 disciplinary approaches with students that were harsher, and more 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.

THINK ABOUT

- Which of the effective teaching behaviours in **TABLE 14.4** 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.

TABLE 14.4 Strategies of effective teachers

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 in their classroom
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 'over-dwell' 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. By contrast, '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. In contrast, 'flip-flop' teachers might disrupt the momentum of a lesson by stopping to correct a student
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

Adapted from Kounin, 1970.

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 **RESEARCH LINKS 14.1**). 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 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 **RESEARCH LINKS 14.1** 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 (see **FIGURE 14.5**). 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.

FIGURE 14.5 Some classroom activities may be better suited to group work. This classroom arrangement is allowing students to collaborate on an engaging task

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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. As suggested by Evertson and Emmer (2017) the most important principle of planning the classroom layout is that it should be suited to the planned pedagogy and activity – this also applies to use of different grouping styles. As shown in **RESEARCH LINKS 14.1**, 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.

RESEARCH LINKS 14.1

Teachers and student behaviour in the context of instructional groupings

Researchers Hollo and Hirn (2015) conducted a study to explore teacher use of instructional groupings in elementary, middle and high school classrooms. They were interested in whether teacher or student behaviours differed in whole-class or small group instructional settings. More than 5000 classroom observations were recorded on hand-held computers using observational software over a five-year period.

Findings

Types of groupings

Across all grade levels the most common groupings were teacher-led whole group and individual seatwork groupings. The amount of time in cooperative or peer group activities was minimal across all grade levels and individual time with a student was almost non-existent. Small group instruction, led by a teacher, occurred 10 per cent of the time in elementary school years, occurred minimally in the middle school years, and 9 per cent of the time in high school years.

Teacher behaviours

In terms of behaviours, teachers in elementary school classrooms engaged in the most frequent interactions with individual students and these were largely about the curriculum or were managerial in nature (giving directions). Older students received fewer active teacher interactions and high school students received slightly more negative feedback.

Student engagement

Elementary students were mostly passively engaged (i.e. listening to the teacher) in contrast to higher levels of active engagement from older students. High school students also had more off-task behaviours.

Teaching strategies

Overall, teachers used more individual active teaching strategies and students were more actively engaged and received more positive feedback in small-group settings compared to whole-group instruction. In whole-group instruction there was a significant association between individual active teacher instruction and negative feedback and disruptive behaviour.

Conclusions

Several aspects of the findings were interesting. The use of whole-group instruction and minimal use of small-group instruction surprised the researchers. The passivity of students in the whole-group instructional contexts was also of concern. Levels of disruptive student behaviour in the whole-group setting compared to small-group settings may surprise you, but as the researchers point out, this confirms other evidence that small-group settings have fewer disruptive behaviours compared to whole-group settings.

The researchers concluded that 'if OTRs [individual active teaching strategies], feedback, and engagement occur naturally in small-group instruction, perhaps intervention efforts would be best directed toward increasing teachers' use of small groups rather than the traditional lecture and seatwork format' (p. 38).

Hollo and Hirn (2015).

ACTIVITIES

1. This study suggests particular advantages of small-group instruction. Why do you think this is the case?
2. Why do you think teachers are disinclined to use small-group instruction?
3. Next time you are in a school or classroom (perhaps during your next practicum) try to observe as many classrooms as you can. What type of groupings are most common in the classrooms you observe?

Promoting self-regulation and social skills

The consideration of student self-regulation and social skills is a relatively recent phenomenon. Where once the emphasis was on teacher control of the classroom, these newer concepts emphasise student direction and the capacity to regulate their own behaviour. 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 training in self-regulation and social skills, in the belief that these skills can assist students to manage and direct their own behaviour.

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 one's turn to speak, and learning to be patient while standing in queues. Later in school life, self-regulatory learning continues – managing emotions in playground disagreements, thinking before answering in class, and increased awareness of the reactions of others. 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 (see **CHAPTER 10**) 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.

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 and colleagues (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 encourage students to be aware of their own thoughts, emotions and behaviours. For younger students, desired behaviours can be recorded on pictorial charts, while older students may need a discrete card or a diary entry. However, these strategies may not be helpful for students with self-awareness and self-reflection difficulties, who may need more specific scaffolds and supports to enable this behaviour, as described in the intervention for ADHD students above (see Guderjahn et al., 2013, for a discussion).

Self-talk strategies can also be used by students who have a reasonable degree of self-awareness. These strategies involve students giving themselves verbal cues about how to behave. 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.

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-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

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.

As explained in **CHAPTER 4**, many social and emotional learning (SEL) programs will include explicit social skills instructions and it is important to remember that these programs are most effective when administered by teachers in naturalistic classroom settings.

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. Refer to **CLASSROOM LINKS 14.1** for an explanation of the approach and strategies.

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 UK (Day et al., 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.

CLASSROOM LINKS 14.1

Stop, Think, Do – the traffic light system

Stop, Think, Do is a simple intervention 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

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.

- **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.'
- **THINK** Consider possible solutions with the student; encourage the student to evaluate the various solutions.
- **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.

Source: Peterson & Adderley, 2002.

Intervening to address classroom behaviours

In any discussion of creating a positive learning environment, we must also acknowledge that there are times in classroom life where teachers must respond to disruptive or troublesome behaviours. Consider the following classroom scenario: Teacher John asks Suzy to suggest a solution to a problem on the whiteboard during a mathematics class, and when Suzy gives a funny reply, all the students laugh. Teacher John becomes angry. After that, whenever the teacher asks Suzy a question, everyone giggles. How could John respond more effectively to this behaviour?

As you can see in this example, John's response to student behaviour can set the tone for future interactions with that student and the whole class. As we advocated at the beginning of this chapter, it is very important to consider your philosophy and beliefs about student development and behaviour. Here we will advocate taking a critical approach to many classroom management interventions you may read about or see practised in classrooms. We also point out the sources of evidence about such classroom interventions.

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 challenging may cause a disruption to a class. Occasionally, teachers also encounter students whose behaviour is so unusual 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 emotional and behavioural conditions that affect a small proportion of students. These conditions 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 more in **CHAPTER 10**). 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 types of problems do teachers report?

Many of the classroom behavioural concerns reported by teachers involve 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 et al., 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

FIGURE 14.6 When teachers provide extra support to students who need it, the classroom is perceived to be a more positive environment by students

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students (and their parents) differ in their beliefs about the sources of behavioural problems. 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. 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 (**FIGURE 14.6**). However, when teachers denied a vulnerable child this support, students reacted with low morale and felt their classrooms were less supportive.

Teachers' response to behaviours and its appropriateness

It may not surprise you to hear that teachers and students sometimes disagree about the teacher's response to behaviour and whether this is appropriate. In part this may be because teachers and students report differing levels of their use of punitive or aggressive responses to student behaviours. Teachers tend to report using fewer aggressive responses than do students (Romi et al., 2011). 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 (Romi et al., 2011). Lewis and colleagues (2005) argue that while it is understandable that teachers react to provocative student behaviours, it is important not to create a climate of cyclical 'hostilities' and very important for teachers to remember that they are the professionals in the classroom.

Types of interventions

As we have seen in the preceding sections, much of the teacher's work in managing their classroom relates to 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 next section of this chapter, we will examine these approaches using the 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; that is, they are incapable of controlling themselves. These approaches are based on

the idea that external forces (i.e. 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.

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. Canters suggests this control is attained through a **classroom discipline plan**, which should contain the elements of establishment of rules, supportive feedback (i.e. 'catch them being good'), and corrective procedures. **FIGURE 14.7** outlines the elements of Canter's approach to a classroom discipline plan.

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

Establishment of rules

- Clearly establish how you want students to behave
- Express rules as observable and doable
- Limit the number of general rules to a maximum of five
- Observe rules at all times throughout the day
- Be consistent by responding to all rule violations in the same manner
- Think through the consequences of rules and clearly explain them to students

Supportive feedback

- Catch them being good – positive behaviours are reinforced by sincere and meaningful feedback
- Give supportive feedback that is simple, direct and specific about the behaviour being praised
- Use rewards such as certificates, notes sent home and special privileges
- Use praise as an incentive to other students who are not behaving appropriately

Corrective procedures

- Make sure there is no doubt that if a student breaks the rules there will be negative consequences
- Negative consequences or punishments should not be harmful, embarrass or humiliate
- When tracking misbehaviour, write the student's name on a board at the first sign of misbehaviour
- For subsequent misbehaviour, place a tick next to the name, until a maximum of five
- Each tick represents an escalating set of consequences – more severe as the ticks increases
- Use a clipboard or notebook to keep this tracking private to avoid humiliation or reactive resentment

FIGURE 14.7 By implementing and following a classroom discipline plan, interventionist teachers believe they respond to behaviour consistently

Source: Canter, 1996; Canter & Canter, 1981.

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 Olivia. (hint)
Olivia: I haven't finished this message yet.
Teacher: Olivia, I would like you to switch your phone off and put it in your bag.
Olivia: 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 'time out', in which a student is isolated for a period of time, privileges are withdrawn or detention is given. The teacher may decide to withdraw a favourite activity from Olivia 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 Canters' 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. 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 et al., 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. In **CHAPTER 5** we discussed the behaviourist strategy known as 'positive 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 **CHAPTER 7** for more on humanism.) 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 *misbehaviour* 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.

Sources of misbehaviour

According to Dreikurs and other interactionalist theorists, children's misbehaviour is generally motivated by four possible goals (Balson, 1992; Dreikurs et al., 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.

These misplaced goals reflect a hierarchical order, with goals further down the list representing the most discouraged state of the child (Dreikurs et al., 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 14.5**.

Planning 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

TABLE 14.5 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	Feels frustrated or gives up on the child	Gives up and does not attempt to change their behaviour

Adapted from Balson,1992, p. 31; Arthur-Kelly et al., 2006, p. 157.

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 (see **CHAPTER 8** for specific examples of appropriate and inappropriate use of praise).

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. 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. For example, teacher John might offer the following form of encouragement to his student Kyle whom he finds most challenging: 'I really enjoyed reading the first draft of your project Kyle; I found the pictures really useful.' The teacher used the personal pronoun 'I' when talking about the feeling the teacher experienced (i.e. enjoyment) and the effect of the student's behaviour (i.e. project work) on the teacher. These statements can also be used in an assertive way to discuss a problem behaviour; for example, 'When I get interrupted during a lesson, I feel frustrated because I have to keep stopping' (De Nobile et al., 2020).

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; for example, a student cannot go swimming on a hot day because they forgot their swimming costume. **Logical consequences** are contrived to influence behaviour; a child flicks pink paint all over another student's desk and has to wash the desk clean. In each case, the focus is on allowing students to experience the consequences of their actions.

natural consequences
Outcomes contrived to influence behaviour

logical consequences
Outcomes that occur without interference

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) is its focus on students' understanding of why they behave as they do and the consequences of their behaviour. The interactionalist approach tends to focus on student responsibility and independence in their choices and decisions but it could be difficult for some students to accept responsibility, and teachers may have difficulty in identifying logical consequences for inappropriate behaviour. As shown in **FIGURE 14.8**, there is always the chance that planned or unplanned natural consequences may not change behaviour in the intended way.

FIGURE 14.8 In some situations, natural consequences may not be the best option

Source: Martin (1987, p. 159). Used by permission.

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) 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.

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 Rogers' 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 by building 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).

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 schoolwork, with skills developed rather than facts learnt, 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 **CLASSROOM LINKS 14.2**). 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.

GO FURTHER
Appendix 14.1
Glasser-based school management

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

CLASSROOM LINKS 14.2

Reality therapy techniques

Edwards and Watts (2008) provide the following steps for conducting a reality therapy interview:

1. Ask: 'What are you currently doing or what have you tried to do to achieve this?'
2. Assist the student to evaluate what is working.
3. Assist the student to explore other options that may be available.
4. 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 gaining control in their own lives.

should expect, including the right to feel safe, the right to be treated with dignity and respect, and 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' rights are 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 et al., 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. De Nobile and colleagues (2020) also point out that while more research is needed, existing research reports positive results.

Non-interventionist approaches may also present difficulties for teachers if students do not wish to cooperate in this approach. In a non-interventionist approach, the assumption of choice, autonomy and responsibility is paramount; other approaches may rely on more coercive or punitive techniques to gain student cooperation. 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 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 classroom.

This section has introduced three approaches that reflect the orientations of interventionist, interactionalist and non-interventionist teachers. These approaches are widely used in Australian schools and no doubt across the Pacific region. The critiques contain points that teachers should

THINK ABOUT

- Earlier in 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?
- In reality, few 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?

IMPLICATIONS FOR EDUCATORS 14.1

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, including 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 before adopting any single approach to classroom management. **IMPLICATIONS FOR EDUCATORS 14.1** lists some points about each approach that educators need to consider when planning classroom-management strategies.

14.3 School-wide issues and approaches

Throughout this chapter, we have largely considered creation of a positive learning environment 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 2018, the Federal Minister for Education launched the Australian Student Wellbeing Framework that replaced the former National Safe Schools Framework. The vision of the Wellbeing Framework is:

> Australian schools are learning communities that promote student wellbeing, safety and positive relationships so that students can reach their full potential.
>
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The principles of the framework confirm that Australian children have the right to education, safety and wellbeing in accordance with our agreement to the United Nations Convention on the Rights of the Child. It particularly emphasises the right of children and young people to have a voice in the decision-making processes that affect them and emphasises the focus on all children and families and the aspirations, education and wellbeing of Aboriginal and Torres Strait Islander students. 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 14.6** outlines the key elements and strategies of the framework.

TABLE 14.6 Elements and principles of the Australian Student Wellbeing framework

Element	Strategies and approaches
Leadership: visible leadership to inspire positive school communities	Principals and school leaders play an active role in building a positive learning environment where the whole school community feels included, connected, safe and respected
Inclusion: inclusive and connected school culture	All members of the school community are active participants in building a welcoming school culture that values diversity, and fosters positive, respectful relationships
Student voice: authentic student participation	Students are active participants in their own learning and wellbeing, feel connected and use their social and emotional skills to be respectful, resilient and safe
Partnerships: effective family and community partnerships	Families and communities collaborate as partners with the school to support student learning, safety and wellbeing
Support: wellbeing and support for positive behaviour	School staff, students and families share and cultivate an understanding of wellbeing and support for positive behaviour and how this supports effective teaching and learning

Responding to bullying in schools

The Australian Student Wellbeing Framework clearly states that schools have a responsibility to provide a safe environment and that schools should collaborate with students to develop strategies to counter violence 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. However, research consistently shows that teacher responses to bullying are largely ineffective; much bullying is ignored or goes unnoticed, and is underreported by students (Rigby, 2010).

Supporting students: duty of care

duty of care
The legal obligation to protect a child of immature age against injury

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**. If teacher approaches to dealing with bullying are ineffective or if bullying is ignored or neglected in schools, the legal duty of care towards students may be breached. Duty of care involves:

> 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.
>
> *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 and this includes protection from all forms of harm or injury, including physical, emotional or psychological harm and injury. While teachers cannot always prevent harm or injury, 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.

If schools or teachers have been found to neglect or breach their duty of care, legal consequences can follow. For example, in 2013 the Supreme Court of NSW Court of Appeal

upheld a judgment that a school had breached its duty of care toward a student by failing to 'take reasonable steps to bring the bullying of the appellant by other students to an end' (*Oyston v St Patrick's College [No 2]* [2013] NSWCA 310 [23 September 2013]). The judgment noted that the school was obligated in performing its duty of care toward the student to ensure the student was protected from bullying, to take reasonable steps to identify the perpetrators and to take reasonable action to prevent repetition of the bullying by these perpetrators. The school was ordered to provide financial compensation to the former student.

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.

It is also important for teachers and administrators to be aware of the fact that even if bullying or aggression is covert or 'hidden', it does not release a school or teacher from their legal obligations or duty of care. Many alleged assaults have occurred in school toilets or other sites that cannot easily be supervised. As such, schools need to develop procedures to ensure adequate supervision, including supervision of all school areas. Online safety should be a key concern of teachers and schools, and it is important to recognise the risks associated with misuse of social media and other technologies (see more about online safety in **CHAPTER 12**). Teachers or schools should 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 especially 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. It is particularly important for schools to take a systematic and comprehensive approach to managing bullying and aggression.

A whole-school approach

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. This is a comprehensive and systems-based strategy for considering the interaction of many features of the individual students, their school community and the wider community outside the school. Whole-school approaches should be supported by clear policies that encourage all members of the school community to take responsibility for the prevention of bullying. **FIGURE 14.9** outlines the components of a whole-school policy (McGrath & Noble, 2006; Rigby, 1996).

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

Recent meta-analyses of research evidence have shown that school-based programs only succeed in decreasing bullying by 20 to 23 per cent, while perceived victimisation only decreases by 17–20 per cent (Ttofi & Farrington, 2011). Other large-scale meta-evaluations have shown that to be effective, school intervention programs must be systemic, or whole-school focused (Cantone et al., 2015). They must also be multicomponent; that is, they must address parents, children and teacher responses and beliefs (Vreeman & Carroll, 2007). Collectively, these research evaluations have shown that whole-school, multicomponent programs demonstrate greater effectiveness than stand-alone classroom curricula or social skills training alone.

THINK ABOUT

- Why are whole school approaches likely to be more effective?
- Why do schools need to evaluate their whole school approach and what might they need to consider in such an evaluation? (See Point 6 of the whole school policy in **FIGURE 14.9**.)

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 discreet 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

FIGURE 14.9 A whole-school policy to address bullying

Bullying in schools: And what to do about it. Jessica Kingsley; McGrath, H., & Stanley, M. (2006). A safe school (anti-bullying) template for schools. In H. McGrath & T. Noble (Eds), Bullying solutions: Evidence based approaches to bullying in Australian schools (pp. 229–78). Pearson Education.

A recent international example of a whole-school approach can be seen in the KiVa anti-bullying program, developed in Finland. The acronym KiVa stands for 'Kiusaamista Vastaan' which means 'against bullying'. The term also means 'nice' in Finnish (Salmivalli, 2010). In this school-wide approach, both prevention and intervention are considered with *universal* prevention strategies for all students, parents and the school community, along with '*indicated*' or *targeted* interventions for identified cases of bullying. This approach is similar to the use of tiered prevention and intervention levels that we saw applied in the school-wide positive behaviour support approach discussed in **CHAPTER 5**.

At the universal level in the KiVa program, all students receive training via classroom lessons and online activities, including computer games. Lessons address important social skills, such as understanding emotions, group interactions, bystander behaviours and formation of friendships. Parents also receive information and training in a booklet. School-wide strategies include posters displayed around the school and special colourful KiVa vests worn by school staff when they are on playground duty. This reinforces the seriousness of the program and the fact that staff are vigilant in supervising playground behaviours.

At the indicated or targeted level, bullying incidents are carefully screened to see if they meet criteria for treatment within the program. A team of staff form the intervention group. One member of staff interviews the target of the bullying to gain an understanding and offer support. Further meetings are then held with the bullies, who are asked to commit to actions and behaviours to help the target of the bullying. Further follow-up meetings are held with the perpetrators and the person who was bullied. In a further indication of a school-wide approach, supportive peers with high social status are also recruited to support the target of the bullying (Hutchings & Clarkson, 2015; see **FIGURE 14.10**).

This is a carefully designed program, with research evaluations in several European countries indicating the effectiveness of this approach. For example, in a large Finnish study, 98 per cent of targets of bullying felt their situation had improved (Garandeau et al., 2014).

The philosophy of intervention

Approaches to intervention 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 or 'traditional' approaches

Punitive approaches are associated with a traditional 'crime and punishment' philosophy, in which sanctions and consequences are applied to breaking 'no bullying' rules (Rigby, 2010). Punitive approaches are commonly used; international surveys show that teachers resort to punishment for even mild cases of bullying behaviours (Rigby & Griffiths, 2011).

FIGURE 14.10 A whole-school approach encourages peer support strategies

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Many people instinctively favour these approaches because bullying is seen as repugnant and we may believe that violence must be punished, but as with other punitive classroom-management strategies, these approaches 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). Second, punishment can lead to resentment and hostility, and students who are punished can react with more subtle forms of aggression (Rigby, 2010). There is a valid concern that students might retaliate by bullying in more covert or hidden ways. Researchers from a wide range of countries report only moderate levels of success using punitive approaches (Rigby, 2010). In the case of an extreme form of punishment known as **zero tolerance approaches**, expulsion and suspension are widely regarded as ineffective (Skiba & Rausch, 2006). Strategies such as suspension and expulsion do not lead to improved behaviour for at-risk students and do not improve students' feelings of safety at school (American Psychological Association Zero Tolerance Task Force, 2008); and they can be disproportionately applied to minority students (Skiba, 2014). As illustrated in **RESEARCH LINKS 14.2**, researchers also have a duty of care to ensure that no harm is done in their method of intervention.

punitive approach
Based on the belief that the bully must be punished, and this punishment will stop them from bullying again

zero tolerance approach
A response to bullying or other misbehaviour that reflects extreme intolerance for antisocial behaviours of any kind, allowing no compromise and usually resulting in strict punishment, such as school expulsion

THINK ABOUT

- Why do you think students might feel less safe in schools where severe discipline is used for bullying behaviours?
- Do you think there are other types of conflicts or disagreements that might be suitable for mediation or restorative justice approaches?
- How do you think you would assess or monitor the victim's safety or comfort with the intervention strategy your school might use?

Although adults may want to punish bullies, serious consideration must be given to the legal principles of duty of care and ethical consideration for the wellbeing of children. If punishment and harsh discipline do not stop the bullying, lead to retaliation or do not treat or respond to the behavioural needs of the aggressive child, a school may be considered in breach of its legal duty of care. Similarly, there are serious ethical concerns to be considered if teachers or parents view punishment as 'retribution' against the aggressor, or worse, fail to consider appropriate treatment or help for either the aggressor or the victim. To learn more about approaches such as the restorative justice approach mentioned by the KiVa researchers, go to Appendix 14.2 online.

GO FURTHER
Appendix 14.2
Anti-bullying programs

RESEARCH LINKS 14.2

Considering 'harm' in intervention approaches

In designing the KiVa anti-bullying program, researchers Garandeau and colleagues (2014) explain that they made a choice not to use harsh, punitive discipline or an approach known as restorative justice or mediation in their program. They noted that there is mounting evidence that extreme punitive measures do little to improve students' feelings of safety. They also point out the philosophy behind restorative justice is the idea that the offender or perpetrator must make 'restitution' or make repairs for the harm they have done. To achieve this, the restorative justice or mediation approaches typically require the victim to engage in mediation meetings with the offender. Herein lies the concern of the KiVa researchers. They explain that, if bullying is conceived as an abuse of power between the perpetrator and the vulnerable target of this aggressive behaviour, then any methods or approaches that seek to sustain interactions between the victim and perpetrator could be potentially harmful.

As you can see in the description of the KiVa program above, the researchers decided to intervene in bullying in a non-punitive but quite direct manner, in which perpetrators are asked to take action to improve the situation.

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 also 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 (Rigby, 2010). Examples of non-punitive approaches include the KiVa program discussed above, the Support Group Approach (previously known as the 'no blame approach') (Robinson & Maines, 2008), the Method of Shared Concern (Pikas, 2002), as well as other restorative justice and mediation approaches (Rigby, 2010). Non-punitive approaches differ from punitive approaches in that they are not quick applications of consequences. As shown in **FIGURE 14.11**, these methods usually involve a series of interviews or meetings between the adult who is facilitating the method and the perpetrators, the victim or other bystanders.

FIGURE 14.11 In non-punitive approaches, teachers engage in serious talks with bullies and targets of the bullying to elicit empathy and suggestions for resolving the situation

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The Method of Shared Concern

The Method of Shared Concern illustrates several of the assumptions behind non-punitive approaches. For example, both this method and also the support group approach address bullying as group behaviour. This is supported by considerable evidence that bullying is not simply a dyadic interaction between a bully and a victim (see more about bullying roles and behaviours in **CHAPTER 4**). In fact, Swearer and colleagues (2009) argue that bullying is often a group process involving ringleaders and

bystanders, who can sometimes encourage the ringleaders to bully but may act to prevent bullying if they are confident enough to defend a victim. Further, these approaches often adopt a treatment or therapeutic stance in the assumption that children who bully can be taught to understand that they have caused harm and can be encouraged to act responsibly.

In the Method of Shared Concern, the emphasis is on group bullying situations and reconstructing the individual's mindset about their involvement in bullying and their capacity to bring about change. These aims are achieved in a series of interviews and meetings with individual children as well as the whole group involved in the bullying interaction. Before taking any action, the situation is carefully investigated and the students involved identified. Interviews are initially held with each individual who has been suspected of being a ringleader or perpetrator. Each interview is conducted in a calm and non-accusative manner. The situation is outlined and the 'plight' or concern about the victimised child is explained. As also seen in the KiVa method, the suspected perpetrators are asked what they could do to improve the situation. The perceived perpetrators are *never* accused or blamed (as this can cause resentment and hostility) but it is made clear that the school is taking the situation seriously and the young person will be required to play a role in helping to remedy the situation. Further, it is also explained that they will be required to attend another interview within a week, to report back on their helpful actions. These interviews are held with each suspected perpetrator *before* the 'victim' is interviewed.

When the target of the bullying is interviewed the situation is explained and they are invited to tell their story. Support is offered and reassurance that the perpetrators or bullies are not 'in trouble' and are not being punished, but have been asked to think about what they could do to improve the situation. This reassurance is provided to allay concerns about retaliation.

Following these initial individual interviews, the situation is carefully monitored. Interviews with each child are held again after one week; each individual is asked to describe what they have done to improve the situation and then positive feedback is given. Monitoring and checking in with the victim continues and the procedure is repeated a few weeks later with the whole group of perpetrators (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 final step is not so much to suggest that victims are equally responsible for bringing about change, but the interview is designed to give the victim the chance to speak or perhaps acknowledge their own role in the situation, such as being a 'provocative victim' (Rigby, 2006). The interviewer seeks a commitment from each child that the behaviour has stopped and the situation has improved. It is made clear the school will continue to monitor their behaviour. Because of the higher level of responsibility and perspective-taking assumed of young people in the method, Pikas (2002) recommended the approach generally be used with children nine years and older. This suits the age group in which bullying behaviours peak.

An investigation of the effectiveness of the Method of Shared Concern was conducted in 17 Australian schools (Rigby & Griffiths, 2011). The evidence for specific strategies in the method was closely studied. For example, the investigators assessed whether or not the perpetrators responded positively to the initial explanation of the plight of the victim. In all cases, the perpetrators acknowledged that the situation had caused distress, and most indicated they were concerned about the victim and would help in some way by stopping teasing or restraining their peer group members from acting hurtfully. In the follow-up interviews, the majority of perpetrators had carried out the proposed actions. The target or victim of the bullying reported that bullying or harassment had stopped in all but two of the cases (an 88% success rate). Similarly, most perpetrators reported they felt they had changed and were pleased or proud of their actions. Teachers reported they would use the method again.

Summary of approaches to bullying

Each of the approaches and interventions described here has received at least some research support and has also been based in evidence or strong application of theory of behavioural change. 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, Garandeau and colleagues (2014) report that there is very little research that has compared the two approaches. Rigby (2006) also reports that there are schools that do 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.

The failure of anti-bullying approaches to solve all bullying problems is one of their perceived weaknesses. As such, the large-scale meta-evaluations as well as the National Safe Schools Framework advocate 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 for duty of care to protect students from harm, which relates to the way in which we respond to both bullies and victims.

14.4 Concluding comments

As suggested by ecological theory, classrooms and schools are complex environments. Within this context, the creation of a positive learning environment requires the establishment of quality TSRs and a supportive classroom climate, and practising pedagogies and organisational strategies that support student learning and engagement. As a teacher, your task is also to find a philosophical approach to classroom management that is congruent with the goals of creating an effective learning environment, is evidence-based, and that will support the development and learning of students from different backgrounds 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.

STUDY TOOLS

Chapter review

14.1 Defining positive learning environments

- The creation of a PLE through classroom management is best approached with a comprehensive model that 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 develop, and be aware of how these beliefs can influence their practice.
- Philosophies of classroom management hold very different implications for the creation of a PLE: interventionist, interactionalist and non-interventionist. Each involves a different balance in the relative power of teachers and students over what happens in a classroom.

14.2 Creating a positive classroom

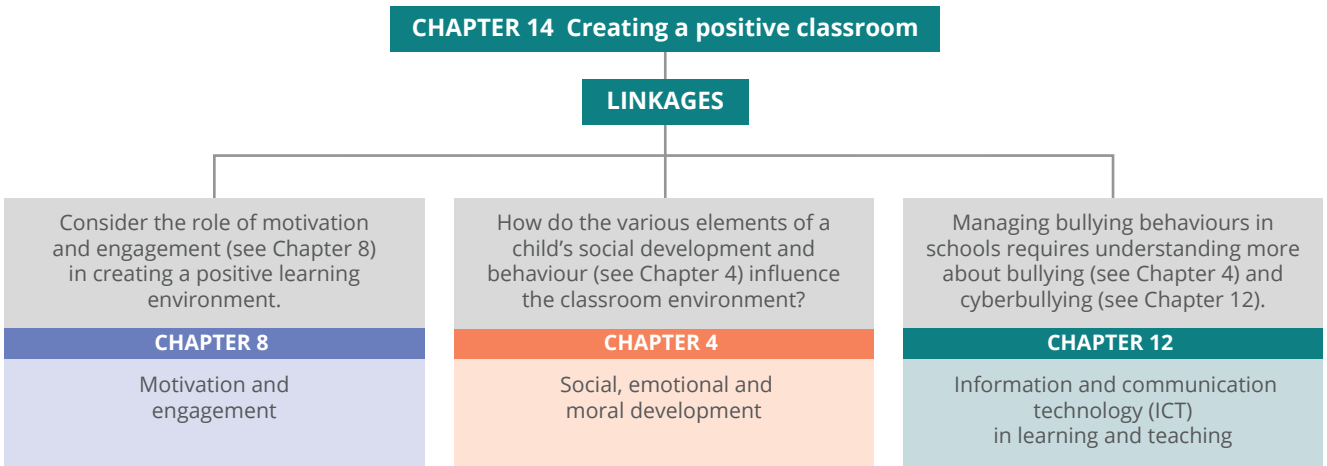
- Most of the discipline difficulties teachers encounter in their classrooms involve minor disruptions, such as talking out of turn, being out of the seat or hindering other children. Serious behaviours, such as physical violence, are rarer.
- Procedures for responding to behaviour vary according to 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.

14.3 School-wide issues and approaches

- Teachers have a duty of care for their students that should not be infringed.
- Schools must implement the appropriate strategies to prevent and respond to 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.

Putting it together

Making links between 'creating a positive classroom' and material in other chapters



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 types 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.

Further research

Go further

The online appendices contain additional material that you should refer to when reading this chapter. The appendices available for this chapter are:

- Appendix 14.1 Glasser-based school management
- Appendix 14.2 Anti-bullying programs.

Recommended websites

Australian Students Wellbeing Framework: https://studentwellbeinghub.edu.au

Bullying. No Way!: https://bullyingnoway.gov.au

Kids Helpline Australia on bullying: https://kidshelpline.com.au/kids/issues

New Zealand Ministry of Education: https://www.education.govt.nz

Recommended reading

De Nobile, J., Lyons, G., & Arthur-Kelly, M. (2020). *Positive learning environments: Creating and maintaining productive classrooms* (2nd ed.). Cengage Learning.

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Putting it together

EDUCATIONAL PSYCHOLOGY IN CONTEMPORARY CLASSROOMS

Module IV has identified key issues relating to ICT, assessment and reporting, and positive learning environments in schools, discussing these issues with reference to relevant research in 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

	ICT in learning and teaching	
Main focus of this chapter	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 • Use and design of multimedia resources to enhance student learning • 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 • Understanding cyberbullying and cybersafety • Potential of technology to address particular learning needs, and provide assistance for learning	

MODULE IV

	Assessment and reporting	Creating a positive classroom
	The critical role of assessment in the learning and teaching cycle	The creation of PLEs and 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 • Student-focused forms of assessment can be implemented to use assessment for learning • 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	• A PLE aims to create an environment that supports learners and their learning • Effective classroom management involves working effectively with students and maximising their learning • Teacher–student relationships are affected by differential teacher attitudes to particular students • Teacher expectations can become a self-fulfilling prophecy and may affect minority learners more severely • 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 • The *duty of care* refers to the responsibility of the teacher to ensure a safe place and protect immature children from all forms of harm and injury including psychological harm • The creation of a PLE and managing classrooms and schools effectively includes addressing bullying

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	ICT in learning and teaching	
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?	

Assessment and reporting	Creating a positive classroom
• 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?	• How does my philosophy influence my approach in the classroom? • How will I support students and their learning through the routines, procedures and rules of my classroom? • How will I respond to student behavioural concerns? What philosophy will underpin my approach? • What are some approaches and strategies I can use to prevent negative peer relationships and bullying?

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