Cambridge Assessment International Education

Developing the Cambridge learner attributes

Foreword

Since their launch in 2011 the Cambridge learner attributes – **confident, responsible, reflective, innovative, engaged** – have been an increasingly visible design principle in the curricula of thousands of Cambridge schools worldwide.

I am often struck when I visit schools by the original ways in which the Cambridge learner attributes are promoted and supported. It was precisely our intention in launching the attributes that they would encourage schools, drawing on well-evidenced ideas about learning, to shape distinctive curricula suitable to their circumstances and contexts.

This new guide revisits the insights into learning and teaching on which the Cambridge learner attributes are built, and suggests how schools can interpret the attributes in a practical way to improve the value of the education they offer. The guide will be useful both for seasoned Cambridge schools looking to make further improvements to the curriculum, and for schools new to Cambridge and wishing to start from a clear understanding of our approach. It is an empowering approach, in which we aim to help schools adopt tools, well-evidenced ideas and flexible resources in order to shape a curriculum which belongs uniquely to the school.

Today's educators are not permitted complacency: everywhere we see, if not downright dissatisfaction with education, then strident demands for improvement. Central to those demands is the idea that students should emerge from the compulsory years of education equipped not only with core knowledge and literacies, but with the abilities and dispositions necessary to be effective life-long learners. When education theories are turned to for help in meeting this challenge, two questions confront schools – how to assess the soundness of a theory, and how to apply it successfully in the classroom.

I believe this guide will answer both needs, by explaining the solid foundations on which the Cambridge learner attributes are based, and showing how to make use of the attributes for the benefit of learners.

**Michael O'Sullivan, Chief Executive,
Cambridge Assessment International Education**

The Cambridge learner attributes

	Cambridge learners	Cambridge teachers
Confident	**Confident** in working with information and ideas – their own and those of others. Cambridge learners are confident, secure in their knowledge, unwilling to take things for granted and ready to take intellectual risks. They are keen to explore and evaluate ideas and arguments in a structured, critical and analytical way. They are able to communicate and defend views and opinions as well as respect those of others.	**Confident** in teaching their subject and engaging each student in learning. Cambridge teachers know their subject well and know how to teach it. They seek to understand their students and their educational needs. They strive to communicate a love of learning and to encourage students to engage actively in their own learning.
Responsible	**Responsible** for themselves, responsive to and respectful of others. Cambridge learners take ownership of their learning, set targets and insist on intellectual integrity. They are collaborative and supportive. They understand that their actions have impacts on others and on the environment. They appreciate the importance of culture, context and community.	**Responsible** for themselves, responsive to and respectful of others. Cambridge teachers are highly professional in their approach to teaching and they are collaborative and supportive. They understand their actions will help shape future generations and they are concerned about the holistic development of every individual they teach.
Reflective	**Reflective** as learners, developing their ability to learn. Cambridge learners understand themselves as learners. They are concerned with the processes as well as the products of their learning and develop the awareness and strategies to be life-long learners.	**Reflective** as learners themselves, developing their practice. Cambridge teachers are themselves learners, seeking to build on and develop their knowledge and skills through a virtuous circle of reflection on practice – involving research, evaluation and adaptation. They support students to become independent and reflective learners.
Innovative	**Innovative** and equipped for new and future challenges. Cambridge learners welcome new challenges and meet them resourcefully, creatively and imaginatively. They are capable of applying their knowledge and understanding to solve new and unfamiliar problems. They can adapt flexibly to new situations requiring new ways of thinking.	**Innovative** and equipped for new and future challenges. Cambridge teachers are creative, experimenting with new ideas and pursuing an enquiring approach in their teaching. They are open to new challenges, being resourceful, imaginative and flexible. They are always ready to learn and apply new skills and techniques.
Engaged	**Engaged** intellectually and socially, ready to make a difference. Cambridge learners are alive with curiosity, embody a spirit of enquiry and want to dig more deeply. They are keen to learn new skills and are receptive to new ideas. They work well independently but also with others. They are equipped to participate constructively in society and the economy – locally, nationally and globally.	**Engaged** intellectually, professionally and socially, ready to make a difference. Cambridge teachers are passionate about learning within and beyond the classroom, sharing their knowledge and skills with teachers in the wider educational community.

Introduction

What are the learning habits students need to be successful in school, higher education, the workplace and life in general? This question inspired the development of the Cambridge learner attributes in 2011.

Since we introduced the attributes a number of schools and teachers have asked us for more guidance. This guide is a response to that request. It is intended to complement the *Implementing the Curriculum with Cambridge* guide and the *Developing your School with Cambridge* guide, as well as other resources on the teaching and learning area of our website (**www.cambridgeinternational.org/teaching-and-learning**).

The purpose of the Cambridge learner and teacher attributes is to support the development of five powerful and highly desirable learning habits that will inspire students to love learning and help them to lead fulfilled and successful lives. Students who demonstrate the attributes habitually approach learning by being confident, responsible, reflective, innovative and engaged. They are able to skilfully employ a broad range of cognitive skills and socio-emotional skills (including personality qualities such as resilience, self-motivation and self-regulation) towards effectively managing their performance.

The attributes are interdependent and should be viewed as a whole. Confidence, for example, needs to be grounded in reflection and responsibility so that the learner demonstrates skill and humility in judging how confident they can be that they are right. Learners need to be confident to be innovative, ready to take intellectual risks and not be frightened of making mistakes because they view these as a learning opportunity.

The learner attributes need to be infused into the teaching and learning of all disciplines, subjects and activities. Effective practice starts with small changes, in particular developing a climate that helps to nurture the attributes. Nothing is more important than teachers modelling the attributes and so the teacher attributes correspond to the learner attributes.

A great deal has been written about the failure of some school systems to prepare students properly for life in higher education and the modern world. Too much attention, it is argued, is given to preparing students for examinations instead of developing the learning habits needed to be effective independent learners and team problem solvers. One dangerous misconception is that teachers have to teach to the test to get the highest grades for students. We know that teaching students to be good learners not only prepares them for university and life, it will also result in higher grades in high-stakes assessments.

We hope that this guide will stimulate discussion and the sharing of practice between schools. One of the main sources for the material presented here has been presentations and discussions at Cambridge Schools Conferences over the past six years. These events will continue to provide rich materials and perspectives. To help us create this guide schools from 15 countries have volunteered case studies to share their experiences and practices. We are very grateful for their contributions (see **Appendix 2** for a summary of participating schools).

Our mission at Cambridge International is to support schools around the world to give students the best education for life. Our qualifications and educational programmes are well designed for this purpose. However, they must be supported by effective teaching, learning and leadership practices. This guide, along with all our professional development activities, will help teachers to develop their classroom practice to improve student outcomes. It will also support school leaders to understand what effective schools look like – and how to become one.

Chapter overviews

How to use this guide

Schools use Cambridge programmes and qualifications in more than 160 countries. Each one of these schools is a unique community with its own identity. We believe that one curriculum prescription or educational approach can never be suitable for all. This guide will help school leaders, governors, proprietors, teachers, parents and students think about how to engage with the learner attributes in their own contexts. Only you know your school and its community, and only you can drive school improvement. Our role is to support you in making the right decisions for your school.

What teachers do in the classroom has the biggest impact on student learning, so much of this guide focuses on effective teaching practice. Teachers themselves need to exemplify the attributes in everything they do: teachers are learners, which is why the attributes are the same for teachers and learners.

Education, however, does not begin or end in the classroom, so we have also given attention to the co-curricular programme and developing a school culture of learning. Throughout the guide we also make references to resources for schools and to complementary programmes run by other organisations.

Chapter 1 The learner attributes are closely related to a wide range of educational ideas and approaches and cannot be considered in isolation. Chapter 1 explores some of these and introduces some of the themes that are considered in more detail in later chapters.

Chapter 2 builds on the ideas presented in Chapter 1. It considers the characteristics of a broad, balanced and coherent curriculum that schools need to support the development of the learner attributes. The second part of the chapter focuses on a supportive co-curricular programme.

Chapter 3 looks at the attribute of reflection and the related concept of learning how to learn. It explores the concept that schools need to have a learning, rather than a performance, orientation with reflection at its heart.

Chapter 4 considers innovation and creativity. These are fundamental to all academic disciplines and educational activities, not just the arts.

Chapter 5 looks at the profound impacts of wellbeing and stress on learning and performance, considering the pressures today's students are under. We also look at strategies to deal with stress.

Chapter 6 focuses on how schools can broaden the educational experiences of students through activities designed to nurture confidence, responsibility, compassion and wisdom. These activities have a particular focus on service learning and student leadership.

Chapter 7 looks at our Cambridge Global Perspectives® and Enterprise courses. These provide schools with an educational programme that is particularly supportive of developing the learner attributes.

Chapter 1: The learner attributes in teaching and learning

Overview

The learner attributes are closely related to a wide range of educational ideas and approaches and cannot be considered in isolation. This chapter explores some of these and introduces some of the themes that are considered in more detail in later chapters.

Competencies

A great deal has been written about the 'skills' needed to flourish in the modern, global, interconnected world. The *Assessment and Teaching of 21st Century Skills* researchers (Griffin, McGaw & Care, 2012) group these skills into four categories (see Table 1). While it can be argued that these have always been central to education, there is no doubt that they have become more prominent in the global information age.

Competencies might be considered to be a broader and better description of these than 21st century skills. Competencies are closely related to the learner attributes and refer to specific patterns of behaviour that enable someone to perform a task at the required standard. Competencies can be defined as: 'combinations of knowledge, skills and attitudes, which facilitate the application of knowledge to real world contexts' (see Cook & Weaving, 2013). The OECD (2005) says that competency 'involves the ability to meet complex demands by drawing on and mobilising psychosocial resources (including skills and attitudes) in particular contexts'.

To communicate competently, for example, an individual needs to be both knowledgeable and skilled in the language being used. But this is not enough. Effective communication is likely to draw on other resources including practical IT skills and skilled habits including confidence, reflection, empathy and creativity. Critical thinking, creativity and problem-solving all occur in contexts that will require specific knowledge, skills and understanding. However, they also require a range of intra- and inter-personal skills, and an inclination to demonstrate them.

Table 1

Defining 21st century skills	
Categories	**21st century skills**
Ways of thinking	Creativity and innovation Critical thinking, problem-solving, decision-making Learning to learn, metacognition
Ways of working	Communication Collaboration
Tools for working	Information literacy ICT literacy
Living in the world	Citizenship – local and global Life and career Personal and social responsibility – including cultural awareness and competence

> " Ultimately, education is not what we do to our children. Rather, it is what we do with them, and for them, to bring out the best in each of them, so that they grow up to embrace the best of the human spirit – to strive to be better, to build deeper wells of character, and to contribute to society. "
>
> **Mr Heng Swee Keat**, Minister for Education, Singapore, 2013

The importance of socio-emotional skills / competencies in the learning process

Put very simply, learning happens when students think hard (Husbands, 2014), effectively mobilising a number of different mental processes and resources that are both cognitive (such as reasoning and memory) and socio-emotional (sometimes called non-cognitive skills).

As well as developing knowledge, skills and understanding, learning involves transforming behaviours and attitudes that underpin cognitive functioning, so that students have the inclination and the resources needed to demonstrate competence.

Kautz, Heckman, Diris, ter Weel and Borghans (2014) describe a number of 'non-cognitive skills': these include personality qualities such as perseverance, self-control, attentiveness, resilience to adversity, openness to experience, empathy and tolerance of diverse opinions. They say that these skills:

* predict life outcomes at least as well or better than traditional measures of cognition

* have positive and strong effects on educational attainment. They also help to improve workplace and life outcomes

* can be enhanced, and there are proven ways to do so.

The Cambridge learner attributes provide a cross-curricular language that can support the development of these broader skills and personal qualities. It is also important to note that these skills are particularly valued in higher education and the workplace. Appendix 1 pprovides evidence of the attributes universities are looking for in undergraduates and considers core skills for employability.

Appropriate challenge

Constructivism, a well-established theory that explains how learning happens, has important implications for effective teaching and learning. Constructivism highlights the fact that learners construct their own understanding from their own experiences. Understanding cannot be transmitted from a person (or any resource) without the active engagement of the learner. The most important implication is that learning needs to engage and challenge the learner's thinking so that they are made to think hard. Every learner brings knowledge, understanding and learning habits to the learning process. These need to be recognised and positively challenged for learning to occur.

The concept of the proximal zone of development, introduced by Vygotsky (1978), is helpful in identifying the right level of challenge. The proximal zone of development describes the distance between what the learner can achieve working on their own and the level of their potential development when being guided by a skilled teacher [or peer]. Vygotsky pointed out that learning is optimised when students' thinking is extended beyond what they can easily manage on their own. Teachers have a responsibility to scaffold learning by challenging a student with carefully designed instruction and activities. These make the student think hard and challenge their existing understanding. Sometimes in learning environments expectations are too easy so learners are bored, or too hard so learners become frustrated and demoralised as the leap in understanding expected is too high.

Teachers are responsible for designing and delivering instruction and learning tasks that foster deep learning in the proximal zone of development. In order to achieve this, Hattie (2009) argues that teachers need to be activators not facilitators of learning. Skilled teachers understand where students are in their learning and then plan and implement appropriate activities and instruction to take them to the next level, constantly challenging student thinking.

Vygotsky's ideas are absolutely relevant to developing the learner attributes. Learners need to be made to think hard about what it means to be confident, responsible, reflective, innovative and engaged in all of the contexts of their learning in the school, within and beyond the classroom, so that their understanding of themselves as learners evolves. The concept of enjoying challenge is crucial. In the words of Mihaly Csikszentmihalyi (1990), p3:

'The best moments in our lives are not the passive, receptive, relaxing times… The best moments usually occur if a person's body or mind is stretched to its limits in a voluntary effort to accomplish something difficult and worthwhile.'

Critical thinking, creativity and the problem of transfer

Critical thinking, creativity and problem-solving relate to particular disciplines. History, science, mathematics and the arts, for example, should all develop the ability to think critically and creatively, and they do this in ways that are not easily transferable to other contexts. This is because the capacity to think critically and creatively is intertwined with knowledge and understanding of a discipline. The main reason for including academic disciplines in the curriculum is that they nurture powerful knowledge (see Young, 2013) with applications that are not easily acquired from everyday experience. Students learn to think competently and solve problems as mathematicians, scientists, historians and artists.

Critical thinking and problem-solving have general applications beyond particular disciplines, of course, and the school's role is to develop these more general competencies. In this sense critical thinking is the ability to identify, analyse and evaluate situations, ideas and information to come up with responses and solutions. Creativity is the ability to imagine new ways of solving problems, approaching challenges, answering questions or creating products.

Because it is not easy to transfer what is learned from one discipline to another, for students to become effective critical and creative thinkers in this general sense they need to be able to reflect on and apply approaches they learn in academic disciplines in an interdisciplinary way. Interdisciplinary approaches need to be based on rigorous disciplinary understanding. Teachers, backed by a supportive curriculum, can help make connections in students' minds between what they learn in one context and discipline and another.

Every student's self-image and learner attributes profile will vary from one context to the next. If a student struggles with mathematics, for example, they are probably not as confident, responsible, reflective, innovative or engaged in this area as they are in others. Helping students identify their passions and areas of strength can form the basis of reflection around why it is that they perform well in one area compared to another. Reflective practices can help them to understand themselves as learners across the curriculum, maximising their strengths and minimising weaknesses.

Intelligence

There are lots of definitions of intelligence. Narrow definitions focus on problem-solving and mental agility in specific analytical problem-solving tasks and are often associated with intelligence quotient (IQ-g) as a general measure.

In a broader sense, intelligence can be understood as a person's ability to adapt to an environment and learn quickly from experience, demonstrating effective problem-solving strategies in a variety of contexts. This broader interpretation recognises the importance of personal competencies and practical problem-solving abilities as well as specific analytical skills.

Robert Sternberg (2009) views intelligence as the ability to achieve goals in life by capitalising on strengths and compensating for weaknesses to effectively interact with different environments using analytical, creative and practical abilities. He points out that successful students in higher education, in life and in the workplace have original creative ideas and the reflective and management skills necessary to make the best of their abilities. Sternberg observed that most of the successful graduate students he worked with were not those with the highest grades but those that demonstrated practical intelligence combined with wisdom and creativity. Practical intelligence is the ability to get things done, to communicate well, collaborate and see a task through to completion. Sternberg argues that intelligence, wisdom and creativity are learnable and can be developed over time. They are forms of 'developing expertise'.

The concept of wisdom, highly valued by Sternberg, is very relevant to the learner attribute of being responsible. It goes beyond being knowledgeable, stressing the importance of using knowledge well to make good judgements.

Howard Gardner (1983) suggested that traditional concepts and measures of IQ fail to measure or explain cognitive abilities. He said that intelligences are in fact multiple. He originally posited the existence of seven intelligences (musical-rhythmic, visual-spatial, verbal-linguistic, logical-mathematical, bodily-kinaesthetic, interpersonal and intrapersonal). He added naturalistic in 1995. Daniel Goleman (1995) popularised the term 'emotional intelligence', referring to the ability to understand one's own and other people's emotions and modify one's behaviour appropriately. He pointed out how critical emotional intelligence is in leadership.

Critics of multiple and emotional intelligence theory say they are more appropriately labelled as aptitudes or abilities, and empirical support for non-IQ-g intelligences is contested. More significantly there have been a number of popular books published suggesting educational approaches derived from these theories are based on poor reasoning and lack of evidence. It does not follow for example, as Gardner acknowledges, that students need to be taught differently depending on their own intelligence profile. Multiple intelligences are not learning styles. Such approaches, which assume students have preferred styles (for example visual, audio, kinaesthetic), have been discredited (see for example Riener & Willingham, 2010).

While recognising these limitations there are very important implications of how intelligence is understood for developing the learner attributes in schools.

1. Inclusive education practices that recognise individual strengths, and stretch and support all students should be valued. It's helpful to have what is sometimes called a 'growth mindset' (see Dweck, 2006 and Deans for Impact, 2015): this is where students and teachers believe that performance can be improved for all through goal-directed hard work. Teachers often have expectations of how particular students are going to progress, which tends to become a self-fulfilling prophecy. Students are sensitive to their teachers' expectations (Muijs, Kyriakides, van der Werf, Creemers, Timperley & Earl, 2014). At worst, this can result in students underestimating their own potential and underachieving.

2. If schools want to give students a broad education, preparing them for life, Sternberg's perspective on intelligence as developing the expertise needed to perform well in different environments has important implications for practice. The global information age requires students to navigate lots of environments using a combination of analytical, creative and practical abilities. This raises questions about what to include in the curriculum. Cheng, for example (2002, see Resources section), argues that there are a number of 'contextualized multiple intelligences' that are increasingly important in the modern world and schools should focus on developing these. The implications for curriculum of developing a wide range of expertise are considered in Chapter 2. The learner attributes can support a wide range of interpretations and approaches that schools adopt.

The importance of emotion and engagement

The importance of emotions in learning, thinking and decision-making is becoming increasingly well understood due to developments in neuroscience. In the past, the assumption was that the emotional and rational parts of the brain were largely separate systems. Immordino-Yang and Damasio (2007) and Immordino-Yang (2016) suggest a very high level of interdependence between effective emotional and cognitive functioning: 'It is literally neurobiologically impossible to build memories, engage complex thoughts, or make meaningful decisions without emotion' (Immordino-Yang 2016, p.18).

Immordino-Yang (2016, pp. 36–40) introduces the concept of emotional thought. This means that emotional and cognitive processes interact to produce thought processes that affect learning and reasoning and underpin decision-making. Having an effective 'emotional rudder' is critical, particularly for students to be able to use knowledge effectively.

Because learners construct their own understanding of the world, bringing prior knowledge and learning habits to the learning process, it is a fact of human nature that we tend to internalise experiences we have based on our existing world view and emotional states. No two people will internalise an experience in the same way. Schools need to nurture emotional awareness by making emotions (as well as reason) an object of reflection and respecting the role emotions play in learning.

Implications for teachers and schools include creating a culture of learning in classrooms so students feel emotionally safe. It is well known that adolescents are particularly concerned about their social image. This needs to be recognised so that students learn to see making mistakes as a learning opportunity and not something to be feared. This is considered in Chapter 5.

The learner attribute of engagement is particularly important. We think more deeply about things that engage us. Fostering emotional engagement in lessons is a great way to help students understand the relevance of what they are learning to their lives. Students need time to engage deeply with concepts and material. An overcrowded curriculum can result in rushing through material without fully engaging with it. One reason teachers need to generate their own schemes of work and lessons plans (see the *Developing your School with Cambridge* guide, Chapter 4:

www.cambridgeinternational.org/teaching-and-learning/developing-your-school-with-cambridge/) is so they can make it engaging and relevant.

Our first case study is a good example of how a school department made learning engaging. It also illustrates how the school supported the development of all the learner attributes with one well-designed activity. The annual writing event helps to improve students' language skills – but that is only a part of its purpose. Students make a personal emotional connection to writers (they become engaged) and produce their own innovative creative response. They are encouraged to discuss ethics, demonstrating responsibility. Reflection is essential to the process, and developing confidence an inevitable outcome, reflected in the students' responses.

Case study 1:

Developing a community of confident and engaged learners at the United World College of South East Asia (UWCSEA)

When planning learning activities for students in the English department at UWCSEA (East Campus), Kate Levy, the Head of Faculty, and her team work hard to consider how students engage with concepts in the English curriculum and the 'real world'.

Each year Kate organises a fortnight-long writing event for students in grades 9 and 10. The 'Write Here' event exposes students to a range of writers, allowing them to hear their stories, their inspirations and their challenges. In this way students make a personal connection to real stories and the power of the pen.

Kate brings in writers from a variety of professions: novelists, speech writers, journalists and those in the marketing industry. They share their experiences of the writing process.

The event is an engaging way for students to:

- develop an understanding of what it means to tell a story responsibly and the ethical concerns that come with it

- ask questions about media representations of people, places, events, and sensitising students to how truths are constructed, and how bias, assumptions and attitudes are embedded in the content, style and structure of the article. The students meet and interview journalists in the parent body about their work

- explore the relationship between words and images through the school's photojournalist writer-in-residence

- consider the relationship between form and purpose. What story and ideas do they want to share, why, and which text type would serve this best?

Case study 1: continued

- consider the values, expectations and sensitivities of the intended audience

- engage in critical thinking. It is quite provocative to hear a photojournalist reveal that he finds photography limited and potentially dangerous as a storytelling tool. Or that same journalist reveal that he felt some sympathy for the Khmer Rouge commandant that he tracked down and helped to bring to justice. Or to meet a teacher-author who had to battle with their editor at every stage to say what they wanted in a book about Western and Asian parenting. Or to hear a spoken word poet (and former refugee and ex-con) reveal how a life of displacement and violence in the US penal system (he spent 18 months in solitary confinement) gave him his poetry.

Students listen intently and talk animatedly about the ideas and the concepts raised by the writers. Many of them make insightful connections between very different speakers. The students' brief is to interview the guests to uncover their stories and then to share those stories purposefully and responsibly.

This ensures high levels of engagement as students respond to issues or stories that they feel connected to. The readers of the students' work (**click here to see an example**) are an authentic audience: perhaps an article for the school publication with an audience of 11 000+, an open blog post or a letter to the Board of Governors. In this way students understand the responsibility of the writer and develop the confidence to communicate appropriate messages in appropriate forms to a wide range of audiences.

By sharing stories through writing, students help to build understanding and compassion in our community. However, through their writing they also build their confidence not only as writers, but as young people with a voice in the community.

The importance of diligent and deliberate practice

Students need goal-directed deliberate practice to develop and embed skills that will help them progress, improve their understanding and apply their knowledge. Deliberate practice focuses on specific areas of weakness or misunderstanding. 'Diligent' refers to the fact it is usually repetitive and involves hard work.

Nowadays, knowledge is freely available on the internet and computers can perform many skill based tasks. One dangerous and false argument is that students therefore do not need to learn content or practise basic skills. This is based on a misunderstanding of what competence is. Form and substance are both equally important. Pak Tee Ng (2016) points out that a master of the martial arts has both substance, developed by repeated diligent practice of basic skills, and the aptitude to apply these in creative and useful ways. The same analogy applies to musicians, scientists, mathematicians, historians, linguists, artists, sportspeople or experts in any field.

One critical role of assessment for learning in classrooms is to identify areas that require focus and deliberate practice that will help students, once they have mastered these, to progress onto the next stage. Often this requires breaking down complex tasks or expectations into smaller component parts and practising to improve these specifically.

One of the limitations of project or inquiry-based approaches, if they are overused or poorly designed, is that students can be asked to demonstrate complex skills without mastering the component skills that are required for competent performance first. The assumption is that these skills are best developed through 'authentic' learning activities that are as much like the desired end product as possible. This may not actually be a good way to develop component skills (see Christodoulou, 2016). This needs to be balanced with the fact that carefully designed project and inquiry work, as part of a broad-based teaching strategy, can support engagement and help students understand component areas that they need to target and improve through deliberate practice.

Critical thinking, creativity, communication and collaboration 'depend on complex reasoning as well as multiple low-level skills that first must be automated' (Abadzi, 2015, p. 35). The importance of the working memory as a bottleneck to processing power in learning and performance is well understood. When learners practise a task like mental arithmetic it becomes automatic and embedded in long-term memory, freeing up space in the working memory for more complex calculations. Longer and

complex chains of skills can only be effectively developed after smaller chains have been formed through practice. Students have limited working memory and this can be overwhelmed by tasks that are too cognitively demanding.

Knowledge is also a prerequisite for sophisticated analysis and understanding. Studying history, for example, should help students to become excellent historians who understand concepts like continuity and change, similarity and difference, cause and effect. This needs to be based on detailed subject knowledge. What that knowledge actually is will vary depending on culture and context. But factual knowledge matters. Acquiring it will help students to understand concepts and transfer their understanding to new contexts.

High-performing musicians and sportspeople understand why they repeatedly practise basic skills, and good schools have a strong expectation of goal directed deliberate practice based on a growth mindset in all disciplines. This is why deliberate and diligent practice, along with all approaches used to support learning, need to become a topic of reflection and discussion in schools.

It is important to note, of course, that the wrong sort of diligent practice, drilling students with what teachers or tutors perceive as the correct answers needed to do well in examinations, is counter-productive. It destroys confidence and engagement, does not teach students understanding of the discipline, is likely to produce worse examination results, and does not prepare students for life. It develops dependency rather than independence.

The importance of reflection in learning

Skilled reflection deepens understanding and permits students to apply their knowledge in new contexts. It is also at the heart of becoming a self-regulated, life-long learner. According to David Whitebread (2017), 'children developing self-regulatory abilities predict academic outcomes and emotional wellbeing more powerfully than any other aspect of children's development'. Chris Watkins (2010) argues that to develop students' self-regulatory abilities, to learn how to learn, schools need to have a learning rather than a performance orientation. This involves making 'learning an object of attention and reflection, in other words to make learning an object of learning'. When this is practised well, students also do better in high-stakes assessments.

The Education Endowment Foundation (EEF) is an independent research foundation in the United Kingdom that investigates the effectiveness of educational interventions. It has shown that metacognitive approaches (a term used to refer to a learner's ability to self-regulate their learning and learn how to learn; see Chapter 3), have consistently high levels of impact. Evidence suggests that the strategies and habits associated with learning how to learn can be particularly effective for low-achieving students. This is detailed in the Teaching & Learning Toolkit: **https://educationendowmentfoundation. org.uk/resources/teaching-learning-toolkit/meta-cognition-and-self-regulation**

John Hattie's *Visible learning: A synthesis of over 800 Meta-Analyses Relating to Achievement* (2009) presents similar findings to the EEF. Hattie stresses the importance of making students' thinking visible, both to the teacher and the student, as a critical process in developing students' understanding of the material being learned. Developing metacognitive awareness and control is identified as having a powerful effect on students' learning and their ability to become independent learners.

Experiential learning, reflective practice and 'challenge education'

Experiential learning engages learners through direct experience of authentic problems and challenges. It is supported by focused reflection as a means of developing skills, acquiring knowledge and developing positive attitudes. The idea is relevant to classrooms, co-curricular activities and service learning.

The extent to which a school engages with experiential learning will depend on its vision, context and culture. All schools should to be concerned with relating learning in classrooms to the students' broader experiences, making learning relevant and engaging. As argued earlier, teaching and learning needs to constantly challenge students' thinking. This will involve using a variety of approaches including: collaborative group work, investigations, fieldwork, projects and presentations in addition to direct instruction and diligent practice.

Practical work is very important in a number of disciplines. To really understand science, for example, students need to practise the scientific method. Practical skills, like any other set of skills, have their own developmental pathway. Actually doing and experiencing a scientific experiment cannot be adequately reproduced by watching one or reading about it in a textbook.

Good reflective practice is fundamental to experiential learning. Kolb (1984) created the cycle of experiential learning (see figure 1), which contains four elements. Concrete experience forms the basis for observation, analysis and reflection. These lead to a new theory or understanding which forms the basis for learning in the next cycle. The critical importance of reflection in learning is considered in detail in Chapter 3. The reflective cycle forms the basis of the Cambridge Professional Development programme for teachers.

Proponents of 'challenge education' advocate the value of taking students outside their comfort zone, requiring them to experience learning in the real world of their communities, the workplace, the wilderness. Being challenged can develop confidence, resilience, practical problem-solving abilities, teamwork and wisdom which aren't easily developed in classrooms. This is considered in detail in Chapter 6.

Figure 1: The reflective cycle adapted from Kolb (1984)

The importance of school culture

The educational programme in a school cannot meaningfully be viewed in isolation from the culture in which it operates. Culture creates the environment in which learning takes place and includes hidden and unintentional messages that may contradict the school's stated aims and objectives. Everyone involved in the school community – teachers, administrators, governors, students and parents – will have their own core values that determine how they think and act. These must be consistent with those of the school and supportive of the learner attributes.

Even if the school backs its mission with a clear strategy, it can be difficult to make progress without addressing culture. School culture is complex. Understanding and engaging with school culture is both an essential and often neglected part of school development. Culture operates on different levels. The most obvious is the surface level, which includes the visible aspects of pedagogy, curriculum and the overt behaviours of teachers, administrators and students. But schools also need to engage with deeper structures, including fundamental beliefs and value systems. Problems occur when deep values don't match surface appearances.

What are the implications?

- Curriculum is built on culture so it is in reality a local construct. No two schools are the same. All Cambridge International or any other external organisation can do is support you to develop your own.

- Culture is not easily changed. It is important to understand and respect what your culture is and work with it, gradually evolving practice rather than trying to enforce practices that are not fully understood or accepted.

- Evaluation is central. Are learners actually experiencing what you intend? If not, why not? Often the intended prescribed curriculum is different from the experienced curriculum.

- Recruitment of teachers, school leadership and governors is absolutely critical. A great deal of attention needs to be given to recruiting people who share the school's vision.

- Most learning happens outside the school, at home and in the wider community, so parental understanding and support for the school mission is crucial.

It is important to teach parents about the value of the learner attributes. In many schools parents are very results focused and might only be engaged with the learner attributes at a surface level. The learner attributes will be more effective when they are actively supported beyond the school by parents deeply committed to them. This guide is intended to help with this process by explaining why supporting the learner attributes will improve results as well as prepare students for life.

School culture is not static and it does change over time. Efforts to ensure that the culture is supportive will be rewarded with more effective practice.

Case study 2 is an illuminating example of how a school reflects on learning that brings together a number of ideas discussed in this chapter. The focus is on learning, and the school recognises that this will automatically lead to performance improvements. It concerns itself with cognitive and affective skills, knowledge, understanding and learning habits. Students are supported to become leaders of their own learning with the approach developing confidence, engagement and reflective practice for both learners and teachers. The desired outcomes are concrete in terms of improving Arabic language skills, and the school recognises the importance of culture, and that learning is different in every class and context.

Case study 2:

Doha College's Lesson Study* approach: High-performance learning in an international context.

How to revolutionise your ideas about learning and therefore change your teaching accordingly.

Watch the video at
https://vimeo.com/228214201

As part of the pioneering High Performance Learning (HPL) programme, launched by Professor Deborah Eyre, we reviewed our Lesson Study planning, observation and analysis cycles to gain a deeper understanding of how students learn, and, in particular, if and how students from different cultural backgrounds can be further supported to excel in their learning. We have subsequently adapted our pedagogy as we have engaged in an approach that is much more responsive to students' learning needs and therefore is a more harmonious learning process between the student and the teacher.

Lesson Study, first introduced in Japan in 1870, is an action research focusing on the development of teacher practice knowledge. The exclusive, non-judgemental focus on the learning processes aims to help us as teachers to challenge some of our misconceptions about how students actually learn. This teacher inquiry looked at students as having individual needs rather than as recipients of our teaching, and this encourages teachers to adapt their teaching to tune in much more accurately to the learner.

We were particularly interested how we, as teachers, can best embrace the notion of HPL. An HPL approach in school develops the cognitive skills and attitudes necessary for students to be successful not just academically but also in the wider aspects of their lives. Skills such as risk-taking, meta-thinking or intellectual curiosity are improved by developing their independence, confidence, ability to collaborate, deal with failure and perseverance, to name but a few

Case study 2: continued

qualities. We felt that by engaging in the observation of the learners, taking on board students' perception of their learning and acting upon it, we would gain an insight of how to best to empower our students to strive for excellence.

We chose a sequence of Arabic lessons to case study three students where we could observe a wide array of context. This included students with a range of social, linguistic and cultural prior knowledge and experience of the subject, as well as different learning styles, abilities, personalities and genders. We planned the research lessons collaboratively, then observed the learning (and not the teaching!), interviewed students about their learning experience and, finally, analysed the progress made. That research, data and student feedback then fed into the design of the subsequent lessons. We found ourselves refining our teaching approach to meet the actual requirements of students, rather than what we thought would work from the teacher's point of view.

The process was a remarkable experience for all the teachers involved, on many levels. Firstly, during the planning stage, we realised that as teachers we work in isolation so that our decisions, thinking and judgement processes are not a product of negotiation or compromise but are very subjective and one dimensional. Secondly, we have a pre-conceived idea of what teaching and learning should look like. Having completed team planning based on our 'knowledge' of students and 'half a century' of teaching experience, we watched 'our' lesson fall apart. We realised that so much of our focus is on ourselves and how we deliver material. Although we have incorporated support, assessment for learning and student feedback into our planning, we used it as a consequence to the learning, rather than enabling it to guide the learning itself.

Consequently, against our expectations, a semi-native Arabic speaker underperformed as he was not comfortable with the grouping (which derived, perhaps, from his social background) and, rather than leading the learning, he would only react when prompted. On the other hand, a student struggling with the

language felt reassured in a group composed of the opposite sex and performed excellently, displaying self-regulation and critical thinking. What surprised us the most was a high-performing student who reacted as predicted to the lesson but, in the interview, commented how unhappy she was with the timings which prevented her from analysing the topic in depth.

The whole process of the Lesson Study made us aware that to provide a truly personalised learning experience, where students strive to achieve the best they can, we need to positively embrace the fact that students are the leaders of their own learning and not us, or certainly not just us. As teachers, we were reminded that we too have to be constantly learning from the students in order to provide them with opportunities to succeed. The final case study lesson was much more in tune with the actual learning needs of the three case study students, who were now fully engaged in their learning. Thus, although the notion of 'knowing your audience' is an old one, we found the process tremendously valuable. Now back with our classes, we are continuing to question and examine our and students' approach to learning, making the experience continuously evolving and therefore better.

By Anna Davis

*See Resources: Pete Dudley: **http://lessonstudy.co.uk**

References

Abadzi, H. (2015). Training the 21st century worker. Policy advice from the dark world of implicit memory. *IBE Working Papers on Curriculum Issues* No 16. Geneva: UNESCO International Bureau of Education.

Cook, R. & Weaving, H. (2013). *Key competence development in school education in Europe*. [online] Available at: **http://keyconet.eun.org/c/document_library/get_file?uuid=3a7a093c-4c8f-473c-8702-f38ed86bb730&groupId=11028** [Accessed November 2016].

Christodoulou, D. (2016). *Making Good Progress?: The future of Assessment for Learning*. Oxford: Oxford University Press.

Csikszentmihalyi, M. (1990). Flow: *The psychology of optimal experience*. New York: Harper Row.

Deans for Impact. (2015). *The science of learning*. [online] Austin, TX: Deans for Impact. Available at: **http://deansforimpact.org/resources/the-science-of-learning** [Accessed January 2017].

Dweck, C. S. (2006). *Mindset: The new psychology of success*. New York: Ballantine Books.

Education Endowment Foundation (Sutton Trust). *Teaching & Learning Toolkit*. [online] Available at: **https://educationendowmentfoundation.org.uk/resources/teaching-learning-toolkit/meta-cognition-and-self-regulation** [Accessed April 2017].

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York: Basic Books.

Goleman, D. (1995). *Emotional intelligence*. New York: Bantam Books.

Griffin, P., McGaw, B. & Care, E. (2012). *Assessment and Teaching of 21st Century Skills*. Springer Science and Business Media.

Hattie, J. (2009). *Visible learning: A synthesis of over 800 Meta-Analyses Relating to Achievement*. London: New York Routledge.

Heng Swee Keat (2013). Keynote Address by Mr Heng Swee Keat, Minister for Education, at the Ministry of Education Work Plan Seminar 2013. Available at: **https://www.moe.gov.sg/news/speeches/keynote-address-by-mr-heng-swee-keat--minister-for-education--at-the-ministry-of-education-work-plan-seminar-2013--on-wednesday--25-september-2013-at-915am-at-ngee-ann-polytechnic-convention-centre** [Accessed 7 December 2016].

Husbands, C. (2014). Presentation given to the Cambridge Schools Conference, Homerton College, Cambridge University (September 2014).

Immordino Yang, M. H. & Damasio, A. (2007). We feel, therefore we learn: The relevance of affective and social neuroscience to education. *Mind, Brain, and Education*, 1(1), pp. 3–10.

Immordino Yang, M. H. (2016). *Emotions, learning and the brain: Exploring the educational implications of affective neuroscience*. New York: Norton and Company.

Kautz, T., Heckman, J. J., Diris, R., ter Weel, B. & Borghans, L. (2014). *Fostering and Measuring Skills: Improving Cognitive and Non-Cognitive Skills to Promote Lifetime Success*. [online] OECD. Available at: **https://www.oecd.org/edu/ceri/Fostering-and-Measuring-Skills-Improving-Cognitive-and-Non-Cognitive-Skills-to-Promote-Lifetime-Success.pdf** [Accessed March 2017].

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development* (Vol. 1). Englewood Cliffs, NJ: Prentice Hall.

Muijs, D., Kyriakides, L., van der Werf, G., Creemers, B., Timperley, H. & Earl, L. (2014). State of the art – teacher effectiveness and professional learning. *School Effectiveness and School Improvement*, 25(2), pp. 231–256.

OECD. (2005). *The definition and selection of key competencies*. [online] Available at: **http://www.oecd.org/pisa/35070367.pdf**

Pak Tee Ng. (2016). Speech given by Pak Tee Ng, Associate Professor, National Institute of Education, Singapore at the Cambridge Schools Conference, Kuala Lumpur, Malaysia, December 2016.

Riener, C. & Willingham, D. (2010). The myth of learning styles. Change: *The Magazine of higher learning*, 42(5).

Sternberg, R. J. (2009). *Academic Intelligence is not enough! WICS: An expanded model for effective practice in school and later life*. Paper commissioned for the conference on

Liberal education and effective practice. Mosakowski Institute for Public Enterprise, March 2009. Clark University and the Association of American Colleges and Universities.

Stobart, G. (2014). *The expert learner: Challenging the myth of ability*. Maidenhead, UK: Open University Press.

Vygotsky, L. (1978). Interactions between learning and development.
In: *Mind in society*. Cambridge, MA: Harvard University Press, pp. 79–91.

Watkins, C. (2010). Learning Performance and Improvement. *Research Matters*, issue 34, Summer. [online] The London Centre for Leadership in Learning. Available at: **http://www.mantleoftheexpert.com/wp-content/uploads/2010/06/Watkins-10-Lng-Perf-Imp.pdf**

Whitebread, D. (2017). *Cambridge Primary/Secondary 1 Global Perspectives programme 5–14: Overview and Academic Rationale*. Unpublished paper presented to the pilot schools. See also Whitebread, D., & Pino Pasternak, D. (2010). Metacognition, self-regulation & meta-knowing. In K. Littleton, C. Wood & J. Kleine Staarman, eds., International Handbook of Psychology in Education. Bingley, UK: Emerald.

Young, M. (2013). Overcoming the crisis in curriculum theory: A knowledge-based approach. *Journal of Curriculum Studies*, 45(2), pp. 101–118.

Resources

Lesson Study, edited by Pete Dudley: **http://lessonstudy.co.uk**

Cheng, Y.C. (2002). *New Paradigm of Borderless Education: Challenges, Strategies and Implications for Effective Education through Localization and Internationalization*. Centre for Research and International Collaboration. Hong Kong Institute of Education. Keynote speech given in Hatyai, Thailand, October 2002. Available at: **http://scholar.google.co.uk/scholar?q=Cheng,+Y.C.+New+Paradigm+of+Borderless+Education:+Challenges,+Strategies+and+Implications+for+Effective+Education+through+Localization+and+Internationalization.&hl=en&as_sdt=0&as_**

See also presentations given at the Cambridge Schools Conference, Hong Kong, 2017:

www.cambridgeinternational.org/cambridge-professional-development/cambridge-schools-conference/previous-conferences/hongkong2017

Chapter 2: Designing and delivering a curriculum that supports the development of the learner attributes

Overview

This chapter builds on some of the points made in Chapter 1 of this guide and Chapter 2 of the *Implementing the Curriculum with Cambridge* guide **www.cambridgeinternational.org/curriculumguide**.

Schools interested in developing the learner attributes need to develop a curriculum that is broad, balanced and coherent in a number of ways.

A broad and balanced curriculum

The *school curriculum* is sometimes narrowly defined to include only the subjects a student studies within a school year, and in sequential years, as they progress through the school. The concept of curriculum, however, can be considered more broadly to include the *co-curricular curriculum*, which recognises the valued educational activities that support learning beyond classes and subjects. We also need to recognise the hidden or informal curriculum. This is learning that takes place as a result of the culture and climate of the school and is often unacknowledged. Broad definitions of curriculum focus on the overall learning experience a student receives as a result of the educational programme and culture in the school.

It can be useful to distinguish the curriculum, which includes all valued learning, from qualifications and subjects. The curriculum in an excellent school is more than the sum of the qualifications, subjects and activities that are visible on the school schedule. This is because careful attention in curriculum design and implementation is given to learning within, across and between the subjects and activities. All subject teachers support the development of the learner attributes and other qualities identified in the school's vision. Breadth, balance and coherence need to be built in by design.

Here are a few questions to consider for your school. Does the curriculum:

- expose students to learning powerful knowledge and skills that will be useful for them in the future? Is there an appropriate balance of subjects, disciplines and activities?

- make connections in students' minds between what they are learning in different topics in a discipline and between different disciplines?

- teach subjects and disciplines in a way that helps students master basic skills and build on these to develop deep understanding of the material and the ability to apply their knowledge in unfamiliar contexts?

- encourage students' creative contributions?

- help students explore their interests and passions, exposing them to new possibilities?

- nurture learning habits in all subjects and activities that help students understand themselves as learners so that they can help themselves learn new material?

- support the development of emotional, physical and creative competences?

- support the development of collaborative and individual learning habits and skills?

- provide challenge in non-academic practical areas, for example service learning?

- support students' physical and mental wellbeing?

How should the curriculum be organised?

Most schools operate a timetable that divides the day into blocks of time in which subjects are taught. The main reason for including academic disciplines in the curriculum as discrete subjects is that they nurture powerful knowledge (Young, 2013), with applications that are not easily acquired from everyday experience, so that students learn to think critically and creatively as mathematicians, artists, scientists, historians etc. Each academic discipline has its own methodology. Critical thinking in science, for example, requires an understanding of the scientific method and the development of scientific knowledge and understanding which is embedded in practice and theory. As competence and understanding grow, learners can take on more advanced concepts and challenges because they have a solid disciplinary foundation.

The idea of powerful knowledge is based on improving understanding and performance, not just learning facts.

One danger with organising learning in this way is that students, teachers and parents can start to view knowledge as compartmentalised into silos that do not relate to each other. Interdisciplinary understanding, the ability and confidence to traverse disciplines, make connections and develop a holistic appreciation of knowledge that provides new perspectives, is extremely important.

For this reason some schools, particularly at primary level, organise the curriculum around inter-disciplinary or trans-disciplinary topics. This can be effective provided careful attention is given to developing the foundational literacies and knowledge needed for progression. Disciplinary understanding needs to be the foundation on which a rigorous interdisciplinary approach is based, otherwise learning can lead to superficial coverage and confusion. One alternative is to use interdisciplinary courses to complement traditional subjects and timetable them separately. These can provide an opportunity for students to investigate interdisciplinary questions using knowledge and skills acquired across the curriculum. This is the approach adopted in Cambridge Global Perspectives (see Chapter 7).

Excellent schools support the development of interdisciplinary understanding by expecting teachers to plan collaboratively. Teachers need to understand what other teachers are teaching a particular year group in order to make connections with their own classes. This can be facilitated through using curriculum mapping exercises to coordinate the curriculum so that knowledge and skills taught in one class support learning in another.

What subjects and activities should the curriculum provide?

This has to be the choice of the school based on school values expressed in the school mission statement, student age, local culture and national requirements. Curriculum is a local construct owned by the school; no one curriculum prescription is suitable for all.

There are a number of views on how to choose what to include in the curriculum and what weighting to attach to each. Traditionally these have emphasised cultural transmission (Lawton, 1989), where the school's role is to empower students with the knowledge, skills and competencies valued in their culture. Today, we see schools placing increasing emphasis on transformation of society, which is based on the argument that the skills needed to succeed in the modern world are different from in the past (see for example Cheng, 2002). Another perspective highlights the critical importance of helping students to identify and develop their passions. All these perspectives have value and they should be viewed as complementary approaches, not alternatives.

A good curriculum must respect local culture and traditions, recognise the changing nature of the world and encourage students to explore their interests. The terms broad and balanced are relative. There is no one right answer about the extent to which schools will want to engage with ideas presented in this guide. One curriculum prescription is not suitable for everyone and some schools will want to specialise in particular disciplines more than others.

Decisions about what to include in the curriculum have an opportunity cost. There are only so many hours in a school day, and days in a school year. Including more disciplines and/or giving more time to particular disciplines/subjects will have a cost expressed in terms of the best alternatives lost. There is, therefore, a potential trade-off between depth and breadth that schools must consider in designing their curriculum. If a school values the learner attributes it needs to evaluate what it offers to ensure an acceptable degree of breadth, balance and depth in curriculum planning.

One common and dangerous misunderstanding in curriculum design is that adding more subjects or content improves it. In fact the opposite is often true. Covering too much content can reduce the quality of that coverage. Howard Gardner made an important point when he said that 'the greatest enemy of understanding is coverage' (Brandt, 1993). What matters most is the quality of engagement in learning so that students learn to deeply understand the material and can apply that understanding in new contexts. This is considered in more detail in Chapter 3. This was one reason why the phrase 'teach less learn more' was introduced into the Singaporean national curriculum (see Ministry of Education, Singapore, 2015).

One way of optimising learning, given time constraints, is to look for areas of synergy across the curriculum. The statement 'an excellent curriculum is more than the sum of its parts' means that learning is more effective when key processes and competencies are reinforced in all disciplines and activities. The learner attributes are designed to help

schools facilitate this. Creativity and innovation, for example, are fundamental to all disciplines and need to be nurtured across the curriculum. They are not just confined to arts subjects (see Chapter 4).

There is also a danger in trying to create a discrete subject out of everything that is valued when the desired learning outcomes are better infused in the curriculum as a whole. Learning how to learn and personal development are concerned with habits and skills that are foundational to performance in all areas, and therefore the concern of every teacher and class. Students need to experience them as habits reinforced across the curriculum. Everything that has value does not need to result in a qualification.

Another important consideration to be aware of in designing the curriculum is the fundamental importance of language. Language is privileged in the curriculum as learners are dependent on their understanding of a language to access knowledge and skills in all subjects taught through the medium of that language. This has direct implications for the student's first or best language and the language of instruction of the school. Students attending international schools are often learning the curriculum through the medium of English, so developing a high level of English language competence will help them learn.

It is also very important that all students continue to develop their first or best language, this can be neglected if attention is just focused on English. All subjects students learn provide rich opportunities for language development and teachers need to be language aware. Students can only become more confident, responsible, reflective, innovative and engaged if their powers of expression and communication, mediated through language, are enriched. Language is also critical to developing student identity and international understanding. Cambridge has published a number of resources on language awareness and bilingual education recognizing the critical importance of language in the curriculum. Further information is available at: **www. cambridgeinternational.org/programmes-and-qualifications/bilingual-education/**

Curriculum coherence, assessment and teaching that support deep learning

We talk regularly to universities about our syllabus development. They often tell us how important it is for them that students understand key concepts and ideas deeply, and can take learning from one area and apply it elsewhere in novel ways. It is mainly for this reason that the high-stakes summative assessment we provide is linear, which means it takes place at the end of the course. This allows students more time to think, mature and practise before they are assessed. Teachers have more time to engage students' interests and support their development through assessment for learning rather than assessment of learning.

Coherence is important to support deep learning. This is different from the concepts of breadth and balance considered earlier. A coherent curriculum organises learning in a carefully planned and aligned 'spiral' instructional system. Oates (2010, p. 13), citing the work of Schmidt and Prawat (2006) relating to effective practice in national education systems, points out: 'A system is regarded as coherent when the curriculum content, textbooks, teaching content, pedagogy assessment and drivers and incentives all are aligned and reinforce one another.' The same principle holds true for effective schools. Curriculum, assessment and pedagogical practice are well aligned and mutually supportive. Learning experiences are thoughtfully sequenced, respecting students' developmental stages.

Our syllabuses, teacher support material, teacher professional development and assessments are designed by subject experts to ensure a smooth progression from primary to upper secondary. We plan the progression carefully so it respects the progression of knowledge and understanding needed to advance to the next stage in each discipline. Subject curricula are based on key concepts, principles, fundamental operations, key knowledge and the learner attributes.

We use ideas about important concepts in a number of ways. Threshold concepts are the ones that students need to understand before they can engage with more difficult material as they progress through a discipline. These are fundamental to curriculum and assessment planning and are used to decide what goes into syllabuses, and to define the level of demand expected, from primary to upper secondary. The order is critical and students need to be exposed to more complex ideas earlier on before they can be

expected to master them. Learning progressions need to be based on a learning spiral where students return to knowledge, concepts and skills repeatedly.

The term 'key concept' is specifically used by Cambridge International to describe essential ideas that help learners to develop a deep understanding of their subject and make links between different aspects. Key concepts may open up new ways of thinking about, understanding or interpreting the important things to be learned. These include a range of significant ideas and organising concepts that help learners to develop a deeper understanding, making sense of their subject and making links between different aspects of it. They can be transformative in nature and can be compared to a door or portal (Meyer & Land, 2003), opening up new and previously inaccessible ways of thinking about the important things to be learned. They support improved ways of understanding, interpreting or viewing, which helps the learner progress. As Cambridge International redevelops its syllabuses, key concepts are being emphasised more clearly (see, for example, Table 2) with the intention of helping students gain:

- a greater depth as well as breadth of subject knowledge
- confidence, especially in applying knowledge and skills in new situations
- the vocabulary to discuss their subject conceptually and show how different aspects link together
- a level of mastery of their subject to help them enter higher education.

Table 2: Example of key concepts from Cambridge International A Level Geography

The key concepts on which this [Cambridge International A Level Geography] syllabus is built are set out below. These key concepts can help teachers think about how to approach each syllabus topic in order to encourage learners to make links between topics and develop a deep overall understanding of the subject. The teaching support package gives teachers guidance on integrating the key concepts into their teaching. See page 7 for more information on our teacher support.

1. Space: the implications of spatial distributions and patterns of a range of physical and human geographical phenomena.

2. Scale: the significance of spatial scale in interpreting environments, features and places from local to global, and time scale in interpreting change from the geological past to future scenarios.

3. Place: the importance of physical and human characteristics which create distinctive places with different opportunities and challenges.

4. Environment: how the interactions between people and their environment create the need for environmental management and sustainability.

5. Interdependence: how the complex nature of interacting physical systems, human systems and processes create links and interdependencies.

6. Diversity: the significance of the similarities and differences between places, environments and people.

7. Change: the importance of change and the dynamic nature of places, environments and systems.

Teachers are expected to embed the key concepts through the study of the topics, both in general and specifically through examples and case studies.

Embedding the learner and teacher attributes in teaching practice

It is the teacher's responsibility to take Cambridge syllabuses and teacher support material, and develop appropriate schemes of work and lesson plans that provide engaging and locally relevant classroom activities for students. Cambridge syllabuses and support material also emphasise the learner attributes in subject-specific ways that complement their more general use across the curriculum (see the example in Table 3).

Table 3: The learner attributes in Cambridge Mathematics

Confident	In using and sharing information, ideas and mathematical techniques to solve problems. These skills support work in other subject areas as well as in mathematics.
Responsible	By learning and applying skills which prepare them for future academic studies, and also help them to become numerate members of society.
Reflective	Through the development of insight into the connections between different branches of mathematics and the steady build-up of mathematical and modelling skills.
Innovative	Through solving both familiar and unfamiliar problems in different ways, selecting from a range of mathematical and problem-solving techniques.
Engaged	By the beauty and structure of mathematics, its patterns and its many applications to real-life situations.

While developing a culture of learning in a school that emphasises effective learning habits will create a supportive environment, nothing is more important than teachers being good role models, exemplifying the Cambridge learner attributes by being confident, responsible, reflective, innovative and engaged themselves.

> " How can we expect inspired students without inspired teachers? "
>
> **Pak Tee Ng** at Cambridge Schools Conference, 2016

Collaboration

One potential limitation with curriculum in schools is that learning tends to be focused on the individual. Most summative assessment practices, notably examinations, assess the student's own knowledge and problem-solving abilities. Students need to learn to function effectively as team members and leaders as this an important ability needed to get on in life and the workplace. They also need to learn to solve problems collaboratively. The Organisation for Economic Co-operation and Development (OECD, 2013, p. 6) defines collaboration as follows:

'Collaborative problem-solving competency is the capacity of an individual to effectively engage in a process whereby two or more agents attempt to solve a problem by sharing the understanding and effort required to come to a solution and pooling their knowledge, skills and efforts to reach that solution.'

Collaborative problem-solving requires teamwork where individuals actively, responsibly and productively work towards a shared goal. This requires high levels of emotional competence and inter- and intra-personal awareness. Collaboration is more sophisticated than cooperation. A cooperative task may involve dividing up the work equally and everyone getting on with their share. Collaboration requires collective intelligence and agility. Individual responsibilities may change as progress or obstacles are met. Many schools tend to support cooperative learning rather than collaborative learning.

Being an effective collaborator requires additional habits and skills to being a good individual learner. Students need to be able to define the problem and ensure they have a joint understanding of what is being asked, think critically as a group, communicate

and reflect on how well the group is progressing towards solving the problem. Effective collaboration is linked to the concept of student leadership considered in Chapter 6. Leadership requires monitoring that the group is doing the right things towards achieving the set task and adjusting practices and work as required. Leadership should be viewed as a process rather than a position of responsibility, and is often distributed with different individuals contributing as leaders in different ways and at different times.

Schools that focus on the learner attributes have a responsibility to provide opportunities for collaborative learning through well-planned learning activities. Many academic disciplines can provide such learning opportunities through collaboration, including social science fieldwork and science practicals, or project work in courses like Global Perspectives and Enterprise (see Chapter 7). The co-curricular programme provides opportunities for group work and collaboration, as many of the case studies in this guide illustrate. Chapter 6 considers how 'challenge education', service and leadership can support the development of collaborative skills.

The assessment of collaboration requires careful consideration of an individual's contribution to the success of a group. This means teachers need to analyse the processes that led to group performance, and reflect on individual and group performance. The process of collaboration, as well as the product of the group, needs to be assessed at least formatively in terms of reflection and feedback.

Information literacy and research skills

Students today are bombarded with information. It has never been more important to learn how to argue critically, evaluate evidence and handle information wisely. Information literacy is closely related to learning how to learn (considered in Chapter 3) and needs to be the concern of all disciplines. Many disciplines focus on critical thinking skills and the evaluation of evidence. These are usually context specific but students can learn to apply them more broadly through supportive teaching and appropriate reflection.

Learning how to research is vital for success in higher education and the world of work. This means being able to define then investigate a significant question, evaluate evidence and prepare and communicate an argument in extended writing and through

spoken communication. It is also an engaging process that will develop confidence, innovation and responsibility.

A well-balanced curriculum provides students with the opportunity to research as a part of their learning experience. It is important that teachers help students to understand research methodology and to improve their research skills. As with any learning activity it is important that students are made to think hard and reflect on the process of research. Cambridge Global Perspectives, highlighted in case study 4 and considered in detail in Chapter 7, is a programme specifically aimed at developing critical thinking and research skills. There are also many possibilities for the co-curricular programme to support the development of practical critical thinking and research. Case study 3 provides one example of this.

Students at Frensham School, Australia (*case study 4*)

Case study 3:

Supporting the development of research skills at The Perse School, Cambridge, UK

Organising a structure: Independent learning and research

Research and scholarship are at the heart of The Perse School's learning culture. The school supports the development of pupils as effective independent learners by a programme of embedded research skills built into the curriculum. There is a strong emphasis on helping students make progress in their capabilities as researchers. Every year group is offered activities ranging from reading groups to lunchtime lectures with experts and external partnerships, trips and visits. Extension tasks and booklets for every subject are issued at the start of the year with a range of challenging material to dip into. The emphasis is on supporting pupils to become independent learners by making good choices about how to direct their time and extend their learning.

Pupils are offered a pipeline of research opportunities as they move through the school, with an increased level of depth and challenge at each stage. These begin with internally designed and assessed independent investigation programmes with teacher mentor support in Years 7 and 8, with the option of undertaking an externally validated research qualification in Year 10 and Year 12 respectively.

Pupils have the opportunity to develop great depth of subject knowledge at the same time as learning valuable skills in project management, the critical evaluation of source material and metacognition and reflection. This emphasis on research-driven learning as a creative approach to the curriculum reflects the school's location and values, situated as they are in Cambridge, a global centre of scholarship.
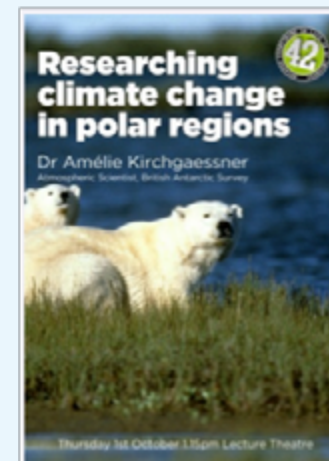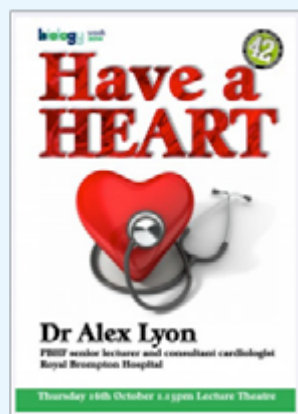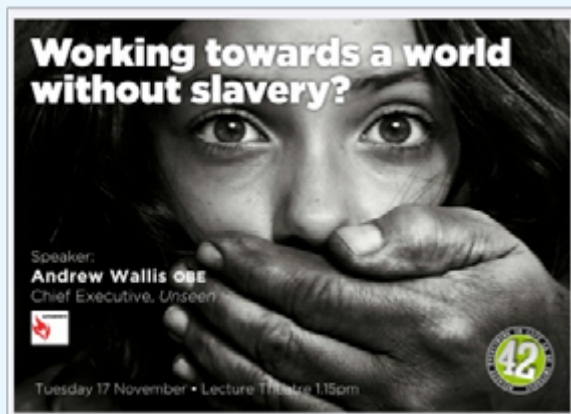
The school's lecture series 'The 42' draws on volunteer speakers to provide a weekly lunchtime focus lecture with Q&A opportunities. It draws a wide student audience from all year groups

The co-curricular programme

Co-curricular refers to learning experiences, usually organised into activities and programmes, which complement what students are learning in the classroom. Another term often used with a similar meaning is extra-curricular activities, 'extra' referring to the fact that these fall outside the scope of the 'normal' curriculum. Co-curricular is a better term as it suggests a central idea in this guide that this valued learning is not extra to the curriculum but fundamental to it.

The learning experiences provided by the co-curricular programme complement and support what the students are learning in the academic programme. They play a particularly important role in developing foundational competencies including self-understanding, communication, leadership, a sense of responsibility, health and wellbeing, confidence and intra- and inter-personal skills.

For this reason, schools that value the learner attributes consider the co-curriculum carefully. The culture of the school is permeated with a sense of valuing worthwhile student activities and these are considered on a par with academic achievement.

It is possible to broaden the concept of the co-curriculum to include activities that the school encourages which are actually provided in the community beyond the school. The extent to which a school is able to provide a rich choice of activities will be constrained by its context and resources. One way to broaden these opportunities is for the school to discover, support and develop opportunities for students to use clubs and resources available in the local community, recognising student participation beyond the school.

As with the academic curriculum there is no one formula for what to include in the co-curricular programme. Typically schools support activities and programmes in: physical recreation, performance arts, community service, student government, recreational hobbies, health and social education, outdoor pursuits and work experience. Many of the best programmes and activities, a number of examples of which are illustrated in case studies in this guide, are student led and managed. Activities and opportunities should reflect the local culture and community, and provide one opportunity for placing the school as a contributing force to community cohesion and development.

How should student participation in co-curricular areas be organised?

Again, this is a decision for each school. Some schools require students to do certain activities and reward credit towards school diplomas and graduating requirements. Other schools are more flexible and voluntary in their expectations.

Structure provides clarity. Well-designed compulsory co-curricular programmes will give students a wide range of experiences. On the other hand, too much compulsion can have unintended consequences. For the learner attributes to become life-long habits it is essential that learners pursue co-curricular activities because they want to, not because they are another requirement to be ticked off. Ultimately we want students to behave in certain ways because this leads to personal fulfilment and enjoyment.

This does not mean that assessment and evaluation of student participation in co-curricular activities should be ignored. Assessment needs to be fit for purpose and we need to assess what we value, not just value what we assess.

How should student performance in the learner attributes be assessed?

Assessment needs to develop self-awareness and responsibility in learners. It also needs to give them the belief, desire and knowledge to improve. With this in mind valid assessment approaches could include:

1. **Self-evaluation instruments and reporting**. This could be done in a number of different ways, respecting the students' age and school culture. Quality is more important than quantity in order to preserve enthusiasm and commitment. Options include:

   - Students complete a self-evaluation as part of the end-of-term report sent home to parents.

   - Students complete self-evaluations of their performance in particular tasks or activities, including individual and group work.

2. **Students running parent–student meetings**. They lead the conversation with their own reflections on how they are doing and what they need to do to improve (as demonstrated in Case study 10 in Chapter 3).

3. **Process journals, e-portfolios or blogs** where students can write about their learning journey and reflect on it.

4. **Involving students, where appropriate, in designing assessment rubrics** that include learner attribute criteria. Students can then evaluate their own performance individually or collectively.

5. **Displays of student work and school activities** that exemplify the learner attributes.

The following four case studies illustrate different approaches schools have developed in order to support the development of the learner attributes and other valued learning highlighted in their missions. Each approach has been designed by the school to reflect its own context and culture.

The Jamieson Programme at Frensham provides structured challenge in a number of areas beyond traditional academics. The school includes Cambridge Global Perspectives as a requirement that supports the development of global citizens, together with The Duke of Edinburgh's international youth award and other activities.

The Global Citizenship Award at ShenZhen College of International Education is an integrated programme. It ensures that the educational objectives of the College are being addressed through the academic and the co-curricular programmes. This started with a sophisticated mapping exercise of skills and habits the school identified as important to the curriculum. They then added a co-curricular dimension, along with ways of encouraging and recording student involvement.

Bromsgrove School created their own bespoke Learner Profile supported by the Bromsgrove Award and Badge system.

Confucius International School, Qingdao introduced the Six Arts curriculum in order to develop a unique programme blending the best of Confucian and Western traditions.

Case study 4:

Jamieson Programme at Frensham, Australia: Grit, gratitude and good humour.

Watch the video at
https://vimeo.com/228213301

Unique to Frensham, the Jamieson Programme is built on the belief that teenagers are risk takers growing up in a complex and rapidly changing world. In order to thrive they must develop empathy, self-control, integrity and grit – as core personal attributes. Based on the precept of experiential education, the programme offers real-world challenge through engagement in new physical, intellectual and emotional experiences in a secure, stimulating environment that is inherently exciting and immensely rewarding.

The Cambridge IGCSE® course Global Perspectives, which the school added to the Jamieson Programme in 2012, is a perfect fit in terms of preparing students to be global citizens of the 21st century. Developing global competence is a core focus of the Jamieson Programme, whose goals are closely aligned with the Cambridge learner attributes.

Responsibility in action, or 'character in action', is a fundamental principle that guides students in a diverse range of activities and leadership experiences. Frensham girls are encouraged to embrace challenges and undertake service activities with 'grit, gratitude and good humour', qualities that awaken a belief in themselves that will stay with them throughout their lives.

Frensham's Jamieson Programme

From its origin in 1986, the Jamieson Programme has become an integral component of Frensham's curriculum. The Programme continues to develop, as each element is tested and reviewed and each activity refined.

Case study 4: continued

The Jamieson Programme has four goals, which provide a focus for students aged 12–16 in Years 7 to 10:

1. Global citizenship: to develop an understanding of your responsibilities as a global citizen; to develop an intelligent perspective about other cultures.

2. Health/fitness and physical challenge: to develop and sustain a healthy lifestyle; to understand and develop your physical capabilities.

3. Critical, ethical and flexible thinking: to develop a love of learning; to become a skilled and critical user of technology; to become a disciplined learner; to develop creativity coupled with a strong work ethic; to develop a deep understanding of mathematics, literature, science, history and the arts.

4. Responsibility, service, leadership: to be the best you can be; to understand and act on your environmental responsibilities; to develop an awareness of, and to act on, your responsibilities to help those less fortunate.

The students meet these goals through regular programmed activities tailored to the needs of each year group. Activities include:

- community service
- outdoor education
- leadership (through, for example, the School Forum and peer support programmes)
- specialised courses in subjects such as presentation skills, personal development and financial literacy
- Jamieson Weekends (when all students remain at school to participate in planned activities)
- Jamieson Week (the final week of the school year full of activities dedicated to the goals of the Jamieson Programme).

The Jamieson Programme – Year 9 experience

The Jamieson Programme for Year 9 targets specifically their personal needs at what is a crucial time in adolescent development. In addition to ongoing involvement with their Year 12 mentors and acceptance of increased responsibility with Junior Houses, each fortnight Year 9 students engage in a mandatory extended-day curriculum from 13.30 to 20.30. During this time they undertake the Cambridge IGCSE Global Perspectives course, exploring key global issues from a personal, local, national and global perspective. The extended day also gives the Year 9 students the opportunity to work together as a whole cohort in a range of activities spread across each term including: community service, environmental projects, personal fitness, health and well-being workshops and challenges, religious studies and study skills.

Integral also is participation in a three-day residential Global Forum, where Year 9 students have the opportunity to engage with global thinking in a range of collaborative workshops with guest speakers from local, business, sporting, social justice and artistic communities. The Global Forum is directly linked to the Cambridge IGCSE Global Perspectives course and the three-day immersion in ideas adds significantly to the outcomes achieved by all students. A cornerstone of the Global Forum experience is working, learning and playing alongside students and teachers from an Intensive English Learning Centre (a school for students who have recently arrived in Australia).

Year 9 also engages in a mandatory programme associated with The Duke of Edinburgh's Award scheme. This includes an outdoor education camp, a caving expedition, overnight expeditions and service activities. Students can also undertake additional service activities that contribute to The Duke of Edinburgh's Award, such as visiting nursing homes, environmental management and the Addis Ababa Fistula Hospital Project. At the end of the school year, Year 9 joins with the rest of the school in Jamieson Week, a whole-school focus on Jamieson Programme activities.

Student reflections

" We are emerging as global thinkers who do not just picture our own lives but consider the perspectives of others. "

Holly, Year 8

" You don't have to do something extraordinary in your life to make a change in the world; little steps can have a big impact. "

Sophie, Year 9

Case study 5:

The Global Citizenship Award at ShenZhen College of International Education (SCIE), China

Most schools have a set of educational objectives, skills and attributes, which the curriculum and extra-curricular programmes are designed to promote. A similar set of objectives are defined by Cambridge as the learner attributes. However, unlike examination results, which provide objective data against which to measure performance, the softer skills and attributes – teamwork, leadership, environmental awareness, empathy – tend not to be so easily quantified and measured.

The story began at SCIE after the Council of International Schools accreditation visit suggested that a clearer definition of international-mindedness should be created and that measures to assess the effectiveness of its implementation be devised. The first stage involved identifying the broad aims of the curriculum, supplemented by a range of activities designed to promote those skills.

The first area to be developed was international-mindedness. The process began with staff seeking to identify what was meant by international-mindedness in the context of our school and our country. We agreed upon a set of strands, running through the whole curriculum. In each scheme of work, opportunities were identified to address the most appropriate strands. These key activities, which addressed each strand, were then plotted on a **whole-school patchwork**, showing how the various strands are embedded in the curriculum. A similar process then took place for the remaining areas, including social skills and thinking skills.

The various skills and attributes within each category were identified, individual courses were examined and opportunities for promoting these skills and attributes were considered and plotted on the patchwork. We were then able to show how the various aspects of the curriculum are embedded into the courses.

Case study 5: continued
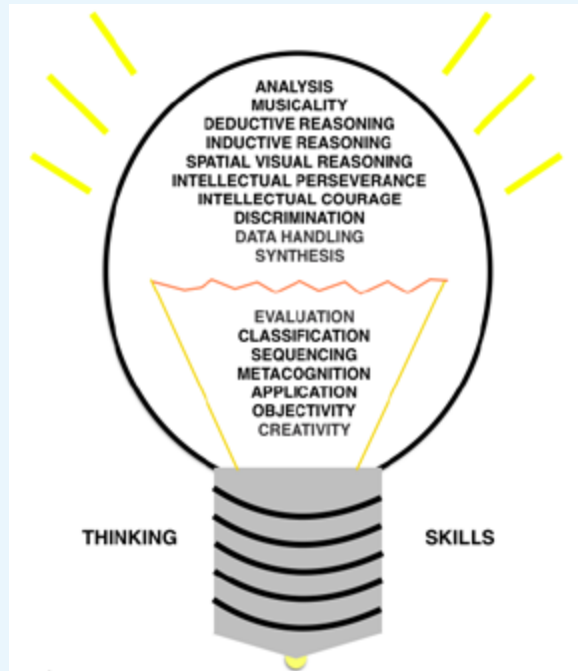
SCIE set out clearer definitions for thinking skills and social skills

We could also map the development of these skills throughout the four-year teaching programme on each subject curriculum map. View example of business studies curriculum map at **www.cambridgeinternational.org/images/411331-business-studies-curriculum-map.pdf**

In addition to identifying the activities, we felt that it would be beneficial to develop a method of recording students' involvement. Given the difficulty of conducting formal assessments of these skills and attributes, we felt that student participation could be recorded as evidence of the process taking place. At the same time, we had

a separate community service and extra-curricular programme known as the Development Award. This required students to meet certain standards in non-academic activities and community service.

Case study 5: continued

Rather than having two separate awards, the sensible option was to combine these two into the Global Citizenship Award. By doing this, we created an integrated programme which ensures that the educational objectives of the College are being addressed through both the taught curriculum and co-curricular programmes.

The Global Citizenship Award was created with four levels:

Y10   Global Freshman Award

Y11   Global Sophomore Award

Y12   Global Citizen Award

Y13   Global Leader Award

At each level, there are three standards available: Award, Merit and Distinction. Students earn points from their teacher, which vary depending on whether Bronze, Silver or Gold is awarded, and by the nature of the task. For example, each hour of community service earns 10 points. We required a system to allow teachers to input records of student activities and for students to be able to check their progress towards the award. This was done via the College Information Management System, which had the added benefit of creating a record of activities and achievements for students. This record can be used when writing pastoral comments for reports or when writing references for university applications, and can generate a non-academic transcript for students to exemplify their rounded education experience.

The programme was introduced in 2016–17. It will take at least one year to find out how many points students earned on average and to set the future levels accordingly. As time passes it may be necessary to adjust boundaries as students become more engaged in earning points. To add validity to the Global Citizenship Award programme, and to increase the interest of students and parents, it was decided that three of the annual student scholarships should go to the highest scorers in the Global Citizenship Award.

We hope that the end product will be an integrated system, which effectively recognises and records all aspects of the students' non-academic experience at the College. It will promote the skills and attributes which form part of the core values of the College and will generate a record of achievement for students. The project also helped to engage staff in the schemes of work and aligned them more closely with the College's educational goals. On the whole, it was a valuable and worthwhile project.

> " The Global Citizenship Award ensures that the educational objectives of the College are being addressed through both the taught curriculum and co-curricular programmes. "

ShenZhen College of International Education

Case study 6:

Developing the Cambridge learner attributes at Bromsgrove International School, Thailand

The reward system at Bromsgrove is unique in developing our learners' awareness of the world around them and of the competences they are developing every day within and outside the classroom. We have created our own, bespoke Learner Profile, which all staff use to develop attributes which all our students need in order to become successful global citizens who are reflective, creative and responsible, and also ready to lead and inspire others.

All students at Bromsgrove from early years through to Year 13 engage actively with the Learner Profile. Recently we recognised the need to develop the areas of service and leadership among our students as the next stage of the development of the Learner Profile. So we came up with the concept of the Bromsgrove Badge and the Bromsgrove Award. These, along with the Learner Profile, help our students to develop the competences required for success in their Cambridge exams.

The Bromsgrove Badge and the Bromsgrove Award are opportunities for students to show how they have progressed in the different aspects of the Bromsgrove Learner Profile and also look at Service and Leadership in the Upper Key Stages. Primary students work towards the Bromsgrove Badge, with Years 2–4 focusing on the core attributes of the profile. Students have to complete six tasks to earn each Bromsgrove Badge. We decided that a more prescriptive approach would be most effective with our youngest learners. During Years 5 and 6, students engage in student leadership activities and in Year 6, complete a student leadership project that counts towards their Bromsgrove Award.

In Secondary, students independently choose a specific attribute to work towards to develop their unique portfolios, with different Key Stages focusing on different areas. They set their own targets, with guidance from their form tutor if required, to allow them to explore areas about which they are truly passionate. When they have achieved the targets, they will have earned the right to apply to be considered for one of the Bromsgrove Attribute Awards.

In Key Stage 3, students focus on the following attributes:

Curiosity, Risk Taker, Determination, Team Player, Positivity, Kindness, Independent

In Key Stage 4, we add:

Service, Creativity

The award culminates In Key Stage 5, when they also explore:

Leadership

To develop this attribute, Sixth Form students lead the student committees. They also lead extra-curricular activities, which has a direct impact on younger members of the school community.

An important part of the scheme is that students are required to take ownership of their work. They can document their progress in any medium, and the response has been exceptionally creative and varied.

Students are encouraged to see the Bromsgrove Badge and the Bromsgrove Award as a long-term project, not simply a tick-box activity. This complements our school's vision to develop life-long learners who are committed global citizens. We celebrate the success of students in a termly Bromsgrove Award assembly and it is also a key part of our BEAM (Building Effective Attitudes and Mindsets) Pastoral Programme.

View Bromsgrove Badge 'curious' tasks at: **www.cambridgeinternational. org/images/410941-bromsgrove-badge-curious.pdf**

View Bromsgrove Badge 'independent' tasks at: **www. cambridgeinternational.org/images/410943-bromsgrove-badge-independent.pdf**

View Bromsgrove Badge 'teamwork' tasks at: **www.cambridgeinternational. org/images/410942-bromsgrove-badge-teamwork.pdf**

Case study 7:

Bringing ancient education traditions into the 21st century at Confucius International School Qingdao, China (CISQD)

Confucius International School in Qingdao, China (CISQD) was founded in 2009 by the direct descendant and current head of the Confucius family. It is the first educational initiative of its kind to unite the best practices in Western teaching with Confucian teaching and principles.

Confucius considered that a primary goal of education was to produce capable individuals (xiancai) – whom he also called *shi* (gentlemen) or *junzi* (men of quality) – who 'combined competence with virtue' and whose subsequent careers in administration and government would bring about the ideal of a kingdom managed with integrity. Confucius believed that education plays a fundamental role in the development of society and of individuals. By raising individual moral standards, it renders society more virtuous. His ethics, philosophy and politics are a cohesive unit, rooted in 'humanity' or 'benevolence' (*ren*).

Confucius's philosophy of education focused on the 'Six Arts': archery, calligraphy, computation, music, chariot-driving and ritual. These concepts have been modernised and made relevant to the modern world at CISQD, while retaining their essential meaning, to form the basis of a broad and balanced curriculum. Newly enrolled CISQD students are provided with the Confucian Six Arts Passport, which will document their engagement in all aspects of the Six Arts throughout their time at CISQD. Documentary proof of continuous engagement in the Confucian Six Arts is a graduation requirement of CISQD and will be a component of the graduation requirements for all CIS schools.

References

Brandt, R. (1993). Authentic Learning – On teaching for understanding: A conversation with Howard Gardner. *Educational Leadership*, 50(7).

Cheng, Y. C. (2002). *New Paradigm of Borderless Education: Challenges, Strategies and Implications for Effective Education through Localization and Internationalization*. Centre for Research and International Collaboration. Hong Kong Institute of Education. Keynote speech given in Hatyai, Thailand, October 2002.

Lawton, D. (1989). *Education, culture and National Curriculum*. London: Hodder and Stoughton.

Meyer, J. H. F. & Land, R. (2003). Threshold concepts and troublesome knowledge: Linkages to ways of thinking and practising. In C. Rust, ed., *Improving Student Learning – Theory and Practice Ten Years On*. Oxford: Oxford Centre for Staff and Learning Development (OCSLD), pp. 412–424.

Ministry of Education, Singapore. (2015). *Nurturing Students*. [online] Available at: **https://www.moe.gov.sg/education/education-system/nurturing-students** [Retrieved May 2017].

Oates, T. (2010). *Could Do Better: Using international comparisons to refine the National Curriculum in England*. Cambridge Assessment. [online] Available at: **http://www. cambridgeassessment.org.uk/Images/112281-could-do-better-using-international- comparisons-to-refine-the-national-curriculum-in-england.pdf**

OECD. (2013). *PISA 2015: Draft collaborative problem solving framework*. [online] Available at: **http://www.oecd.org/pisa/pisaproducts/Draft%20PISA%202015%20 Collaborative%20Problem%20Solving%20Framework%20.pdf**

Pak Tee Ng. (2016). Speech given by Pak Tee Ng, Associate Professor, National Institute of Education, Singapore at the Cambridge Schools Conference, Kuala Lumpur, Malaysia, December 2016.

Schmidt, W. & Prawat, R. (2006). Curriculum coherence and national control of education: Issue or non-issue? *Journal of Curriculum Studies*, 38(6), pp. 641–658.

Young, M. (2013). Overcoming the crisis in curriculum theory: A knowledge-based approach. *Journal of Curriculum Studies*, 45(2), pp. 101–118.

Resources

Boix Mansilla, V. & Jackson, A. (2011). Educating for Global Competence: *Preparing Our Youth to Engage the World*.

Publication: **http://www.cambridgeinternational.org/Images/258219-- globalcompetence-dr-veronica-boix-mansilla.pdf**

Boix Mansilla, V. (2015). *Educating with the world in mind*. Presentation at the Cambridge Schools Conference, Homerton College, Cambridge University, 2015.

Podcast: **https://soundcloud.com/cie-education/cambridge-schools-conference- 2015-veronica-boix-mansilla?in=cie-education/sets/cambridge-schools- conference-2**

Slide presentation: **http://www.cambridgeinternational.org/images/258220- educating-with-the-world-in-mind-dr-veronica-boix-mansilla.pdf**

Husbands, C. (2014). *Great schools, great teaching and how to get them*. Presentation at the Cambridge Schools Conference, Homerton College, Cambridge University, 2014.

Podcast: **https://soundcloud.com/cie-education/great-schools-great-teaching-and- how-to-get-them-prof-chris-husbands**

PowerPoint slides: **http://www.cambridgeinternational.org/images/177638-chris- husbands.pd**f

Chapter 3: Reflection

Overview

Chapter 1 briefly considered how skilled reflection is critical to becoming an engaged, self-regulated, life-long learner. This chapter looks at the attribute of reflection, and the related concept of learning how to learn, in more detail. It starts by considering what reflection is and exploring its key role in the learning process. It then considers implications for students, teachers and schools. This chapter is closely related to Chapter 4 of the *Developing your School with Cambridge* guide (available at **www.cambridgeinternational.org/images/271309-teaching-cambridge-programmes.pdf**). A number of useful resources are provided at the end of the chapter that expand on the ideas developed in it.

What is reflection?

Reflection is an active, disciplined and deliberate strategy. It is incorporated into the processes and activities of teaching and learning to help improve understanding. It is, therefore, much more than a review and justification of what has happened at the end of a period or activity.

This chapter considers two closely related types of reflection:

1. Reflecting on what is being learned to support deeper understanding of the material.
2. Making learning itself an object of reflection to support student self-regulation and learning how to learn.

Reflection is necessary for learners to be able to effectively manage complex thinking processes and outcomes. For Dewey (quoted in Moon 1999 p. 12), reflection is an essential part of the process of making meaning that pushes learners from one experience to the next: 'The kind of thinking that consists in turning a subject over in the mind and giving it serious thought.' Reflection is 'active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends.'

Reflection helps students to develop a deeper understanding of what they are learning through making new connections and relating different ideas. To Perkins (1992 pp. 77–79), demonstrating understanding involves being able to carry out a number of

> 66 Cambridge students understand themselves as learners. They are concerned with the processes as well as the products of their learning and develop the awareness and strategies to be lifelong learners. Cambridge teachers are themselves learners, seeking to build on and develop their knowledge and skills through a virtuous circle of reflection on practice – involving research, evaluation and adaptation. They support students to become independent and reflective learners. 99
>
> **(Cambridge learner reflective attribute)**

performances that both show understanding of a topic and help advance it. Perkins illustrates this in the context of Newton's First Law of Motion (every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it). If students are given the opportunity to reflect upon this concept, with appropriate teacher guidance, exploring key ideas and considering their implications, they are then able to:

- explain this law in their own words
- provide further examples of the law at work (exemplify)
- apply the law to new situations and phenomena not yet studied
- offer up evidence in defence of the law (justify)
- note the form of the law and draw from it any further general principles about the physical world (contextualise and generalise).

Critically, the process of reflection is necessary for the above to happen – the ability ('performance') to extrapolate and generalise comes as a consequence of thinking

deliberately and hard about the intended constructs (the important things we want our students to learn) and practising them in relation to different questions. Reflection, therefore, is a critical activity that helps develop deeper understanding of the material being covered.

Because all learning is constructed in learners' minds, learning cannot simply be transmitted from a teacher or a book to the learner. A teacher who is instructing the whole class needs to incorporate reflective strategies and activities into lesson plans as much as a teacher who is overseeing group or practical work. The best whole-class instruction is highly reflective.

The reflective student: learning how to learn

'Effectiveness as a learner hinges on the ability to be versatile as a learner. To have a rich view of learning and a learning orientation which is in turn linked to the ability to plan, monitor and review one's learning' (Watkins, 2010).

Metacognition (thinking about thinking) is a general term to describe the processes involved when learners plan, monitor, evaluate and subsequently make changes to their learning behaviours. Another term developed by Watkins (2010) to convey the very specific idea of reflecting on and regulating learning, is 'metalearning'. We use the two terms interchangeably in this guide.

In 1999, the US Department of Education's Office of Educational Research and Improvement (OERI) commissioned the National Research Council (NRC) to synthesise and review the research literature on the science of human learning. The subsequent report, How People Learn (Donovan, Bransford & Pelligrino, 1999), suggested important implications for the design of curricula, teaching, assessments and learning environments. It highlighted three findings that had both a solid research base and strong implications for how students learn and therefore how teachers should teach. These are consistent with the description of constructivism as a theory that explains how learning happens (which we covered in Chapter 1):

1. 'Students come to the classroom with preconceptions about how the world works. If their initial understanding is not engaged, they may fail to grasp the new concepts and information that are taught, or they may learn them for the purposes of a test but revert to their preconceptions outside the classroom.'

2. 'To develop competence in an area of inquiry, students must: a) have a deep foundation of factual knowledge, b) understand facts and ideas in the context of a conceptual framework, and c) organise knowledge in ways that facilitate retrieval and application.'

3. 'A metacognitive approach to instruction can help students learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them.' (Donovan et al, 1999, pp. 10–13)

To ensure students are appropriately challenged and made to think hard, teachers and students need to reflect carefully on where students are in the learning process before learning commences. In this sense, reflection is a carefully structured and disciplined process. It is based on an understanding of the material being learned, the process of learning and the current strengths and limitations of the individual learner in that context.

A metacognitive approach can help students navigate their learning journey. Students reflect upon their thinking, evaluating the success or otherwise of their approaches to learning as they are deployed, and then revising them if need be. It is a habit, incorporating strategies and skills.

Metacognition involves two distinct processes. Metacognitive knowledge is the knowledge the student has about the task in hand, their own cognitive abilities and the learning outcomes or goals. Metacognitive regulation involves a student controlling the cognitive processes and strategies being used as they complete a task, for example, re-reading a passage of text because the meaning was lost first time around (see Flavell, 1976 pp. 231–236). It is quite common for a learner to demonstrate metacognitive knowledge but not be competent at metacognitive regulation. Both are critical.

Swartz and Perkins (1989 pp. 179–183) defined four levels of metacognition:

Figure 2: The reflective learner

Tacit learners are unaware of how they think and learn – they simply accept whether they know something or not and will very likely have barriers (real or otherwise) in the way of their progress and development.

Aware learners know about some of the kinds of thinking they do – they can compare and apply, for example, but are not strategic in their thinking. Again, barriers to learning in the form of misconceptions are prevalent and these learners do not work hard to overcome them.

Strategic learners can organise their thinking by using problem-solving, decision-making, evidence-seeking and other kinds of cognitive strategies to aid their learning. They prove successful where the task or activity is known to them and are able to select an appropriate approach based on prior understanding and knowledge. Where strategic learners can fall down, though, is in situations and contexts that they have not come across before.

At the final level, reflective learners are not only strategic in their thinking but are able to reflect upon their thinking-in-progress, pondering their strategies and revising them as appropriate. They thrive in the unfamiliar or unknown, actively learn from failure or setbacks, and have developed a considerable degree of resilience and determination. Moving from being a tacit to a reflective learner involves 'learning how to learn'.

Learning to learn is concerned with developing the capacity to accurately reflect on one's learning and deliberately apply this understanding to learning in the future. In the words of Watkins (2010) this involves making 'learning an object of learning'. This requires a number of learning habits, strategies and processes incorporating metacognitive knowledge and regulation including:

- self-awareness of how I am learning and how effective my learning is
- identifying and overcoming barriers to learning
- questioning assumptions
- delaying gratification, sticking to a task, enjoying challenges and difficulties
- organising learning effectively
- being willing and able to ask for help, understanding when one's own resources are limited
- learning from mistakes and setbacks
- trying new strategies.

The attitude a learner has towards learning is critical. Effective learners are more likely to be self-regulated and intrinsically motivated. They approach learning in a way that emphasises understanding and retention of learning. Extrinsically motivated students are predominantly driven by rewards and recognition. Deep and strategic learning, what Watkins (2010) terms a *learning orientation*, not only helps students develop the learning skills they will need for further education, life and the world of work, it also helps them perform better in public examinations. This can be a powerful fact in persuading results-orientated parents and students about why reflective learning matters. Learning needs to be made an object of attention, reflection, conversation and evaluation in everything the school does.

For students to effectively regulate their own learning it is important that they understand their performance in relation to what constitutes excellence. They must develop concepts of standards and measure their current performance against these. Students need to understand what good performance at a task looks like and reflect on the implications for them (see Figure 3).

Figure 3: Making learning an object of learning

This is not easily achieved and too often reflective activities and processes carried out by teachers and students are superficial. Cognitively demanding tasks require a number of complex skills and sophisticated understandings, and it may be that a student is lacking some basic techniques or has not fully grasped a critical concept. They may not be aware of this and unconsciously have become skilled at disguising these in order to keep up with the class. The art and science of excellent teaching and learning is being able to accurately interrogate performance and deduce real strengths and limitations. Some of the implications for teachers are considered later in this chapter.

The following case study from a state school in the United States gives an example of a school committed to raising standards through high expectations for all based on students taking responsibility for their learning. It uses state standards and the Cambridge curriculum to help them develop a mastery of learning.

Case study 8:

Encouraging students to take on responsibility at Parkside Middle School, Virginia, USA

Our overarching goal when becoming a Cambridge International School was to be able to develop and sustain a community in our building that encourages our students to take responsibility for their own learning.

Parkside, unlike many middle schools, is not a community school. All our students come by bus to our school as none of the communities that surround our school service our school district. Therefore, our students arrive to Parkside as 6th graders from five very diverse elementary schools. Many of our students come from homes where their parents are very involved and have high expectations for their students, while others come from homes where their parents are illiterate, and depend on the school to provide their children with an adequate education. With these challenges, Parkside decided that the Cambridge International ethos provided our entire student population with high expectation for all, offered an enriched curriculum, experiencing active learning across all contents and providing students with the opportunity to develop their critical thinking skills, not only in the curriculum but also when dealing with problems in the real world.

The mission of Parkside Middle Cambridge International School, a culturally and technologically rich learning environment, is to inspire and empower all students in a student-focused environment to excel both academically and socially, and prepare them to be productive citizens and future leaders.

All students are encouraged to take responsibility supported by a pledge recited by all students, every morning. The pledge states 'I am responsible for my own learning, I am responsible to the success of the class, I will make a difference.' Many times during the school day, students are reminded of this pledge to guide them with their personal decision making. The emphasis on our students taking an active role in their own learning is the driving force at Parkside.

Our goal is to develop learners who are confident in working with information and ideas (their own and those of others), responsible for themselves, responsible to and respectful of others. We include reflection in our daily practices to encourage students to be reflective as learners, while developing their ability to learn, innovate and be equipped for new and future endeavours.

Virginia has very clear standards of learning that drive our curriculum, therefore in English, Maths and Science, we enrich our curriculum with Cambridge programmes. At Parkside, we believe that it is important that our students (and parents) truly understand the standards that they are expected to master, and that the grades they earn depict this learning. It is important that our students understand the areas where they have strengths as well as weaknesses so they can work alongside their teachers to develop next steps in the educational journey.

All student assessments focus on the development of mastery of learning. Students play an active role in the mastery process. They record their progress in data folders and through the online gradebook maintained by teachers. All grades that are entered in the gradebook are broken down by individual standards, and only summative assessments and projects are included. With that students are expected to re-learn, re-study and re-take all assessments to improve on their learning. Classroom study and homework are viewed as practice opportunities so they do not receive grades. Our vision is to structure learning experiences for our students to be able to take risks in their own learning, and not to see mistakes as failures, but as a way of practising for the goal of mastering the material.

Approaches to teaching and learning that support reflection and learning how to learn

It is important that reflection is fundamental to the day-to-day activities of all teachers, and that it forms part of their lesson planning and practice. Students need to learn to enjoy being made to think hard and actively reflect on learning as it occurs. Powerful approaches and strategies include (all appropriately supported by the teacher):

- making learning goals and assessment criteria explicit, helping students to plan strategies and develop ways of monitoring their progress towards achieving these goals

- involving students in collaborative activities in which they practise articulating their own understandings of the material and reflect on their own performance and learning process

- reciprocal teaching and learning which involves students summarising and presenting to others key ideas, findings and outcomes and/or teaching their peers specific content and skills

- instructional practice which requires students to give explanations of their own understanding of the studied material leading to discussion and questioning

- teaching students self-verbalisation. This helps students to develop a language that enables them to be self-critical evaluators of their own performance and what they are learning

- students assessing their own levels of understanding, effort and strategies on task and peer assessment where students learn to assess each other

- encouraging discussion of strategies in class so that students understand when to use certain strategies, the impact they have on their learning, and why the strategies work

- visible thinking routines. These are an effective way to promote deliberate thinking and to provide a structure to the way students go about the process of learning (see for example Harvard thinking routines at: **http://www.visiblethinkingpz.org/ VisibleThinking_html_files/03_ThinkingRoutines/03a_ThinkingRoutines.html** One example is 'connect, extend and challenge':

  - **Connect:** How are the ideas and information presented connected to what you already know?

  - **Extend:** What new ideas did you get that extended or pushed your thinking in new directions?

  - **Challenge:** What is still challenging or confusing for you to get your mind around? What questions, wonderings or puzzles do you now have?

In a study of metacognition in five and six-year-olds the researcher Larkin (2000) used a coding framework to identify all the metacognitive behaviours she saw when observing both teachers and students. On pages 39 and 40 are two tables summarising the different behaviours and the language used in support of metacognition in the classroom. While based on young children, the examples illustrate styles that are relevant and adaptable for all ages (note that some of the examples have been adjusted for an international audience):

Table 4: Metacognitive talk – teachers

Teacher behaviour and language supportive of metacognition	
Explanation	**Example**
Refers to self-learning strategies	'What could you do if you've got problems?'
Questions acquisition of knowledge	'How do you know that?'
Teacher prompts regarding information provided	'We found the biggest; what else could we do?'
Teacher aids explanations	'X explained putting the biggest to smallest very well.'
Teacher questions/comments on strategies	'How are you putting them in order?'
Teacher asks for predictions of success	'Will this make it easier?'
Teacher shows expectations of planning	'How are we going to do this; what do we need to think about?'
Teacher expects checking	'Check what you are counting in or the unit of measure.'
Teacher refers to own cognitive processes	'I don't understand it either, so let's have a look together.'
Teacher refers to thinking	'Let's put on our thinking caps.'
Teacher refers to universals of cognition	'We are learning how to solve problems. We are learning to analyse a poem.'
Teacher prompts evaluation	'Was it difficult to do or was it easy?'

Table 5: Metacognitive talk – students

Student behaviour and language supportive of metacognition	
Explanation	**Example**
Shows knowledge of self in relation to cognition and/or predicts from this.	'I know what to do.' 'Oh I love hard work.'
Refers to what others may think/desire	'She doesn't know.' 'He doesn't want to be last.' 'I think they can help us.'
Refers to universals of cognition	'We've got to solve a problem.' 'I think we need to quote more examples from the poem if we're going to get more marks for "analysis".
Questions task information and/or seeks clarification	'Something is missing.' 'Can you explain what that means? I think it is important.'
Predicts success/failure	'We'll be finished soon.'
Rating: refers to ease/difficulty of task	'I think this is easy. It won't take us long at all.'
Compares with other tasks	'This is like when we made a model.'
Evaluates: indicates knowledge about what might be useful	'We should build up the boxes.' 'That's the quickest way to do it.'
Refers to planning how to do the task	'We need to know where best to start.' 'We should talk about it together.'
Paraphrases to confirm understanding	'Did you mean...?'
Asks questions of self	'Is that right?'
Checks work	'This one's good, this one's not.'

Reflective learning and study skills

Making learning an object of learning requires learners to develop a sophisticated and accurate understanding of the learning process. Sometimes in schools this is not sufficiently recognised or supported. Students, parents and teachers should think about what learning involves and how it happens, as well as considering how the learner attributes can contribute.

One way of looking at learning is to consider learning efficiency, the amount and quality of learning that takes place over a specified period of time. Improving learning efficiency can result in more being learned, more quickly, more effectively and more deeply. This creates more time for further learning in valued areas across the formal and co-curriculum, and for students to pursue passions and interests.

One example of wasted time and effort that slows down learning efficiency is when students adopt ineffective study habits. Table 6 looks at some of these. The common factor in ineffective study is that it is passive and not targeted or specific enough. Students tend to practise what they already know and can do, and are not sufficiently challenged (the work is too easy) or they cannot access it and get demotivated (the work is too demanding). The revolution that has occurred in high-performance sport towards high-quality, targeted, specific practice based on evidence of performance is relevant to schools.

Table 6: Effective study habits

Misconception and common practice	Reality and more effective practice
In revising for examinations and tests students read the textbook and their notes over and over again trying to memorise everything. Often students are spending time reviewing what they understand already. Students easily get distracted – as revision is passive, their mind can wander with the illusion they are learning.	Students need to focus and practise specific areas of challenge identified by formative assessment and reflection. Revision is more effective when students have to answer questions and note what they can and cannot do well. This provides a clearer focus for further study. This form of revision is active as students are testing their understanding and reflecting on the outcome.
Students copy out their notes over and over and concentrate on factual recall.	Learning is best split into chunks and facts are best learned in connection with the concepts and ideas to which they relate. See the section on mind maps in Chapter 4 on innovation and creativity.
Revision is delayed until a unit test or end-of-year examination. Lessons and units are taught as discrete entities.	Revision and practice should be constant. At the start of every lesson students (supported by teachers) should be made to think of what has been recently learned. Teachers need to build bridges in students' minds between learning in different classes, and students need to practise and practise again new skills and understandings soon after they are learned so that they become deeply embedded. Once a concept is deeply learned and understood it is very hard to forget, making revision before the examination much easier.

Table 6: **Effective study habits** continued

Misconception and common practice	Reality and more effective practice
Students revise and work alone.	While revision can effectively be done by students alone it does not have to be a solitary activity. Revision can effectively be done as a collaborative activity with students working in pairs or groups. Students can specialise by dividing up the material, testing each other and teaching each other. Note that student reciprocal teaching has a very high effect size in Hattie's (2009) analysis of effective practice.
Once an assignment, examination or test is complete, students do not reflect on what caused their performance to be what it was.	Assignments provide powerful formative learning opportunities. Students can be encouraged to reflect on their performance using specific practices and instruments designed for this purpose. See for example Stanford University's 'exam wrappers' concept: **teachingcommons.stanford.edu/teaching-talk/exam-wrappers**

Students and teachers can be encouraged to ask a series of reflective questions that help identify the processes of learning that are taking place and link learning activities together. One simple example is in Table 7, right:

Some schools try to support study skills through providing specific, discrete classes or activities as part of a personal and social health curriculum. This can support the development of a learning orientation but will not work unless practices and habits are modelled and supported by all teachers across the curriculum. Learning is highly context specific and cannot be separated from what is being learned. Individuals will have different strengths and limitations in different subject areas, and it is important that they engage with these as they learn new material.
All teachers in the school need to support learning how to learn.

One practice that can work well is to include student self-evaluation in reporting and parent conferences. One example of this is provided in Case study 9 (on the next page), which highlights the focus of parent conferences as 'talking with students about their learning, not talking about a student's work'. The case study also emphasises the value of reflective conversations as part of every teacher's professional development and the role parents play as an active participant in a three-way conference, which exemplifies some of the points made in the following sections of this chapter.

Another tool some schools use is to require students to write learning journals or blogs, or to keep their portfolios of work regularly updated with metacognitive reflections on their learning as it progresses.

Table 7: **Nine questions for students to develop metacognitive thinking** (adapted from Innerdrive, 2017).

Before the task
1. Is this similar to a previous task?
2. Can I describe in my own words what success in this task will look like?
3. Where is the best place to start?

During the task
4. Am I on the right track?
5. What can I do differently if I'm not?
6. Who can I ask for help? (One strategy: see two classmates before approaching the teacher for help.)

After the task
7. What worked well?
8. What could I have done better?
9. Can I apply or connect this to other situations and learning contexts?

Case study 9:

Reflective learning at United World College South East Asia, Singapore

Reflection as a tool to support learning is widely used in schools, and this has certainly been true at United World College South East Asia (UWCSEA). But perhaps it was only when we as teachers started to use reflective conversations as a tool for our own professional development that we began to see the importance of reflective dialogue to support student learning too.

How we define reflection
Reflection can improve **self-awareness, self-management, thinking** and **wellbeing** through three phases of reflection:

Awareness phase. In the first phase we look again (as in the metaphor of a mirror) at ourselves. We do this by intentionally creating conditions that allow for heightened awareness of feelings, thoughts, events (actions, achievements, completed tasks, outcomes) or approaches (use of particular strategies, perspectives or thinking during a process). Sometimes reflection might stop here with greater mindful awareness.

Analysis phase. In the second phase we might use thinking routines (protocols, dialogue, mediative questions, prompts etc.) to help us consider causal factors, with the aim of clarifying or understanding our feelings, thinking and mindset. This might be 'thinking' in lots of domains from the cognitive to the affective (moods, feelings, attitudes). Sometimes reflection might stop here with a greater sense of causality, clarity or understanding.

Application phase. In the third phase we might think about the implications or the application of what we have learned during previous phases of reflection. We may try new thinking, new perspectives or modify existing approaches with the help of thinking routines. This might support the development of a growth mindset, enhance self-regulation and support an internal locus of control. (UWCSEA East – reflection guidance)

Example of how we use reflective dialogue with students
Three-way conferences are held twice a year and are attended by high school students, their parents and their teachers. They form one opportunity to support reflective conversations and increase student ownership of the learning and self-directedness.

- Three-way conferences are based in UWCSEA Learning Principles, including:
  - learners use timely and goal-directed feedback
  - learners have ownership of their learning
  - learners think and act upon their learning.

- Three-way conferences encourage development of elements of the UWCSEA Profile including:
  - communicator, self-aware, self-manager, resilience.

- Three-way conferences strengthen open communication about learning between students, parents and teachers. The focus is on talking with students about their learning, not talking about a student's work. It is about developing student voice and then listening to it.

It is through the use of mediative questions used in Cognitive Coaching® that students (and teachers) are encouraged to reflect on their own learning, and to become more self-directed. Mediative questions engage and transform the thinking of a student. They have three characteristics that make them powerful:

1. They are invitational, i.e. they encourage students to think about their learning in a strategic way.

2. They engage specific cognitive operations, e.g. compare, analyse, predict.

3. They are intentional, i.e. they have a deliberate purpose in their structure and use.

Case study 9: continued

Before each three-way conference, students are asked to spend time going through the first phase of reflection for each of their subjects. Parents are asked to consider the student's learning at home and questions they might ask for clarification from the student and the teacher. Teachers consider the sorts of mediative questions they might ask each student to support their analysis of what is helping or hindering their learning. During the three-way conference, students and parents are encouraged to take notes to help with the setting of goals and to support phase three of the reflective process.

The value of reflective conversations to support student learning may best be summarised by one parent's response: 'Feedback to my child was very

motivational. I liked that they did not focus so much on grades but on progress, attitudes and strengths. This is what we teach current leaders – how to motivate people!'

It is our intention to use reflective dialogue to help student and teacher learners think reflectively about their growth and development, to be able to plan future learning and to have a sense of autonomy. The open communication and support of the process has also been helped in building trust within the UWCSEA community.

Examples of questions	Phases of reflection
What might be the skills you contributed most? What did you need to consider when planning? What did you have control over in this situation? What aspects of this unit might have challenged you most?	Awareness
What options did you have when planning? Why was this important to you? How might you have responded if…? What restraints did you have and how did you overcome them?	Analysis
How might your actions have shaped the outcome? How might you consider planning this service differently next time? How might your approach influence other situations or people? Which of your skills did this call for and how might you use them in other situations?	Application

The reflective teacher

For students to be reflective it is essential that teachers model reflective processes themselves and create the right conditions in the classroom through the way in which they plan and deliver their lessons. Teachers need to nurture practices that support metacognitive knowledge and regulation in students. We considered some strategies for this in the previous section. They need to apply the same principles to their own professional practice and become reflective practitioners.

Reflective practice can be described as the process of learning through and from experience, towards gaining new insights of self and practice (Schön, 1983). Schön makes reference to two main processes of reflection in professional practice – reflection-in-action (self-monitoring) and reflection-on-action (an aspect of self-evaluation). He emphasised the former more because he argued that in many professions, there is an absence of a secure body of knowledge: 'Real-world problems don't come well formed. They tend to present themselves, on the contrary, as messy, indeterminate, problematic situations' (Schön, 1992 pp. 49–63).

This is best illustrated in a classroom environment. Students come to the classroom with preconceived ideas about how the world works that teachers do not always immediately recognise or understand. Teachers need to be able respond quickly to what they learn about student understanding as the class progresses. In such an uncertain, 'messy and indeterminate' context, reflection-in-action is critical to addressing this and making sure that what happens next brings student learning back on track. This involves asking questions of ourselves and exploring the problem with the students to get to the bottom of it. Effective teaching, therefore, involves probing and questioning, reflecting on the outcomes of this process and adapting practice accordingly.

Kolb's (1984) experiential learning cycle was introduced in Chapter 1. Another influential model of reflection is Gibbs's reflective cycle (1988, p. 49). It builds on Kolb's work on experiential learning, and proposes that theory and practice enrich and inform each other in a never-ending cycle. Gibbs describes seven stages of a 'structured debriefing' in relation to the learning experience:

- Description – illustration of the teaching/learning experience, where no judgments are made and conclusions are not drawn.

- Feelings/reactions – describing the reactions and feelings that emerged as part of the experience.

- Evaluation – making value judgements about the experience.

- Analysis – making sense of the situation, bringing the ideas from outside the experience, comparison of different people's experience.

- Conclusions (general) – what can be concluded from the experience and the analysis undertaken.

- Conclusions (specific) – what can be concluded about one's own specific, unique and personal situation and way of thinking.

- Action plan – thinking about how to differently approach the same type of situation in the future; what steps can be taken on the basis of what was learned?

The model is a cycle: learning and actions provide new forms of experience that become the subject of reflection. Mezirow and Associates (2000) stress that professional learning happens because the teacher takes charge of his or her critical reflection and explicitly plans and carries out steps to learn from it, transforming his or her behaviour. This level of personal responsibility for learning is crucial during initial teacher education, but should continue throughout a professional career if the teacher is to be successful.

Dr Ron Ritchhart has an excellent bank of resources for teachers to develop themselves as reflective practitioners on his blog: **www.ronritchhart.com/COT_Resources.html**. He has also developed a tool for patterns of thinking in the classroom (available at **tinyurl.com/patternsofthinkingtool**), which helps structure a post hoc view of recent teaching and learning. A checklist called Visible Learning Inside (**tinyurl.com/visiblelearninginside**), developed by Professor John Hattie, provides an evaluation and reflection tool on teaching efficacy in the school. Here teachers are asked to reflect on what their students are telling them about the impact of their classroom practice. It is a powerful way of gaining feedback on teaching and learning in the school, as well as increasing student voice.

Table 8 illustrates how Cambridge Professional Development Qualifications are based around developing the teacher as a reflective practitioner.

Table 8: Developing reflective practice through Cambridge Professional Development Qualifications

Cambridge Professional Development Qualifications in teaching and learning

Cambridge Professional Development Qualifications contain a number of guiding questions to help develop teachers as reflective practitioners. These include:

Module 1

Unit 1:
- an identification and explanation of the key features teachers think make an effective lesson
- an evaluation of the impact their new learning and experiences will have on their practice.

Unit 2:
- an analysis of the effectiveness of the lesson, highlighting what aspects went well and explaining why they think these went well
- an evaluation of their existing teaching practice, identifying what aspects need further development and explaining how they intend to change and develop those aspects in their future practice.

Unit 3:
- an explanation of how they used formative assessment to monitor the learners' learning and progress and evaluate how effective it was
- an evaluation of the new knowledge and skills they have developed throughout the programme and an explanation of how this will help to develop their future professional practice so that their learners will learn more effectively.

Module 2

Based on the two taught sequential lessons and teacher experiences during this module, reflection will consider:
- an analysis of the approaches to teaching and learning they used in the two observed lessons – this should identify what engaged and motivated their learners to learn, and explain the reasons why
- an evaluation of the two lessons, highlighting what worked well and why, and what did not work well and why – it should also explain what developments they intend to make in the future

Module 2 continued
- an evaluation of the learning activity and formative assessment activity they designed and used that were 'new' to their practice
- an evaluation of their teaching practice and the learners' learning, using feedback from a variety of sources to identify existing strengths and those aspects that need further development.

Module 3

Based on their Diploma experiences and teaching the sequence of learning (programme plan) designed for Module 2, reflection will consider:
- an evaluation of the current programme plan indicating what realistic and feasible changes they would like to make to develop future learning programmes
- an analysis of the significant changes in their planning, teaching and assessment practice – this also explains why the changes have been adopted and the impact these have had on their learners' learning
- an analysis of the strategies used to promote inclusive learning and the impact this had on the learners and their learning
- an analysis of the activities that encouraged the learners to be curious and creative in their learning and how effective they were in motivating them to learn
- an evaluation of how learning was inclusive so all the learners' learning was supported, challenged and extended
- an analysis of how effectively formative assessments were used to support and monitor the learners' learning
- a justification of why an understanding of the concept of learning and how people learn helps to develop their professional practice
- an evaluation of the knowledge and skills they have developed during the Diploma programme – this should also explain what they intend to develop in their future professional practice to help their learners learn more effectively.

Reflective schools and school effectiveness

Schools need to be reflective organisations to set up the conditions needed for learners and teachers to be reflective. Effective schools are those that successfully progress the learning and growth of all of their students, regardless of background, beyond their normal expected developmental rate of growth. The two most important in-school variables to impact on student outcomes are the quality of teaching and school leadership.

Where should schools concentrate their efforts in terms of analysis and reflection? While there is no single key determinant of an effective school, research suggests that there are many things that schools can do to become more effective and maximise the chances of success for every child. These actions emerge from what are called the correlates (or indicators) of effective schools. These include: high academic standards and expectations; a school climate which focuses on achievement and learning; instructional leadership; high-performing teachers; students who are confident as learners and perceive themselves as in control of their learning; parents with high aspirations and expectations; resources that are fit for purpose; and excellent school governance including sound financial management.

Setting high standards for individual student achievement, measuring and tracking performance against these standards, and then intervening as soon as any student begins to fall behind these standards are central to effective schools. Schools that collect, analyse and reflect upon student achievement data, then design teaching strategies to build student outcomes, are likely to be effective (Barber & Mourshed, 2007).

The Cambridge Standards for School Self-Evaluation (see Table 9) are based on these indicators of effective schools and provide a mechanism by which schools can reflect upon them formally.

More detailed consideration of school effectiveness is provided in the *Developing your School with Cambridge guide*. This is available at: **www.cambridgeinternational.org/ teaching-and-learning/developing-your-school-with-cambridge/**

Professional learning and development

A large body of research confirms that, of all the in-school variables that can be influenced, classroom teaching has the largest impact on student outcomes (Hallinger, Heck & Murphy, 2014; Hanushek & Rivkin, 2012; Hattie, 2009). It is what teachers know and do – their knowledge, pedagogical practices and relationships with students – that makes the difference in improving student learning outcomes. High-quality teachers are characterised by having a deep knowledge of their subject discipline and how concepts are taught, a commitment to ongoing professional development, high expectations for all students and the creation of a positive student–teacher relationship. According to Hattie (2003):

'Teachers account for about 30% of the variance [in student performance]… Students who are taught by expert teachers exhibit an understanding of the concepts targeted in instruction that is more integrated, more coherent, and at a higher level of abstraction than the understanding achieved by other students.'

Creating strong, professional learning communities among teachers is a powerful tool for improving student outcomes. Networks of professionals, planning and collaborating together around student learning, are known to have a greater collective impact than teachers working in isolation. The work of Bolam et al (2005) and Louis & Marks (1998) found that student achievement was significantly higher in schools with strong professional learning communities. It is important, therefore, that the focus shifts from helping individuals be more effective in their isolated classrooms to creating a collaborative culture of interdependence and shared responsibility (Dufour & Marzano, 2011; Fullan, Rincon-Gallardo & Hargreaves, 2015) and building, what Hattie (2015) calls 'collaborative expertise'.

School leadership and governance

The school principal, together with other senior administrators, has a critical role in creating the conditions necessary to support the learner attributes and the practices associated with effective schools. They need to provide a clear vision and sense of direction for the school, promote evidence-based teaching practices, prioritise professional learning, create a culture of high academic expectations and ensure that student learning is central to school improvement strategies. It is interesting to note that school leadership has a significant influence on student outcomes, second only to classroom teaching (see for example: Leithwood et al, 2004; Louis et al, 2010; Qian & Walker, 2011; Robinson, Lloyd & Rowe, 2008). Leadership is also the single most important determinant of attracting and retaining high-quality teachers (Darling-Hammond, 2013).

The importance of the principal as an instructional leader is well supported by research (see for example Robinson, 2008). Robinson concludes that the more school principals focus all their efforts and their own learning on improving teaching and learning, the greater their influence on student outcomes. More recently, Hattie (2015, p. 24) has argued that leaders need to build teacher instructional skills through 'collaborative expertise'. Fullan et al (2015) build on the theme of capacity building by arguing that the primary strategy for leaders is to build effective collaborative cultures.

Within the school the relationship between leadership and school improvement and school effectiveness is clear. What is also increasingly clear is the critical role that strong governance plays in effecting ongoing improvement. The Confederation of British Industry argues that 'evidence shows that more effective governance and higher quality leadership and management together have a positive effect on the quality of provision and on pupil achievement'(Confederation of British Industry, 2013 p. 8). Its research confirms that schools and principals need robust support structures to help drive improvements. Leaders benefit from a clear framework in which to act, so that they can carry out their roles effectively and be properly held to account.

The Cambridge Standards for School Self-Evaluation

The *Developing your School with Cambridge guide* Chapter 2 (available at **www.cambridgeinternational.org/images/271307-creating-the-school-development-plan.pdf**) considers the registration standards expected to become a Cambridge authorised school, and development planning post-registration. The Cambridge Standards for School Self-Evaluation (see Table 9 and Table 10) are designed to help schools reflect on their progress post-registration with Cambridge, providing more support for schools that want this service. Schools can complete a questionnaire that provides a carefully structured opportunity to engage with their three main stakeholders – students, staff and parents. It also allows them to collect data which will help them reflect on their performance, design improvement strategies and track progress over time in the key areas of performance as defined by the literature relating to effective schools.

The focus for school improvement defined in these standards is unambiguously a student learning culture and everything that contributes to that culture, such as leadership, teacher quality, governance and parental support and involvement.

While the evaluation surveys provide powerful feedback, schools are encouraged to collect other data sets (for example, academic results and annual improvement plans) to complement the data collected through these surveys. These data may also suggest that the school needs to investigate further particular areas for development, and this can be done at the school level through a range of analysis and data strategies.

Table 9: Cambridge Standards for School Self-Evaluation

Cambridge Standards for School Self-Evaluation

Domain 1 – The school's mission and values

1. The school has a clear mission and vision statement underpinned by its educational values.
2. The culture of the school focuses strongly on student growth and the realisation of their potential in all areas of development.
3. The actions of the school leaders and teaching staff are consistent with the school's values and philosophy.
4. The school promotes intercultural understanding, celebrates diversity and actively develops in students a deep appreciation of other people's views and perspectives.

Domain 2 – School management and leadership

1. The school principal and leadership team have the appropriate knowledge, skills and experience to lead the school effectively.
2. The school leadership team promotes high-quality educational programmes and activities for all students and tracks individual growth.
3. The school culture is inclusive and supports all students and staff in their learning and development.
4. All members of staff are supported through a performance and development programme which focuses on continuous improvement.
5. The leadership team has a clear process for evaluating programmes and developing school-wide improvement strategies.
6. Teachers and staff have a clear sense of their shared purpose and mission.
7. Students and staff feel valued and are treated with dignity and sensitivity.

Domain 3 – Quality of teaching and learning

1. The school's written curriculum is fully articulated and made available to the school community.
2. The school is committed to an ongoing and rigorous review of its academic programme to ensure quality outcomes for all.
3. Teachers and teaching are of an excellent quality and are enhanced by systematic, high-quality professional development opportunities.
4. The teaching and learning programme caters effectively for individual student needs.
5. Formative assessment (assessment for learning) is embedded into classroom practice throughout the school.
6. Students at the school are actively engaged in their studies, think reflectively, and exhibit a love of learning.
7. Students demonstrate behaviours and attitudes that are consistent with the school's mission and values.
8. Student transitions from year to year are managed effectively and seamlessly.

Domain 4 – The physical environment of the school

1. The school's resources are sufficient to support a high-quality teaching and learning programme.
2. The school is a safe and secure place in which students can learn.
3. Students have access to up-to-date technology, tools and resources to enable quality learning.
4. The school uses resources sustainably and in turn encourages students to take responsibility for the local and wider environment in which they live.

Domain 5 – School community engagement

1. School parents are actively engaged in the life of the school and have regular opportunities to contribute their knowledge and expertise.
2. Parents receive regular reports about the progress of their child/ren in academic domains as well as other areas of development.
3. Parents are perceived as co-partners in their child/ren's learning.
4. The school engages with and mobilises relevant individuals and groups within the community and welcomes them as co-contributors to the life of the school.

Table 10: Some exemplar questions from the Cambridge Standards for School Self-Evaluation

Examples of questions asked against Cambridge Standards for School Self-Evaluation:

Formative assessment (assessment for learning) is embedded into classroom practice throughout the school. (Standard 5)

To what extent do students agree with the following?

- My teachers provide me with feedback about my learning on a regular basis.
- My teachers help me to understand mistakes I have made.
- My teachers regularly mark my work and return it to me promptly.
- My teachers provide support when I am having difficulties.
- I am encouraged to give feedback to teachers on my learning.
- In my assignments, I know what I have to do to be successful.

To what extent do teachers agree with the following?

- In my classes, I use a broad range of assessment tasks.
- Students have opportunities to provide written feedback about their learning in their classes.
- Students have opportunities to improve their work after they receive feedback.
- It is important to show students what success looks like in their learning.
- I always give students written feedback about their work.
- I use a range of formative assessment strategies to plan the next steps in my students' learning.
- I know what the key concepts are for my curriculum area and pay particular attention to them in my classroom practice.

To what extent do parents and carers agree with the following?

- Teachers provide feedback through written comments on assignments.
- Our children receive individual attention with any difficulties they may encounter.
- Our children know where they are in their learning and what they have to do next to improve.

Chapter 3 continued

References

Barber, M. & Mourshed, M. (2007). *How the world's best-performing school systems come out on top*. New York: McKinsey and Company.

Bolam, R., McMahon, A., Stoll, L., Thomas, S. & Wallace, M. (2005). *Creating and sustaining professional learning communities*. Research Report Number 637. London: General Teaching Council for England, Department for Education and Skills.

Confederation of British Industry. (2013). *Leading the way: improving school governance and leadership*. [pdf] Available at: **http://www.cbi.org.uk/cbi-prod/assets/File/pdf/leading_the_way.pdf**

Darling-Hammond, L. (2013). *Getting teacher evaluation right: what really matters for effectiveness and improvement*. New York: TCP.

Dewey, J. (1933). *How we think*. Boston, MA: DC Heath & Co.

Donovan, M. S., Bransford, J. D. & Pelligrino, J. W. (1999). *How people learn: bridging research and practice*. Washington DC: National Academy Press.

Dufour, R. & Marzano, R. (2011). *Leaders of learning: how district, school, and classroom leaders improve student achievement*. Bloomington, Il: Solution Tree.

Flavell, J. H. (1976). Metacognitive Aspects of Problem-Solving. In L. B. Resnick, ed., *The Nature of Intelligence*. Hillsdale, NJ: Erlbaum, pp. 231–236.

Fullan, M., Rincon-Gallardo, S. & Hargreaves, A. (2015). Professional capital as accountability. EPPA, 23(15), pp. 1–22.

Gibbs, G. (1988). *Learning by doing, a guide to teaching and learning methods*. Birmingham, UK: SCED.

Hallinger, P., Heck, R. & Murphy, J. (2014). Teacher Evaluation and School Improvement: An Analysis of the Evidence. *Educational Assessment, Evaluation and Accountability*, 26(1), pp. 5–28.

Hanushek, E. & Rivkin, S. (2012). *The Distribution of Teacher Quality and Implications for Policy*. [pdf] Available at: **http://hanushek.stanford.edu/sites/default/files/publications/Hanushek%2BRivkin%202012%20AnnRevEcon%204.pdf**

Harvard Project Zero. *Visible Thinking*. [online] Available at: **http://www.visiblethinkingpz.org/VisibleThinking_html_files/03_ThinkingRoutines/03d_UnderstandingRoutines/ConnectExtendChallenge/ConnectExtend_Routine.html** [Accessed 10 April 2017].

Hattie, J. (2003). *Teachers make a difference: What is the research evidence?* Background paper to invited address presented at the 2003 ACER Research Conference, Carlton Crest Hotel, Melbourne, Australia, 19–21 October 2003.

Hattie, J. (2009). *Visible learning: a synthesis of over 800 meta-analyses relating to achievement*. London: Routledge.

Hattie, J. (2015). *What works best in education: the politics of collaborative expertise*. [pdf] London: Pearson. Available at: **https://www.pearson.com/content/dam/corporate/global/pearson-dot-com/files/hattie/150526_ExpertiseWEB_V1.pdf**

Innerdrive. (2017). Available at: **http://blog.innerdrive.co.uk/9-questions-to-improve-metacognition** [Accessed 17 April 2017].

Kolb, D. (1984). *Experiential learning as the science of learning and development*. Englewood Cliffs, NJ: Prentice Hall.

Larkin, S. (2000). *How Can We Discern Metacognition in Year One Children From Interactions Between Students and Teacher.* Paper presented at the ESRC Teaching and Learning Research Programme, First Annual Conference – University of Leicester, November 2000. Available at: **http://www.leeds.ac.uk/educol/documents/00003273.htm**

Leithwood, K., Louis, K., Anderson, S. & Wahlstrom, K. (2004). *How lead¬ership influences student learning: A review of research for the learning innovation, change and improvement from Leadership Project*. New York: The Wallace Foundation.

Louis, K. L., Leithwood, K., Wahlstrom, K. L. & Anderson, S. E. (2010) *Learning from Leadership: Investigating the Links to Improved Student Learning*. Final Report of Research to The Wallace Foundation, University of Minnesota and University of Toronto.

Louis, K. S. & Marks, H. M. (1998). Does professional learning community affect the classroom? Teachers' work and student experiences in restructuring schools. *American Journal of Education*, 106(4), pp. 532–575.

Mezirow, J. & Associates (2000). *Learning as transformation: critical perspectives on a theory in progress*. San Francisco: Jossey-Bass.

Moon, J. (1999). *Reflection in learning & professional development*. London and New York: RoutledgeFalmer.

Perkins, D. N. (1992). *Smart schools – better thinking and learning for every child*. New York: Free Press.

Qian, H. & Walker, A. (2011). Leadership for learning in China: The political and policy context. In: T. Townsend & J. MacBeath, eds., *International Handbook of Leadership for Learning*. The Netherlands: Springer Publications.

Robinson, V. M., Lloyd, C. & Rowe, K. (2008). The impact of leadership on student outcomes. An analysis of the differential effects of leadership types. *Educational Administration Quarterly*, 44(5), pp. 635–674.

Schön, D. (1983). *The reflective practitioner*. San Francisco: Jossey-Bass.

Schön, D. (1992). The crisis of professional knowledge and the pursuit of epistemology of practice. *Journal of Interprofessional Care*, 6(1), pp. 49–63.

Swartz, R. J. & Perkins, D. N. (1989). *Teaching Thinking: Issues and Approaches*. Pacific Grove, CA: Midwest Publications.

Watkins, C. (2010). Learning, Performance and Improvement. *Research Matters*, issue 34, Summer. [online] The London Centre for Leadership in Learning. Available at: **http://www.mantleoftheexpert.com/wp-content/uploads/2010/06/Watkins-10-Lng-Perf-Imp.pdf**

Resources

A number of resources are available in the Cambridge 'Teaching and learning' area of the Cambridge International website at **www.cambridgeinternational.org/learning**:

- Getting Started with Reflective Practice
- Getting Started with Metacognition
- Education Brief on metacognition
- Active Learning

Building Learning Power presentation by Professor Guy Claxton at the Cambridge Schools Conference, Homerton College, 2014. Guy Claxton is a widely respected and experienced neuro-scientist, author and educationalist with a particular passion for developing students' capacity for life-long learning:

Podcast: **https://soundcloud.com/cie-education/the-building-learning-power-approach-to-making-successful-independent-lifelong-learners**

Presentation slides: **http://www.cambridgeinternational.org/images/177923-guy-claxton.pdf**

Guy Claxton's website with resources: **https://www.buildinglearningpower.com**

Chris Watkins' website contains a very large number of excellent, free resources: **chriswatkins.net**

Harvard University Project Zero: A number of resources for teachers to develop themselves as reflective practitioners can be found on Dr Ron Ritchhart's blog: **http://www.ronritchhart.com/COT_Resources.html**. As a researcher at Harvard Graduate School of Education's Project Zero, Ritchhart has developed a patterns of thinking in the classroom reflection tool, which helps structure a post hoc view of recent teaching and learning: **tinyurl.com/patternsofthinkingtool**

See also Harvard University Visible Thinking: **http://www.visiblethinkingpz.org/VisibleThinking_html_files/03_ThinkingRoutines/03d_UnderstandingRoutines/ConnectExtendChallenge/ConnectExtend_Routine.html** [Accessed 10 April 2017].

Stanford University's Teaching Commons website: **https://teachingcommons.stanford.edu/teaching-talk/exam-wrappers**

John Hattie: Visible Learning Inside: A checklist, developed by Professor John Hattie of Melbourne University. **Visible Learning Inside** is an evaluation and reflection tool, completed by students, on teaching efficacy in the school. Here teachers are asked to reflect on what their students are telling them about the impact of their classroom practice. It is a powerful way of gaining feedback on teaching and learning in the school, as well as increasing student voice. **The Education Endowment Fund (Sutton Trust) toolkit:** **https://educationendowmentfoundation.org.uk/resources/teaching-learning-toolkit/meta-cognition-and-self-regulation**

Listen to **Prof Dylan Wiliam** talk about the importance of young people being able to reflect on their learning and how teachers can utilise these insights: **https://www.youtube.com/watch?v=bojaoVYrBmE**

Chapter 4: Innovation and creativity

> 66 Electricity is not only present in a magnificent thunderstorm and dazzling lightning, but also in a lamp; so also, creativity exists not only where it creates great historical works, but also everywhere human imagination combines, changes, and creates anything new. 99
>
> **Lev Vygotsky**, 1930/1967, cited in Smolucha, 1992, p. 54

Overview

Innovation and creativity are fundamental to all academic disciplines and educational activities, not just the arts. The creative process, as with reflection considered in the previous chapter, is a critical component of making sense of learning experiences. A number of approaches to teaching and learning are considered in this chapter that help to nurture creativity and innovation. See Figure 6 for a visual overview (page 58).

What are innovation and creativity?

Innovation can be broadly thought of as new ideas, new ways of looking at things, new methods or products that have value. Innovation contains the idea of output, of actually producing or doing something differently, making something happen or implementing something new. Innovation almost always involves hard work; persistence and perseverance are necessary as many good ideas never get followed through and developed.

Creativity is an active process necessarily involved in innovation. It is a learning habit that requires skill as well as specific understanding of the contexts in which creativity is being applied. The creative process is at the heart of innovation and often the words are used interchangeably.

According to Kampylis and Berki (2014, p. 6):

'Creative thinking is defined as the thinking that enables students to apply their imagination to generating ideas, questions and hypotheses, experimenting with alternatives and to evaluating their own and their peers' ideas, final products and processes.'

Kaufman and Beghetto (2009, p. 6) developed four categories of creativity which help to reveal the nuances between different levels and types of creativity. See Table 11 (page 54).

Table 11: Four categories of creativity

Big-C creativity (sometimes called 'high' creativity)	Big-C creativity is reserved to describe the work of an elite few who have transformed their discipline with their inventions. Their work has been generally accepted as being innovative and ground-breaking, even if it was considered controversial when it was first created. Some examples are scientific works such as Einstein's theory of relativity and Darwin's theory of evolution, and works of art such as Picasso's Guernica, Jane Austen's novel Emma or Ludwig van Beethoven's Symphony No. 9 in D Minor. Big-C creativity is out of reach of most of us, and big-C creators themselves are often as extraordinary as their creations.
Pro-c creativity	This type of creativity has involved time (usually at least 10 years) and effort to develop. A musician who showed promise as a child, has trained to degree level and now makes a living teaching and playing classical music could be classified as pro-c. A physicist working at a university who teaches and undertakes academic research could also be classified as pro-c.
Little-c creativity	Little-c creativity is about 'acting with flexibility, intelligence and novelty in the everyday' (Craft, 2005, p. 43). This results in creating something new that has 'originality and meaningfulness' (Richards, 2007, p. 5). This everyday kind of creativity can be found in the kind of person who can resolve a complex problem at work, is a keen gardener with an eye for design, or takes creative photographs and exhibits them on a photo-sharing website. School-age learners may work at little-c level if they engage in purposeful practice in their discipline. Little-c creativity involves practice and may be developed over a long period of time. The internet has provided the infrastructure for little-c creativity to thrive. Websites such as YouTube, Instagram and Etsy enable creative people to share their expertise and work.
Mini-c creativity	Mini-c is defined as the 'novel and personally meaningful interpretation of experiences, actions, and events' (Beghetto & Kaufman, 2007, p. 73). This is the kind of creativity that can be nurtured by teachers and parents. 'Mini-c happens when a person demonstrates "flexibility, intelligence and novelty" in their thinking' (Craft, 2005, p. 19). It is usually applied, but not necessarily limited, to children's creativity. Mini-c creativity may not be visible to outsiders and may consist purely of ideas and connections that the learner creates. As Vygotsky (1967, p. 7) explains: 'Any human act that gives rise to something new is referred to as a creative act, regardless of whether what is constructed is a physical object or some mental or emotional construct that lives within the person who created it and is known only to him.' Piaget suggested that 'to understand is to invent' (1976, cited by Richards, 2007, p. 95) meaning that a learner 'invents' an understanding of new material for themselves. Mini-c creativity could describe a learner's achievement in finding several different ways of approaching a maths problem. It could also involve making a new connection between their existing knowledge and a new piece of information which helps them to understand the subject more fully.

The boundaries between these categories can be blurred and they are not age specific. A person could fit into multiple categories in different areas of their life. For example, a chef who could produce dishes at a pro-C level while at work might work at a little-c level when attending a watercolour painting class.

The two categories most relevant to schools are little-c and mini-c creativity. They highlight the fact that being creative and innovative is not so much about revolutionary ideas or new inventions that change the world. It is about individual growth achieved through small insights. Creativity and innovation are fundamental to all disciplines and an essential part of the learning process, forming an important dimension of learning how to learn, which we considered in Chapter 3. They are also fundamental to teachers improving their professional practice and to school development.

Being innovative and creative is dependent on the other attributes. Being creative requires reflection, encourages engagement and develops confidence and responsibility. The ability and inclination to be creative is essential to living a fulfilled and successful life, and it is valued in higher education and the workplace. There are many other benefits of maximising one's own creative potential such as physical and psychological health improvements, improved resilience in the face of difficulties and even lower levels of aggression (Richards, 2007, p.9).

Craft (2005, p.15) points out that our understanding of innovation and creativity have progressed and broadened over time. In the early 20th century creativity was considered to be an innate, elusive quality that individuals were born with. Initially creativity was most closely associated with the arts but grew to include science, technology and other disciplines. In the 21st century creativity is increasingly viewed as a distributed and collaborative process of communal sense making and problem solving.

As with all the learner attributes, cultural perspectives are also very important when considering creativity. Confucian heritage cultures, for example, tend to see creativity more as a collective exercise. They place responsibility for creativity on the social group rather than the individual. Individuals, therefore, are not encouraged to stand out from the class in the same way or to the same extent as in Western cultures. This does not mean that creativity is in any way less valued. As with all the learner attributes, ideas presented in this chapter need to be interpreted and implemented in a culturally sensitive way.

Creativity, innovation and learning

As discussed in Chapter 1, learning involves challenging, refining and improving understanding by being made to think hard. Sometimes, to understand new concepts and broaden perspectives, our approaches to thinking need to be creative, imaginative and lateral (incorporating new ways of looking at things), as well as linear (using existing patterns of thought).

One characteristic of the creative process that makes it particularly powerful is that it requires not only knowledge and understanding of the domain being investigated, but also a willingness to question and not be constrained by existing knowledge. Learners should understand how they can question or challenge established knowledge to help them to formulate their own understanding, and imagination can play an important role:

'One cannot think creatively unless one has the knowledge with which to think creatively. Creativity represents a balance between knowledge and freeing oneself of that knowledge' (Johnson-Laird, 1988, p.207, cited by Sternberg, 2012, p.4).

For creative thinking to deepen and extend learning, rather than be an enjoyable but superficial activity, it must be grounded in understanding of the content being investigated. It is vital that learners have sufficient understanding of the material with which they are being asked to be creative. Creative practice needs to complement diligent and deliberate practice that develops foundational skills – not be a substitute for it.

A revised version of Bloom's original 1956 taxonomy by Krathwohl (2002, p.212–218; see Figure 4) includes creativity in the taxonomy and places creativity above evaluation as a higher order thinking skill. An alternative, and probably more accurate, representation would be to include creativity as a process involved in skills at all levels represented in the taxonomy, and increasingly so with higher order skills. It might be thought that remembering factual information does not involve creative processes. In fact, as the section later in this chapter on mind maps reveals, creative approaches can be very helpful in remembering information. The processes used by champions at the World Memory Championships are highly creative as they use the mind's capacity to recognise and remember chunks or patterns that have meaning to the individual much more effectively than isolated facts.

Creative learning activities, like any other, need to respect Vygotsky's zone of proximal development with appropriate scaffolding provided by the teacher.
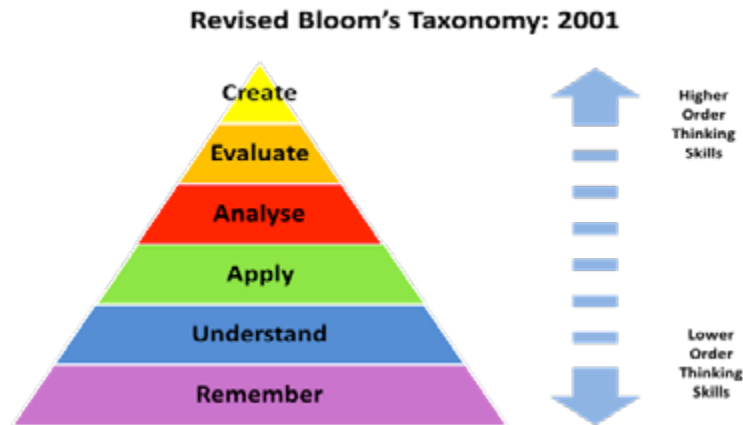

Revised Bloom's Taxonomy: 2001

Figure 4: A revised version of Bloom's taxonomy

This is an area in which cultural sensitivity may be particularly important. If students are not used to being asked to demonstrate creative habits and skills they need to be guided. How the creative activity links to broader learning objectives needs to be clearly understood by teachers and students.

Having a creative habit, the disposition to behave creatively is critical. Csikszentmihalyi (2002, p.99) emphasises the importance of having a playful attitude while remaining disciplined. Whenever possible, play should be used to extend the range of opportunities to think. There are several character traits and learning habits that affect a learner's personal disposition, motivation and confidence to be creative. For example:

- resilience: an ability to tolerate uncertainty and persevere at a task to overcome obstacles
- not being afraid to make and learn from mistakes
- an ability to suspend judgement while generating ideas

- willingness to take sensible risks or go out of their comfort zone in their work.

A creative learner needs to be able to develop and apply a set of skills that they can use in the creative process. These include being able to:

- clarify, analyse and re-define the problem or question to uncover new ways of looking at it
- ask thoughtful questions
- notice connections between seemingly unrelated subject matter
- challenge established wisdom by asking: how would I improve this?
- recognise alternative possibilities
- look at things from different perspectives.

Creative processes usually require self-regulation, and the ideas relating to reflection and metacognition considered in Chapter 3 apply. These include learners:

- being aware of their own skills, both strengths and limitations
- thinking of a range of different strategies or approaches to use in response to a problem or question
- planning which approach to use
- monitoring their work, and being flexible enough to change to a different approach if necessary
- critically evaluating their work at appropriate points

Creating a culture of creativity in schools and classrooms

We are all born with a creative instinct and all people have creative potential. Young children naturally engage in play – a state when the imagination is used to 'try out' situations and possibilities. A cardboard box becomes a car, grass becomes food, a toy comes alive. As children mature and move through their school career, creativity can be stifled as an unintended consequence of other pressures. Students can become fearful of making mistakes if they only receive recognition for giving an answer

the teacher is looking for rather than valid original thinking and ideas. A study on creativity and innovation in education in European member states (Craft, 2005, p.21) found that teachers preferred their learners to be 'conforming' or 'considerate' to 'risk taking' and 'playful' (Ferrari, Cachia & Punie, 2009, p.21). A culture of 'one right answer' stops learners from being willing to make mistakes. They quickly learn to guess what answer the teacher has in their heads. As von Oech (1998, p.14) points out, 'many of us have been taught that the best ideas are in someone else's head'.

Like any habit, creativity can be encouraged or discouraged. Having a learning rather than a performance orientation, considered in Chapter 3, helps to create an environment where creativity is encouraged. Schools that are successful at stimulating creative learning:

- value and celebrate learners' creative and innovative contributions

- do not overcrowd the curriculum. They focus on depth as well as breadth. They manage time effectively, providing opportunities for pupils to explore, concentrate for extended periods of time, reflect, discuss and review. Students are expected to reflect deeply on the material that they are learning and to make connections between subjects and topics

- encourage a broad and balanced curriculum so that students experience a range of subjects and activities, including the arts

- encourage students not studying the arts as qualifications to pursue creative activities in the co-curricular programme

- develop codes of behaviour and classroom procedures that value and promote creativity

- encourage sensible risk taking, for example, teachers trying something new in their lessons.

The creative process requires time and collaboration, so creating time for creative thinking activities is important. Using a flipped classroom approach for example, where learners prepare content and do written exercises preparing for lessons in advance at home, allows teachers to plan for higher-level creative thinking activities during class time. Another approach that helps students to make connections across topic areas and

Figure 5: A creativity orientation

understand the discipline as a whole is spaced delivery of content in lessons. This involves teachers revisiting related subject matter over a long time rather than just teaching each topic as a separate entity.

Creating a climate in the school by providing an environment that supports innovation can be very powerful, as Case study 10 shows:

Chapter 4 continued

Figure 6: Visual overview of innovation and creativity (Hover your mouse over the image to enlarge)

Case study 10:

St. Andrew's Scots School, Buenos Aires, Argentina – The Learnerspace: a new pedagogy by design

Watch the video at
https://vimeo.com/228213052

Makerspaces have become ubiquitous in schools all over the world to encourage students to apply creativity and critical thinking through design. A similar approach to learning, transforming a traditional environment into a Learnerspace can also be a great catalyst for moving pedagogy towards a learner-centred model.

Of all the many spaces in school, the school library lends itself to becoming an emblem for a new learning paradigm. In that context, we set out to embody the principles of 21st century learning through a transformation that was as profound as it was bold, and that went far beyond architectural modifications.

The first dimension of change entailed making true on the principle that learning is continuous, and transcends the physical and chronological boundaries of the classroom. By de-centralising books from the library and sending them out to school corridors and departments, we sent out the message that learning is not restricted in space and time. By allowing students to freely check out books without restrictions or controls, throughout the school, we explicitly stated that learning is a transcendent value that knows no limits or constraints.

In moving from a library to Learnerspace, the most important element of change was making sure that the redesign of the space was conducive to joyful learning. Three distinct spaces were created: a large, flexible workspace with furniture that could be rearranged freely to suit multiple configurations; a cave-like, forest-themed silent room; and a collaborative room with two projectors and floor-to-ceiling walls that students can write on. All throughout the Learnerspace, blackened walls invited students to express themselves using chalk.

Student reactions surpassed our best expectations. From being a space that students mostly used to seek refuge from cold weather, the library almost immediately became the centre of gravity of the school. Students naturally tended to occupy and make spaces come alive in ways that were hitherto unforeseen. Teachers started delivering their lessons at the Learnerspace, often sharing space with colleagues, and increasingly applying differentiation of teaching to the needs of individual learners.

And then the true joy of the learning process gradually emerged. Midday philosophy talks, quiz show-type contests, educational board games, and even a chessboard with a clock for blitz games also became manifestations that learning could be an enjoyable process.

The Learnerspace embodies most of the desired learner attributes: students discuss their learning and naturally engage in metacognitive reflections, propitiated by the collaborative environment and the literal writing on the walls; they become less teacher dependent; exercise their creativity by expressing themselves actively within the space; work on the development of creative projects; take possession of the space in meetings related to their leadership roles; and create new extracurricular projects.

Many of the community forums and discussions also take place in the agora-like open space, with an openness that inspires the discussions and projects that emerge from such gatherings. The importance of the physical learning environment is often underestimated in how it can truly foster a new learning modality consistent with the modern information-rich world. Sometimes schools are daunted by the magnitude of the change required, but our Learnerspace has joyfully demonstrated that a few changes in the layout can have a substantial and inspiring effect.

Common misconceptions about creativity

Runco (1999, cited in Ferrari, Cachia & Punie, 2009, p.16) explains that people sometimes hold tacit beliefs or theories about the nature of creativity which can have detrimental effects on attempts to nurture creativity in an educational context. These theories are different from what research suggests is in fact the case. For example, many people believe that creativity is a natural talent which cannot be taught, whereas studies have shown that learners can improve their creative thinking skills with the right type of input.

Figure 7: Common misconceptions about creativity

Elaboration of Sharp (2004), Beghetto (2007b), Runco (1999) as cited in Ferrari et al. (2009) p17

Creative teachers: How can teachers help learners to develop their creative habits and skills?

'Cambridge teachers are creative, experimenting with new ideas and pursuing an enquiring approach in their teaching. They are open to new challenges, being resourceful, imaginative, and flexible. They are always ready to learn and apply new skills and techniques.'

Chapter 4 of the *Developing your School with Cambridge guide* considers the attributes of effective teachers (available at **www.cambridgeinternational.org/teaching-and-learning/**). It highlights that effective teachers have a deep knowledge of their subject as well as an understanding of how students think about subject content at different developmental stages (pedagogical knowledge). They are able to make thinking visible, helping learners to recognise misconceptions and manage their own learning. Because the creative process is fundamental to student learning, nurturing creativity is also an aspect of good teaching in all subjects.

Fostering a creative climate in the school, supportive of creative teacher professionalism, is another theme considered in the Developing your School with Cambridge guide. It is very hard for a teacher to be creative if they are following a prescribed curriculum and given little or no room for their own creative input into their teaching practice. Syllabuses, textbooks and teacher support material are extremely important in helping to structure and support learning but they also need to allow for the teacher's professional creativity. Teachers can support creativity and innovation by:

1. **Role modelling creative habits**
    Nothing is more important than the teacher exemplifying the habits, behaviours and thinking they want students to demonstrate. They need to exemplify creative traits such as curiosity and the development of creative skills (see thinking routines later in this chapter).

2. **Appreciating the critical importance of questions, both their own and those asked by students**
    Considered later in this chapter.

3. **Treating mistakes as learning opportunities and encouraging learners to take sensible risks in the classroom**
    Encouraging learners to take 'sensible risks' in their work is important for building up their creative confidence. It is important that this takes place in a supportive environment, and that the teacher and learner have discussed what boundaries are acceptable in their context. It is also important to set some ground rules in collaboration with learners.

4. **Giving learners sufficient time to complete their work**
   Sometimes ideas need time to develop before becoming valuable. Giving learners the scope to come up with their own ideas can be challenging for both teachers and learners. Learners will need time to think and work independently of the teacher. Delay judgement of learners' ideas until they have had time to work them out properly.

5. **Scaffolding tasks carefully to provide the appropriate level of challenge**
   Ideally, a teacher should try to design tasks that help the learner to cross over into this area by 'scaffolding', or supporting them at first, and then withdrawing support so that the learner can increasingly achieve the task on their own.

Even a small change in teaching approach can bring about a change in a learner's creative disposition. If learners start to see that there is not always 'one right answer' to many questions, both in school and in life, then their creative confidence will grow. The most important thing of all is for learners to lay the foundation of their personal creative abilities, on which they will build throughout their lives

Incorporating creativity into classroom practice across the curriculum

Problem solving and enquiry are at the heart of learning. By definition, they require learners to think hard using their existing understanding to engage with the question or problem at hand and work out solutions.

Pitching questions or problems at exactly the right level to stretch student thinking, and providing just enough support, is the mark of a good teacher. How teachers present problems and questions will vary depending on student age, the local culture, the discipline being studied and many other factors. There is a place for a wide range of approaches including whole-class instruction as well as individual and group collaborative work, and some variety is important.

Sometimes it is incorrectly assumed that creativity occurs best in group work with the teacher acting as a facilitator. In fact, direct instruction involving the whole class can encourage creativity as long as the classroom culture is supportive and the class focuses on powerful questions and problems. It is important to note that direct instruction, well done, is identified in John Hattie's work (2009, p. 204) as a highly effective approach to teaching and learning. Direct instruction should involve a highly skilled active process in which the teacher engages and challenges student thinking, responding quickly to student thinking as it emerges. Discussions are focused on important concepts and ideas with questions from students. The teacher stimulates thought and encourages new ideas and new ways of thinking. Both students and teachers see errors as guiding what still needs to be learned rather than signalling failure.

Enquiry-based learning is often associated with student-led projects. In this context learning involves a teacher and/or learners setting a meaningful problem or question which challenges and extends learners' understanding over an extended period of time. Projects could be within one subject or combine two or more subjects. The problems or questions may be open ended, complex and multi-faceted. Projects often culminate in learners doing a presentation of their work to the rest of the class, but the 'product' created could be something that is made public such as a blog, website, exhibition or magazine. By its nature, project-based learning involves learners using reflective, creative and critical thinking skills in collaboration with others.

For project-based learning to work well it is important that the learning objectives are clear, supportive of the broader curriculum, and the teacher plays an active role in supporting the development of student understanding. This may involve the teacher standing back for long periods, allowing students to explore and experiment and think through the problem, but they need to be active in challenging student thinking and bringing learning to a productive conclusion. Cambridge Global Perspectives (considered in Chapter 7) provides well-structured examples of this approach.

One advantage of enquiry-based learning is that it provides an opportunity for learners to collaboratively explore a question or problem from multiple perspectives using lateral as well as linear thinking. Edward De Bono is credited with inventing the concept of lateral thinking and has developed a number of approaches including the Six Thinking Hats (1993, p. 54), a strategy that can be used to help learners at all levels and in any subject, to think about a question from multiple perspectives (see De Bono in the Resources section).

Using questions to trigger creative thinking

Socrates (470–399 BC), popularised through Plato's writings, believed the best form of teaching was through using skilled, disciplined questioning to deeply explore ideas resulting in improved understanding. This technique has become known as 'Socratic questioning' and is a fundamentally important teaching and learning approach in all disciplines. A good question, from the teacher or student, has the power of making student thinking visible and is a natural part of the ongoing feedback loop in classrooms between students and teachers, helping to guide the instructional process.

On average, teachers ask between 300 and 400 questions a day (Leven & Long, 1981, p.29). If a teacher carefully plans the type, wording and delivery of questions that they are going to ask in a lesson, research shows that the quality of learners' thinking and responses will improve (Budd Rowe, 1986, pp.43–50). Questions that stimulate responses that require complex mental processing can encourage creativity. What if…? and Why…? questions tend to stimulate creative and critical thinking, especially if followed by more questions that probe and encourage the learner to go further (Kazemi, 1998, pp.410–414).

Asking learners to think of their own questions is a particularly valuable activity. Guy Claxton (cited in Scales, 2013, p.250) points out: 'Asking good questions is the basis for becoming a successful learner. If children aren't asking questions, they're being spoon-fed.' A learner formulating a question can illuminate their current thinking, helping to guide instruction, as well as being a creative activity in its own right. Encouraging learners to ask questions can:

- develop their curiosity about the subject, helping with engagement
- stimulate learners to 'think hard' about a topic
- consolidate a learner's understanding of the material
- enable learners to look at a topic from different perspectives
- clarify a goal or plan for their own investigations
- inspire them to want to find out the answer.

One line of questioning that can encourage creative input is 'possibility thinking'. This requires learners to explore ideas and use their imagination to generate lots of possibilities. If a teacher regularly asks questions that have more than one answer during lessons, this can develop an atmosphere where learners feel that their unique contributions are welcomed and valued. This helps learners to develop their creative disposition as described earlier in this chapter.

Table 12: Examples of possibility thinking

Consider asking your learners questions that have more than one possible answer

In maths: 'How many ways can you find to make 24 using any mathematical operation?'

What was the question?
'The answer is… 1989, … what was the question?'

Give learners a word or number that could be the answer to many different questions in your subject. For example, the question could be:

- When did the Berlin Wall fall?
- In which year did South Africa start to dismantle the apartheid system?
- In which year did the Cold War end?
- Which year saw the dissolution of the Soviet Union?
- Which year saw the end of the Soviet Union's occupation of Afghanistan?
- When did Tim Berners-Lee produce the proposal that led to the World Wide Web?

Thinking routines, introduced in Chapter 3 (see Harvard University's Project Zero 'Visible Learning' resources at the end of the chapter) can be helpful in generating questions and nurturing critical and creative thinking skills, emphasising the use of discussion and collaboration in the classroom. One example of a thinking routine is below in Table 13. This can be adapted to almost any subject or context to prompt thinking and questions from learners.

Table 13: Harvard Project Zero – Artful thinking routine: See/Wonder/Connect

This thinking routine is useful to trigger questions and thinking about a topic for which you have a related photograph, artwork or object. For example, photographs of a specific place for a geography case study.

See: Show learners an artwork, photograph or object that relates to your subject. This could be in an art gallery, or the classroom.

Wonder: Brainstorm a list of 3–5 questions about the artwork. Use these question stems as starters:

I wonder… Why… What are the reasons… What if… I am puzzled by… How would it be different if… What if we knew…? If I could interview the artist/maker, I'd ask…

Connect: Compare the artwork/object/photograph to others you've seen. How are they similar? How are they different?

The questions that learners formulate should be recorded and displayed if possible, to show the value that the teacher places on them

Mathematics, creativity and innovation

'Creativity is what maths is all about… We're coming up with some completely unexpected patterns, either in the reasoning or the results… We're thinking in terms of beauty and creativity, but the outside world thinks of us like a computer' (Sir Andrew Wiles, who proved Fermat's Last Theorem).

The Fields Medal is the mathematical equivalent of the Nobel Prize, awarded to mathematicians who have made major contributions to the field. In 2014, it was awarded to a successful young mathematician called Manjul Bhargava. His achievement was to simplify a very complicated mathematical 'proof' from the 18th century into a few lines. He was inspired by seeing a Rubik's Cube in his room, and imagined that the numbers that he was working on were applied to the corners of the Rubik's Cube. 'If you think about things the way someone else does, then you will never understand it as well as if you think about it your own way,' he said about the creative process that led to his breakthrough.

That mathematics is still being created often comes as a surprise to most students, and many teachers. Their perception is that mathematics is the one subject in which you know conclusively that you have the right answer. Indeed, many students prefer mathematics over other subjects precisely because of this. The misconception arises because they believe that calculation, and solving routine problems such as those assessed in qualifications, is mathematics. In fact the whole point of learning mathematics is to solve problems, including those which are non-routine, and that of course involves thinking creatively.

While Fields medallists – who are certainly exhibiting Big-C creativity – come along only once in a while, there are plenty of opportunities in mathematics lessons to support students in becoming creative mathematicians of the small-c or mini-c variety. Indeed, a mathematics scheme of work that does not include opportunities for students to think mathematically – to explore, discover, imagine and produce some mathematics which is original to them – needs serious adjustment.

So what does creativity look like in the mathematics classroom?

Firstly, creativity is considerably inhibited if students do not have an adequate mathematical toolbox. In other words, they need to have a reasonably secure base of

knowledge and skills to draw on. However, creative activities should not be restricted to those who are already good mathematicians. The very act of being creative can itself enhance students' understanding and fluency, so such tasks are suitable for all.

To support students in being creative, teachers offer tasks and activities which allow students to:

1. Find multiple ways of solving a problem.

2. Ask their own questions as well as answering the teacher's.

3. Discover relationships, patterns and make connections that are new to them.

4. Conjecture about the results of making changes.

The NRICH project (**www.nrich.maths.org**) offers 'low threshold, high ceiling' tasks. These are open-ended tasks which everyone can begin, but which have enough challenge built into them to occupy the most confident and competent, so they are suitable for whole-class teaching.

Next are four examples of such tasks.

1. Finding multiple ways of solving a problem

This activity, recorded on squared paper (with square size appropriate to age of student) supports the concept of equivalent areas. The examples offered show identical halves and the majority of students will be able to replicate this idea. However, creative individuals will look for examples where although the areas are equivalent, the shapes of the halves are not the same. This is an example of students devising their own solutions and simultaneously extending their idea of a half, and of area. To see how students solved this, visit **nrich.maths.org/1788/solution**

Halving

Stage: 1 ★ ★

These images show squares split in half:
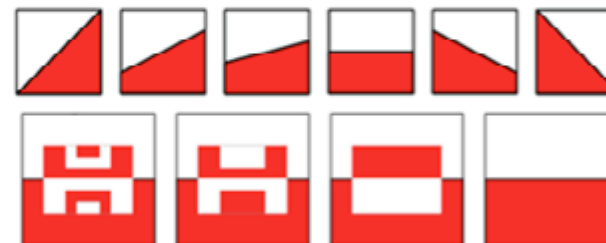
How might you check that each was correct?
Can you think of more ways to split a square into two halves?

2. Ask their own questions

The mathematics in Got It! is quite trivial – adding small numbers. However, to 'solve' the question, students have to work out how to win. This requires asking the right questions and trying out lots of strategies. The question includes some 'high ceiling' hints such as changing the target – but students have to choose wisely if they are to succeed. For an interactive version visit **nrich.maths.org/1272**

Got It!

This is a game for two players.

Start with the target number of **23**.

The first player chooses a whole number from 1 to 4.

Players take turns to add a whole number from 1 to 4 to the running total.

The player who hits the target of 23 wins the game.

Can you find a winning strategy?
Can you always win?

What happens if you choose a new target number?

What happens if you change the range of numbers you can add?

Can you work out a winning strategy for any target and any range of numbers?

nrich.maths.org

3. Discover relationships

This interactive task allows students to play around with the characteristics of squares, using visual clues initially. To solve the last question, they have to focus on the coordinates and are then confronted with the idea that points in certain relationships have coordinates that fit a pattern. This activity highlights the power of digital technology to provide instant feedback – a hugely important part of working creatively. Visit **nrich.maths.org/10733** to find out more.

Coordinates of Corners

Stage: 3 and 4

This resource is part of "Dotty Grids - Exploring Coordinates and Vectors"

Move the dots below to make some squares. Can you make a variety of squares whose sides are not parallel to the axes?
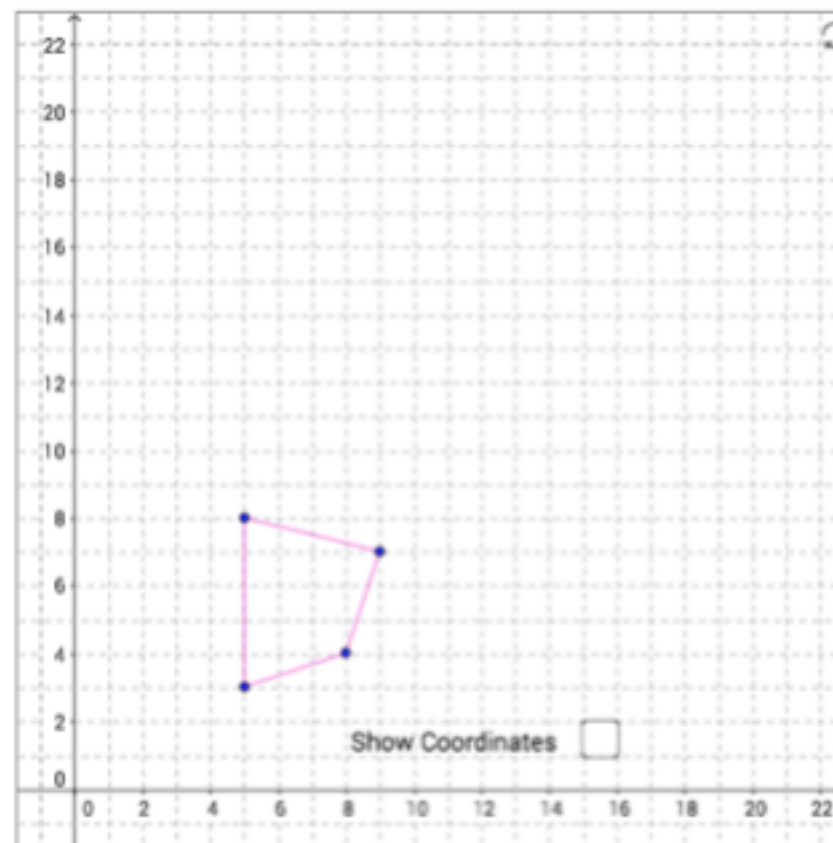
If you have a set of four coordinates, is there a quick way to decide (without drawing) whether they form a square?

4. Conjecture about making changes

White Box (**nrich.maths.org/7007**) models the scientific process of working out the structure of atoms and molecules. It is an ideal activity to support students in making conjectures or hypotheses, as they work systematically to change the layout, record their findings and deduce what is happening. Where must the triangle be to produce that result? What if I move it to…? As with 3 above, these modelling-type questions would not be possible without immediate feedback.

A proficient mathematician therefore needs not only a thorough knowledge and understanding of the subject matter, but they also need creative thinking skills to be able to manipulate that knowledge and to become truly innovative.

White Box

Stage: 2, 3, 4 and 5 ⭐

The White Box contains a number of filled triangles.

Your challenge is to find the locations of those filled triangles in the grid.

You can fire rays into The White Box and observe where the rays exit using the Experiment Window.

Some rays will pass straight through the Box but some will be deflected by the filled triangles.

You can use the Hypothesis Window to test your ideas. Clicking on a triangle once marks the triangle as empty, clicking again fills it.

FULL SCREEN VERSION
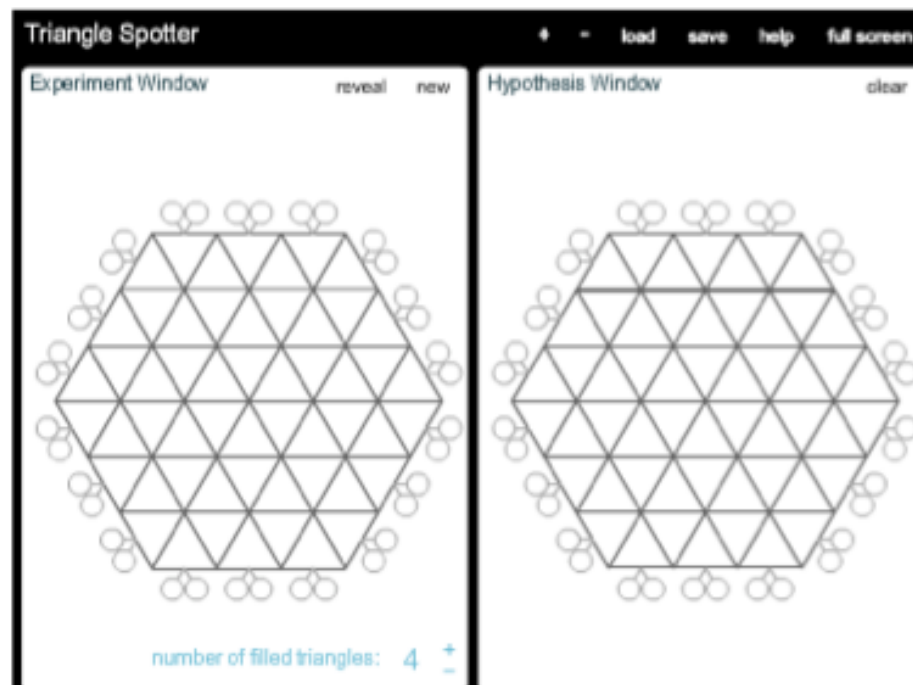
Science and creativity

Science is not only a body of knowledge to be learned and understood, it represents a powerful method in identifying and solving problems with a significant creative component. Well-planned, structured enquiry is fundamental to science teaching as it reflects the scientific method: curiosity based on existing knowledge, hypothesis formulation, systematic observation, measurement and experimentation leading to new insights. A deep understanding of the scientific method provides powerful knowledge to students, preparing them for further study in science and helping them to understand applications beyond science. One simple example of enquiry-based learning in science that offers the potential for creative thinking is in Table 14, below.

Table 14: An example of a low-tech tinkering activity: Marble Machines (Winterbottom et al, 2016, p.14)

Cambridge teachers exploring the idea of scientific tinkering

In this activity the participants choose from a wide selection of recycled materials and low-tech tools (for example, scissors, sticky tape, cardboard, elastic bands, pipe cleaners) to achieve the goal of 'getting a marble to move from the top of the pegboard to the bottom as slowly as possible'. The imposed condition 'as slowly as possible' is important. Without it, it's too easy, and the goal is too closed.

Through their explorations, participants may engage in 'engineering' (for example, working out the best materials to create a funnel), 'making' (for example, building a run from cut-up tubes) and 'tinkering' (playfully experimenting with the different materials as they develop their thinking and set new short-term goals).

In a science lesson, this could be a starting activity to help learners to encounter ideas about forces and motion before any of them have been taught the ideas theoretically. By imposing the 'as slowly as possible' condition, learners use intuitive ideas about friction. They also use ideas about rotational movement, linear movement, acceleration and velocity. When they have misconceptions about those topics, this activity can help expose them, and enable the learners to discover that they have misconceptions.

However, most of the time, this is not used in the context of a specific topic in science. It is more there to foster skills, and understanding of the nature of science, including hypothesis setting (albeit informally), testing, controlling for variables and collaboration.

What can we learn from the arts?

Arts subjects such as art and design, music, drama and dance are often associated with creativity and innovation. A broad and balanced curriculum (see Chapter 2) recognises that encouraging the arts can help students to develop their own creative voice and creative thinking skills. Studying an arts subject can also build learners' self-confidence as they feel valued for their unique contributions and talents. When encouraging creativity across the curriculum, it can be useful to look at the ideas and techniques that underpin the teaching of creative subjects such as art, drama and music.

Learner autonomy: Arts subjects can be popular with learners because of the perceived high level of learner choice that is involved. Learners often work on projects that they have devised themselves, according to their own interests and passions. Unique and original work is particularly valued, in both informal and formal assessments. When learners take control of their work in this way, their levels of intrinsic (internal) motivation tend to increase (Craft, 2005, p.56).

Valuing uniqueness: Every learner's outcome will be different in arts subjects. The idea of there being 'no one right answer' is deeply embedded in both the teachers' and the learners' approaches. Although other subjects have more fixed subject matter, it is important for students to learn that there is often more than one correct answer or more than one way to arrive at an answer.

Experimentation and play: In all arts subjects, there is an emphasis on experimentation and 'play'. An art teacher will introduce a technique or material, for example acrylic paint, and learners try it out. This may initially involve copying examples and practising. Boden (2001, cited in Ferrari, Cachia & Punie, 2009, p.19) describes this as 'exploratory creativity', and likens it to a jazz musician learning to improvise based on a defined set of chords or scales. Having developed some degree of skill, learners can then start to experiment and push the boundaries of the material or technique. They may choose to combine it with another technique or idea to produce something that is original to them. Boden calls this 'combinatorial creativity' – the generation of new ideas by combining or associating existing ideas.

There is a role for experimentation and play in all disciplines so that students learn to use their imagination and develop engagement. As in arts subjects, this must be balanced with, and be supportive of, skill development so that it supports students' basic literacies.

Looking at and discussing artworks: The study of artworks is not necessarily limited to art or art history lessons. Images of artworks can be used to prompt thinking in any subject area. Teachers can use carefully chosen artworks to prompt discussions and deeper critical thinking about a topic. Visual Thinking Strategies (VTS), developed by Yenawine (2014, p.25; see the Resources section) uses art to help learners of any age to develop their visual literacy, thinking and communication skills, and is an excellent resource.

Journals, notebooks and sketchbooks: Keeping a notebook, sketchbook or journal is an essential part of an art and design education. All the creative skills can be practised through the discipline of keeping a record of a learner's observations, ideas, reflections and collections. By recording and collecting a wide range of information, a learner can then start to cultivate creative connections between different elements and come up with more unique and original ideas. Notebooks and journals have been used by many great creators, such as the poet Lord Tennyson, who recorded fragments of thought and then generated connected words and images which led to his poetry (Michalko, 2001, p.58). Charles Darwin kept detailed journals on his travels to the Galapagos Islands, and his journals contain a record of his tentative diagrams of the branching system on which he eventually based his theory of evolution. Guy Claxton (2006, p.353) recommends encouraging learners 'to keep a commonplace book… in which they keep scraps of overheard conversation, images, quotes, fleeting thoughts that didn't go anywhere… as most creative writers, scientists, composers do'.

The value of failure: The arts, perhaps more naturally than other subjects, accept and celebrate failure as a learning opportunity and understand that it is an inherent part of the creative process. As West-Knights (2017, p.49) points out: 'One of the mainstays of drama classes… is the notion that mistakes are OK, as long as you are trying things out.'

Peer review and feedback: Peer review sessions (sometimes called group critiques) are commonly used in art and design as a method of informal interim assessment. Learners present their work to small groups of their peers and receive constructive feedback. The process is carefully scaffolded by the teacher, who leads initial sessions, modelling the types of questions and comments that are appropriate. When successful, peer reviewing helps learners to build independence, gain insight into their peers' working and thinking processes, and develop confidence in themselves as creative individuals.

Making connections: mind mapping

As illustrated in figure 6 on page 58, mind maps (sometimes called concept maps or spider diagrams) are a flexible and powerful tool for representing information and nurturing creative and critical thinking. Originally popularised and developed by Tony Buzan in the 1970s, mind maps are designed to 'harness the full range of cortical skills' (Buzan, 1986, p.45) by using key words, colour, images, number, logic, rhythm and spatial awareness.

Mind maps are essentially diagrams that visually organise information. They normally consist of a central concept, which is expressed with a key word or short phrase. Related ideas branch off from this, spreading across the paper, which is usually in landscape format to give the optimum space for ideas to be written. Each main branch that emerges from the central theme can then branch out further to related sub-sections.

The theory of semantic network models (Collins & Quillian, 1969, p.240) helps to explain why mind maps are effective. Each learner has their own unique understanding of any subject at a particular time based on their own personal associations and connections. The act of creatively constructing mind maps requires students to think hard about what they are learning and to build new connections. Learners will find it easier to remember information by building their own personal representation of understanding. It is impossible to create a mind map without active engagement and thinking through the construct being mapped. Building up a large amount of information on a page also encourages creativity. Learners can make connections between topics, which they may not see while studying a dense block of text. Mind maps can be used in a number of ways including:

- Note taking. The act of creating a mind map requires chunking of information and concepts, relating them to each other. This can be helpful both in developing understanding and helping to memorise information. It makes the process of note taking active rather than passive. At the end of a unit, a teacher might ask learners, individually or collaboratively, to create a mind map of what they understand about a topic that has been covered. Many learners find mind mapping a very useful technique when revising for exams, as the process of reformulating their notes into a new structure is in itself a memorable activity.

- Planning essays, presentations or projects. By using key words, learners can fit large amounts of information onto one page, allowing them to get an overview of a topic and to plan information strategically.

- Clarifying, analysing and re-defining problems or questions. This helps learners to uncover new perspectives, to build higher-level thoughts and to develop understanding, analysis, synthesis and evaluation.

- Making connections. This supports the development of holistic and disciplinary understanding through connecting ideas from different topics or different subjects.

Mind maps are an extremely versatile and accessible approach to help visualise and understand material. Many learners, including those who have dyslexia or other learning difficulties, find mind maps very useful, and they can be used to support learning in all disciplines. Research by Park and Brannon (2013, pp.2013–2019) found that training learners to use visual and spatial representations significantly improved their performance in mathematics, even when undertaking numerical problems. Research has shown that mind mapping is more effective as a means of knowledge retention and transfer than attending lectures, participating in class discussions or reading text passages alone (Nesbit & Adesope, 2006, p.434).

For more information on mind maps see the references and resources at the end of this chapter.

Assessing innovation and creativity

As argued already in this chapter, the outcomes of creative processes are incorporated naturally into teaching and learning. Teachers can assess them when students complete an assignment or task and have demonstrated creativity.

Because creativity is a process inherently linked to reflection, it is often valuable to assess progress at appropriate points in the journey. This needs to be done sensitively. If learners or teachers are too critical of ideas during the ideas generation phase, they may find that they dismiss all their ideas and do not have anything to work with.

Creativity lends itself to self-evaluation, peer evaluation, process/progress learning diaries (sometimes called process or progress journals), portfolio assessments, blogs, presentations and exhibitions. As Rachel Logan, Product Manager for Art and Design at Cambridge explains: 'We are assessing how well they have thought "around" a problem, not necessarily how well the solution works.' She adds: 'It's vital that learners have critically evaluated their outcomes, but in the end it's mostly about the process that they went through to get there.'

Ellis and Barrs (2008, p.78) have developed a generic rubric to informally assess creative learning. Rubrics are designed to clarify criteria and standards against which students' work can be assessed. This focuses on the processes involved in creative work, including investigation, skills, discussion, evaluation and reflection. The rubric is intended for use in a primary classroom, but could be adapted for any level.

References

Beghetto, R. A., & Kaufman, J. C (2007). Toward a broader conception of creativity: A case for mini-c creativity. Psychology of Aesthetics, Creativity and the Arts, 1, 73-79

Budd Rowe, M. (1986). Slowing down may be a way of speeding up! *Journal of Teacher Education*, 37, p. 43.

Buzan, T. (1986). *Use Your Memory: Understand Your Mind to Improve Your Memory and Mental Power*. UK: Pearson.

Claxton, G. (2006). Thinking at the edge: developing soft creativity. *Cambridge Journal of Education*, 36(3), pp. 351–362.

Collins, A. M. & Quillian, M. (1969). Retrieval time from semantic memory. *Journal of Verbal Learning and Verbal Behavior*, 8, pp. 240–247.

Craft, A. (2005). *Creativity in Schools: Tensions and Dilemmas*. UK: Routledge.

Ellis, S. & Barrs, M. (2008). The assessment of Creative Learning. In: J. Sefton-Green, ed., *Creative Learning*. [pdf] UK: Arts Council England. Available at: **https://www.sussex.ac.uk/webteam/gateway/file.php?name=creative-learning-sept-2008&site=45** [Accessed November 2016].

Ferrari, A., Cachia, C. & Punie, Y. (2009). *Innovation and creativity in education and training in the EU member states: Fostering creative learning and supporting innovative teaching*. European Commission Joint Research Centre.

Hattie, J. (2009). *Visible learning: A synthesis of over 800 Meta-Analyses Relating to Achievement*. London: New York Routledge.

Kampylis, P. & Berki, E. (2014). *Nurturing creative thinking*. [pdf] International Academy of Education, UNESCO, p. 6. Available at: **http://unesdoc.unesco.org/images/0022/002276/227680e.pdf**

Kaufman, J. C. & Beghetto, R. A. (2009). Beyond Big and Little: The Four C Model of Creativity. *Review of General Psychology*, 13(1) pp. 1–12.

Kazemi, E. (1998). Discourse that promotes conceptual understanding. *Teaching Children Mathematics*, 4, pp. 410–414.

Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: An Overview. *Theory into Practice*, 41(4) pp. 212–218.

Leven, T. & R. Long. (1981). *Effective Instruction*. Washington, DC. Association of Supervision and Curriculum Development.

Michalko, M. (2001). *Cracking creativity: the secrets of creative genius*. California: Ten Speed Press.

Nakamura, J. & Csikszentmihalyi, M. (2002). The concept of flow. *Handbook of positive psychology*, pp. 89–105.

Nesbit, J. & Adesope, O. (2006). Learning with concept and knowledge maps: A meta-analysis. *Review of Educational Research*, 76(3), pp. 413–448.

Park, J. & Brannon, E. (2013). Training the Approximate Number System Improves Math Proficiency. *Psychological Science*, 24(10), pp.2013–2019.

Richards, R. (Ed) (2007). *Everyday creativity and new views of human nature: Psychological, social, and spiritual perspectives*. Washington, DC: American Psychological Association p.349. **http://dx.doi.org/10.1037/11595-000**

Scales, P. (2013). *Teaching in the Lifelong Learning Sector*. Maidenhead: Open University Press.

Smolucha, F. (1992). A reconstruction of Vygotsky's theory of creativity. *Creativity Research Journal*, 5(1), 49-67.

Sternberg, R. J. (2012). The Assessment of Creativity: An Investment-based Approach. *Creativity Research Journal*, 24(1), pp.3–12.

von Oech, R. (1998). *A Whack on the Side of the Head: How You Can Be More Creative*. 3rd ed. New York: Warner Books.

Vygotsky, L. S. (1967). Play and Its Role in the Mental Development of the Child. *Soviet Psychology*, 5(3), pp.6–18.

West-Knights, I. (2017). Why are schools in China looking west for lessons in creativity? *The Financial Times*. Available at: **https://www.ft.com/content/b215c486-e231-11e6-8405-9e5580d6e5fb** [Accessed 21 April 2017].

Winterbottom, M., Harris, E., Xanthoudaki, M., Calcagnni, S. & De Puer, I. (2016). *Tinkering: A practitioner guide for developing and implementing tinkering activities*. Tinkering: Contemporary Education for the Innovators of Tomorrow project.

Resources

Questioning

Rothstein, D. & Santana, L. (2015). *Make just one change: Teach students to ask their own questions*. **Cambridge, MA: Harvard Education Press.**

This practical teachers' guide describes the 'question formulation technique' as developed by the authors over several years of working with learners across a range of socio-economic backgrounds, including bilingual learners. The book goes through the strategies step by step and gives examples of how teachers of different subjects have implemented the technique.

Essentially, the strategy is to prompt learners' curiosity with a 'question focus' which could be an image, statement or audio-visual stimulus. Learners then create questions through divergent thinking routines. They then prioritise and improve these questions with help from their teacher. Finally, a range of possible next steps are suggested as to what learners might do with the questions. These include 'do-now' activities,

identifying topics for further research and investigation, preparing for tests, providing formative assessment information for teachers or preparing a research agenda for the next unit of study.

Educating for Creativity: Level 1 Resource Guide

www.creativeeducationfoundation.org/wp-content/uploads/2015/06/EFC-Level-1-FINALelectronic.pdf

This guide from the Creative Education Foundation gives lots of useful tips about how to encourage your learners to solve problems creatively. The creative problem solving (CPS) process is based on the Osborn-Parnes CPS model. There are descriptions of brainstorming-type activities for cross-curricular projects. The ethos behind this model is to encourage an environment in which creativity and innovation can thrive using a range of techniques and strategies. The authors aim to nurture creative skills which will become an integral part of learners' work and life in future.

Buzan, T. (1996). *The Mind Map book*. **New York, NY: Penguin.**
One of many publications by Tony Buzan that explores the possibilities of mind maps and explains how they are best generated.

De Bono, E. (1993). *Serious Creativity: Using the Power of Lateral Thinking to Create New Ideas*. **USA: Harper Business.**
Although primarily aimed at a business market, this book contains very detailed descriptions of how to implement Edward De Bono's many lateral thinking tools, including Six Thinking Hats, Provocations, Random Input and more. There are also suggestions for how to run training or set up a creative thinking session, which could easily be adapted for use in schools.

Online resources from Edward De Bono
Edward De Bono's CoRT thinking tools are described in this resource, along with many other ideas for using questions to trigger critical and creative thinking:
www.nsead.org/downloads/Effective_Questioning&Talk.pdf

Instructions and descriptions of De Bono's CoRT thinking tools with examples:
http://elearnmap.ipgkti.edu.my/resource/gkb1053/sumber/CoRT1-4.pdf

Simister, C. J. (2009). *The Bright Stuff: Playful ways to nurture your child's extraordinary mind*. **Harlow: Prentice Hall LIFE.**

This book contains a large number of creative thinking ideas that could be incorporated into all levels of teaching.

Craft, A. (2000). *Creativity across the Primary Curriculum: Framing and Developing Practice*. **London: RoutledgeFalmer.**
This is an inspiring read, practical but informed by theory and research. Anna Craft explores core principles and the different subjects, and considers ways in which teachers can develop a more 'creative mindset' towards the curriculum and pedagogy.

www.amazon.co.uk/Unlocking-Creativity-Teaching-Curriculum-Teachers/dp/1843120925

Fisher, R. (2005). *Unlocking Creativity: Teaching Across the Curriculum: A Teacher's Guide to Creativity Across the Curriculum*.
A comprehensive guide to incorporating creative approaches into your lessons. It has sections on specific subjects including maths, creative writing, drama, science, design technology, geography, music, art and religious education.

Scoffham, S. (Ed) (2004). *Primary Geography Handbook*. **Sheffield: The Geographical Association.**
This subject-based handbook for teachers has a wealth of tried and practical examples of creativity applied to geography. Chapters on 'Young geographers', 'Geography, creativity and place', 'Geography and the emotions' and 'Making geography fun' show how creative teaching and promoting creative thinking in children is central to a subject not usually thought of as creative.

Yenawine, P. (2014). *Visual Thinking Strategies: Using art to deepen learning across school disciplines*. **Cambridge, MA: Harvard Education Press.**
An in-depth explanation of visual thinking strategies (VTS) as mentioned in this chapter. This is a teacher's guide to the VTS project, which started as a collaboration between the education team at the Museum of Modern Art, New York and academics at Harvard University. It includes lots of examples of how to implement the strategies as well as written records of typical conversations in classrooms where VTS is being used.
www.visiblethinkingpz.org/VisibleThinking_html_files/03_ThinkingRoutines/03d_UnderstandingRoutines/ThinkPuzzleExplore/ThinkPuzzleExplore_Routine.html

This site contains excellent resources explaining a wide range of thinking routines developed by Harvard Project Zero, including this 'think, puzzle, explore' thinking routine. These activities are easily adaptable to any learning situation for any age. There are also videos of the routines in use in classrooms.

Compass Points thinking routine from Harvard Project Zero:
www.visiblethinkingpz.org/VisibleThinking_html_files/03_ThinkingRoutines/03c_Core_routines/CompassPoints/CompassPoints_Routine.html

Project-based learning resources
www.bie.org/resources
The Buck Institute for Education, USA. This site contains resources and case studies on successful project-based learning.

www.hightechhigh.org/htm/projects
High Tech High in San Diego, USA. Examples of learner projects with learning outcomes and teacher reflections.

https://jennyluca.com/2012/10/02/project-based-learning-giving-it-a-go-in-an-english-classroo
This blog explains one English teacher's experiences implementing project-based learning in her English literature classroom, studying Romeo and Juliet.

www.bie.org/object/document/english_learner_scaffolds_for_pbl
English literature project-based learning scaffolding guide.

Tinkering
www.museoscienza.org/tinkering-eu/download/Tinkering-A-practitioner-guide.pdf
This document explains the background behind the tinkering movement, and gives detailed guidance on how to design and implement tinkering activities. Although the examples are design-technology based, they could be adapted for science or art lessons.

www.raeng.org.uk/education/schools/teaching-and-learning-resources/curriculum-resources
The Royal Academy of Engineering (UK) offers a range of resources for teachers of STEM subjects (science, technology, engineering and maths). The lesson plans include topics such as 'Desert', which looks at how people and animals survive

in the desert. Activities include learners designing a 'fog catcher' based on their understanding of condensation. It includes handouts and resource lists.

Creative thinking for school leaders

This is a more generalised guide to creative thinking, aimed at school leaders: Kampylis, P. & Berki, E. (2014). Nurturing creative thinking. International Academy of Education, UNESCO.

Creativity through making

https://www.gse.harvard.edu/news/uk/14/10/learning-making

https://www.weareteachers.com/making-matters-how-the-maker-movement-is-transforming-education

Rubrics for creativity

https://ccgiftedcollaborative.wikispaces.com/file/view/6+Creativity.pdf

http://ec.europa.eu/research/science-society/document_library/pdf_06/report-rocard-on-science-education_en.pdf

Chapter 5: Student wellbeing

Overview

Learning is embedded in emotional states. A confident, responsible, reflective, innovative and engaged learner reasons and makes decisions on the basis of positive personal values and an understanding of their emotions. This chapter looks at the profound impacts of wellbeing and stress on learning and performance. Most of it has been written by the author and speaker Nicola Morgan, informed by presentations she gave in 2016 at Cambridge Schools Conferences.

Schools should care about wellbeing and stress because it is the decent and fair thing to do. However, they also need to care because wellbeing and stress management directly affect students' outcomes at school as well as their ability to thrive in later life. The concept of resilience is often used to describe people's ability to deal with pressure and stress effectively. It is a life skill that schools need to nurture. All students will encounter adversity and barriers to learning. The resilient will overcome these, helping them to fulfil their potential.

This chapter considers a number of potential pressures that can have an impact on young minds. Adolescent brains are different from those of mature adults in significant ways. The world in which young people operate is dominated by technology and social media, and this is creating new pressures that need to be understood. This chapter ends with some practical strategies for schools to improve stress management, increase wellbeing and empower students to manage their lives.

The adolescent brain

Adolescence can be described as a progressive transition from childhood into adulthood. During this phase teenagers go through profound changes in brain and functional development. These changes affect young people in different ways and to different extents, but it is important for teachers and other adults close to young people to recognise this.

For example, scientific evidence (Casey, Jones & Hare, 2008) suggests a neuro-biological reason for high-risk-taking and impulsive behaviour and emotional reactivity in adolescents. Emotional processing that occurs in subcortical limbic regions is particularly powerful in relation to control exerted by the prefrontal cortex area of the brain. This means that in situations that are personally emotionally charged, adolescents tend to rely less on intellectual reasoning and more on their feelings. If the situation is not emotionally charged, for example if an adolescent is asked a hypothetical moral question, logical reasoning will dominate.

The development of the social brain during adolescence supports the observation that during this period of life individuals may be more susceptible to social pressure to seek status with peers and also to embarrassment in social situations. Peer influence is an extremely important driver for behaviour at a time when adolescents are moving away from the protection of their family unit and building new groups (see Blakemore S.-J., 2014, for much work on the adolescent social brain). The importance of self-image in front of peers is particularly heightened during adolescence.

What is wellbeing?

Wellbeing describes a state of overall mental and physical health, strength, resilience and fitness to function well at work and personally. It was brought into the public and educational domain by positive psychologists, notably Seligman (2011), and offers an alternative to the goal of 'happiness', which tends to describe a transient, short-term state which cannot logically or practically be sustained for long. 'Happiness' itself – that active emotion, 'how I feel now' – is highly reactive, depending on the right things happening to or around the person. When a sad, worrying or difficult event or thought occurs, that feeling of happiness necessarily ceases or decreases. Happiness is hard to control, being immediately dependent on both an internal mindset and external factors.

'Wellbeing' is more stable and resilient. Although it is somewhat affected in the longer term by outside influences, when a sad, worrying or difficult thing happens, wellbeing is not immediately affected. In fact, a good state of wellbeing offers some protection against difficult outside events. One might say that wellbeing is a background state, whereas happiness is a temporary response to stimuli. Wellbeing helps cause success and good function; happiness is caused by them (among other things).

Wellbeing is neither permanent nor innate. It is a state of mind and body which is acquired over time and can be lost over time. It forms a valid part of a school curriculum because:

- it has profound direct effects on learning and performance

- it affects relationships with peers, family and teachers

- many aspects can be (to a valuable extent) within the control of an individual who has learnt good practices

- not being fixed, it is vulnerable over time to external events; therefore the individual needs to build a bank of wellbeing for resilience

- understanding about and strategies for wellbeing gained at an early age can be used at all stages of the individual's life – wellbeing management is a genuine life skill

- it explicitly affects learner attributes as students can better 'understand themselves as learners' when they understand some influences that directly affect their ability to learn easily

- for all these reasons, it falls into the competency category of Living in the World.

In summary, people with good wellbeing feel generally healthy, sufficiently positive, able to focus on the task in hand and ready to deal with whatever occurs. They have reserves of physical and mental health, and resilience, to help them deal with more negative events or challenges. Crucially, people with good wellbeing can proactively manage stress, rather than suffer from it. For more insights see Dodge, Daly, Huyton & Sanders (2012).

What is stress and what problems does it create?

Stress is a positive, life-enhancing and even life-saving biological response to threat or the need for peak performance. Its fundamental function is to respond instantly to physical threat or danger and optimise the powerful 'fight or flight' response in the brain.

When threat occurs, the brain (first the amygdala, followed by the hypothalamus and pituitary gland) instantly triggers the release of chemicals, most importantly the hormones adrenaline (in the US epinephrine) and cortisol. These combine to speed up the heart and breathing so that blood (carrying oxygen and glucose) is pumped quickly to the muscles of legs and arms, enabling them to be stronger than normal and to move faster. The nervous system is stimulated and the brain instantly becomes super-alert, focusing acutely on the threat, rapidly reacting to and choosing options to deal with it. The individual is likely not to notice less irrelevant things (including pain) and instead focuses on the task in hand: to survive and win, whether by fighting or fleeing. The physical feelings produced by these chemicals are somewhat unpleasant but this state of discomfort and agitation is required to stimulate the individual to act.

Thus, in a situation of threat, the stress response allows the individual to super-perform: to run faster, jump higher, fight harder, focus better and react more quickly and strongly, both mentally and physically, than under relaxed circumstances. 'Threat' is not confined to physical danger such as being chased by an aggressor or predator (the original biological purpose). It applies to all situations where a creature is required to super-perform or deal with challenge: exams and tests, competitions and matches, arguments and debates, any performance or situation where people are looking at the individual. Even apparently small things such as being asked a question one does not know the answer to, being addressed by a stranger, noticing that one is late for something, a person saying something hostile, something unusual or unpleasant or strange, hearing about a frightening or tragic event, having an anxious thought: all these activate the biological stress response. And the aim in every case is the same: to enable survival and success.

Therefore, stress is not something to avoid or fear. It is natural and healthy and facilitates best performance. In that case, why do we tend to frame it negatively? Why do some people 'suffer' from stress and become ill, under-performing instead of super-performing? Exactly what are the problems with stress?

Clearly, people do suffer from stress. Stress-related illnesses lead to time lost from school and adult work. Suffering from stress is very unpleasant and spoils our enjoyment of life. But we should be clear about the exact problems if we are to avoid meaningless clichés and if, crucially, we are to understand and act on some solutions.

There are three main ways in which stress can be a problem, whatever the age of the individual. We will later look at some ways in which teenagers may respond differently and reasons why some extra attention may be needed for that age group.

1. Panic: too much adrenaline response can lead to a feeling of panic or a full panic attack.
2. Cortisol build-up: cortisol doesn't disappear quickly once the threat is over and the build-up can lead to many short, medium and long-term problems.
3. Preoccupation: when our mind is occupied by something, we have less 'bandwidth' to focus on necessary tasks, so performance suffers.

Let us look in more detail at each problem. Later in this section, we will look at solutions.

The panic response and the effects of cortisol build-up

An over-production of or over-reaction to adrenaline makes the heart race to the extent that, instead of feeling focused and ready, we feel panicky, out of control. Most people will have experienced this. One feels overloaded by information and messages, while experiencing uncomfortable physical symptoms, such as shallow breathing, a racing heart or palpitations, sweatiness, nausea and even, sometimes, vomiting or diarrhoea. Usually, this passes quickly once the anticipated event (such as an exam, sporting match or public performance) is over. However, the individual may feel so uncomfortable that he or she focuses more on the discomfort than the performance.

Sometimes, this leads to a panic attack. A panic attack is different from a more ordinary feeling of panic in two ways: first, it is usually in response to something relatively minor rather than something commonly recognised as terrifying. This means that it can be unpredictable and sufferers may become anxious about the possibility of a panic attack. Fear of a panic attack can trigger a panic attack. Secondly, the severity is such that the sufferer loses control; the need to get away from the stressful situation can lead to running from the room, failing to notice what one is doing; sufferers commonly really believe (falsely) that they may die.

Whereas adrenaline dissipates quite quickly from the body once the threat or perceived threat has passed, cortisol lingers. Today's stresses tend to be frequent and lingering, rather than the occasional life-threatening ones that the stress response evolved for, so there is a huge opportunity for cortisol to build up.

Possible effects of cortisol build-up are wide ranging, and directly affect wellbeing, function and performance in all areas of life, including home, social and school. A function of cortisol that helps explain this is that it supresses some bodily functions that are 'unnecessary' in the moment of stress: including protective mechanisms such as the immune system. So we become temporarily vulnerable and this vulnerability can linger after the stress trigger has passed. It is often impossible to be clear which of the following are directly caused by cortisol build-up or simply a more general repeated assault on the stress system, but factors commonly associated with persistent stresses leading to cortisol build-up are:

- sleep problems – difficulty in getting to sleep; also waking in the night or early in the morning and not being able to return to sleep
- poor concentration (which is also damaged by poor sleep)
- weaker immune system – it is common to be prone to minor ailments when suffering stress build-up
- other physical health problems – many illnesses may be worsened or some even triggered by stress; people with unconnected health problems may take longer to recover when under stress
- repeated headaches and stomach-aches
- change in appetite and therefore weight gain or loss – people may either lose appetite or be drawn to more unhealthy foods, particularly sugar and other carbohydrates
- low mood – which can lead to problems in relationships and lower self-esteem
- irritability – also affects relationships and self-esteem.

Preoccupation

This interesting and complex topic is relevant not only to the effects of stress on learning and performance but also to the widespread problem of distraction and multi-tasking in today's technology-dominant society. This will be mentioned in more detail later in the chapter but here let's look at preoccupation in relation to stress.

It is helpful to think of the brain as working on a 'bandwidth' principle (see Mullainathan and Shafir 2014), using the analogy of broadband bandwidth. The capacity of connection to the internet (whether fixed or wireless) is finite. If someone using the same line is doing something that occupies much bandwidth, everything else is slower. The brain works analogously. We have a finite amount of bandwidth or processing power, and different activities (both mental and physical) occupy different amounts. Some occupy little – those we have become expert in and which require little concentration, such as walking, clapping hands, routine tasks such as brushing our teeth. Other activities occupy a lot – complex or unfamiliar ones, or any we sense require a lot of concentration, such as reading complex or new material, writing, solving a problem, listening to instructions (see Levitin, 2014 for a comprehensive overview).

One activity which illustrates this is car driving. Once we are experienced drivers, we can do some driving without thinking very much; we can hold a conversation; listen to music or voices on the radio; think about our next meeting. We are driving somewhat automatically and using relatively little bandwidth compared to when learning to drive. But when a situation arises where we have to concentrate more, these secondary tasks become more difficult. If we have to concentrate on an unfamiliar route, or park in a tricky space, or a traffic situation arises, we tend to stop talking and may turn the radio off because we sense that we need more bandwidth for the driving activity. In fact, car manufacturers often engineer the car so that radio volume reduces during parking.

This will become very relevant when we look at distraction in the context of wellbeing, but it is relevant to our discussion of stress because one thing that occupies bandwidth is any major stressful situation or anxiety. When we are worried about something, that worry occupies a significant amount of bandwidth and affects concentration and performance. It is vital that we understand that bandwidth is effectively finite. Even if it turns out that we can learn to stretch it somewhat, in practical terms we are limited by the bandwidth we have at any time. This means that if a significant part of our bandwidth is occupied by something else, we cannot focus and perform at our best on the task in hand. Performance on that task suffers. This is why genuine multi-tasking is so difficult. People of all ages are vulnerable to this but there are reasons which make teenagers more likely to be vulnerable.

How do the challenges of stress affect teenagers more than others?

Biologically, stress seems to work similarly whatever one's age. There may, however, be small differences in sensitivity and adaptation in adolescence compared with adults. Some research suggests (Romeo, 2013), that hormonal stress responses may be stronger in teenagers, who may also adapt to a stressful stimulus more slowly, requiring more exposure to a particular stressor before learning to manage it with a less negative response. However, these differences are not categorical and may be small. Regardless, there are several ways in which teenagers may have more difficulty with each of the three stress problems.

Panic response:
- Teenagers have less previous experience of each stressor, so may be less able to process an event as 'something I have met before and will be able to manage'.
- They are less likely to have learnt simple strategies with which to fight the response.

Cortisol build-up:
- A school day contains many possible stressors. Students go between lessons, switching topic rapidly, and are required to perform better both in subjects they succeed in and subjects they struggle with. They are asked questions they cannot answer or criticised for imperfect work. Break times are not usually a genuine 'break', as students must socialise in a noisy environment and may be dealing with negative situations with friends and peers. (This is particularly the case for introverts, who require more breaks from noise.) There are pressures about how they look, how they speak, how many friends they have.
- There is little opportunity to relax, and adolescent free time often involves social media and screen time.

Preoccupation:
- Three mental activities use a significant amount of brain bandwidth: intrusive worrying or anxiety; processing new information; and using digital media. These are not the only high-bandwidth activities but teenagers may be trying to do all three simultaneously. When we discuss digital media and multi-tasking, this will become even more relevant.

- When preoccupied by a worry, it is very difficult to focus on work. The brain area we would use to force focus is the prefrontal cortex, which is not fully developed until well into the 20s (Morgan, 2007) so most teenagers will struggle more than adults with this.

- Teenagers typically have a great deal going on in their lives, each one occupying mental capacity.

What extra stressors do teenagers have?

There are stressors that apply more to this age group than to others. Consider how each might contribute to one of the three negative stress categories, occupy brain bandwidth and lower wellbeing.

- A perfect storm of change – everything is changing: their brains, bodies, chemistry, friends, pressures, curriculum, fears, protection from adults. Change is stressful if it is change one has not asked for or cannot control.

- Lack of control – they can control very little about their day. They may have developed 'learned helplessness', becoming so used to lacking control that they fail to notice where they could have control. They may not ask for help because they think no help is possible.

- Exams – stakes are high, with frequent demands to achieve the best, often unattainable goals.

- The internet and social media – these provide enormous benefits but come at some cost. Many costs apply equally to adults engaging in digital media, but teenagers may be more vulnerable because of extra pressures to do what friends and peers are doing and less well-developed neural control centres. Very briefly, these costs include:

  - Strong temptation to spend too much time on devices – this temptation is biological and powerful, involving dopaminergic reward pathways in the brain (Kardaris, 2017), which are activated during pleasurable experiences and addictive behaviours towards activities or substances we find pleasurable. Addictive behaviour is defined as continuing to seek pleasure despite clear negatives occurring from that pleasure.

  - More 'friends' than we can manage – the evolutionary biologist Dunbar (1997) has studied social groups of different species in relation to brain size and posits that humans can manage up to 150 'friends'. Friendships need to be maintained by certain actions and contact, and with more than around 150 we cannot do this properly. Anyone on social media typically has far more than 150 friends and contacts, and the act of trying to maintain them all – by responding with 'likes' or sympathy, for example – is stressful, exhausting and time consuming.

  - Constant comparison and goals of perfection – everyone's lives seem to be perfect, as they display their beautiful (touched-up) photos and talk about only their successes.

  - Competition for popularity – measured by how many 'likes' one's social media post has received. Each time we see that someone has liked a post or photo, we get a small rush of dopamine, that chemical responsible for the feeling of pleasure. There's evidence (Freitas, 2017) that many young people (and perhaps others, too) measure their own worth by how many likes a post or picture has received and can spend huge amounts of time checking.

  - The 'online disinhibition effect' – the theory proposed by Suler (2004) showing that most people of all ages are somewhat less careful or inhibited online than face to face. The 'toxic disinhibition' that he describes helps explain the prevalence of cyber-bullying and online 'trolling', as well as careless behaviour such as sending risky messages or pictures.

  - Some young people are dealing with difficult situations at home. They may be witnessing parental strife or unhappiness, dealing with illness or even the death of someone close to them, caring for a family member or aware of a whole range of preoccupying life problems. It is harder for adults to protect them from these things and yet they are not yet fully equipped to cope.

  - Friendships and peer pressure can be huge problems for this age group, harming wellbeing and dominating mental space.

  - Information overload, 'continuous partial attention' (Stone, 2017) and the problems of multi-tasking. These arguably affect any adults, too, and form such a large topic that we will look at them separately.

Digital media: information overload, continuous partial attention and multi-tasking

Those who use the internet and social media are reading far more than we were 20 years ago. Our screens, especially when we are online, provide many requests for attention, whether from notifications from apps or platforms, hyperlinks which we must decide whether to follow, moving images to attract attention, and text that encourages us to skim rather than to focus deeply. Many of us are in a state of what Stone (2017) calls 'continuous partial attention' – a phrase she coined in 1998, before smartphones had come to dominate. This state is likely to create a level of stress and inefficiency and, therefore, to lower performance on tasks that require focus.

We are all familiar with the experience of trying to concentrate and someone interrupting with a question or demand for attention. Most would agree that ability to concentrate is harmed, that we would perform better if left uninterrupted. When we (and this applies to all ages) work on digital media we have a situation where those interruptions and distractions are almost inevitable. Very often, communication software will be open while we are working, so notifications of emails or other messages may arrive. We can choose not to open those messages, of course, but that requires great self-control, which in turn requires significant mental energy and bandwidth. Even if we switch off our email and social media and remove our phones from sight, focusing on the document on our screen, we are distracted by hyperlinks. Each one requires a decision: to click or not. If we click, we are taken somewhere else and must adjust to the new document while somehow trying to remember the one we were reading. If we choose not to click, we expend energy in that decision, and research suggests that it takes more mental capacity to resist the temptation than to follow the link.

The message from a number of sources (Levitin, 2014; Gazzaley & Rosen, 2016) is clear: multi-tasking (with activities that require conscious mental process) is generally bad for performance and the attempt to multi-task by allowing interruptions is stressful.

Extra stress for introverts

Introverts are often particularly poorly catered for and undervalued in today's noisy, busy, social, collaborative schools and many workplaces. Yet they are estimated to make up a third to a half of all people (Bayne, 1995). To understand this, we must first understand introversion (see Cain's work (2013) for an excellent analysis). We must note that introversion is neither 'better' nor 'worse' than extroversion; they are simply two different sets of personality traits and there are advantages and disadvantages to each.

Despite popular opinion, shyness has little to do with introversion. Introversion describes an over-reaction to external stimuli, especially stimuli that include human interaction. Introverts may deal very well with strangers, have lots of friends and be adept performers. But every social situation, from a relaxed face-to-face chat with a close friend to walking into a room full of strangers or performing in front of a crowd, is mentally and physically tiring for an introverted person. An extroverted person, on the other hand, will typically feel energised by social interaction. This is partly a biological response but partly also because as an introvert it can feel as if one is using more 'brain bandwidth' when interacting with other people. Introverts may spend more effort imagining what the other people might be thinking, what other people's needs are, how the social situation is working. An extrovert might be having fun, while the introvert is processing a number of potentially alerting and stressful thoughts. They can do it but it has a cost: mental exhaustion and a feeling of being overwhelmed.

At school, many teaching methods and activities involve collaborative work. While collaboration cannot be ignored, teachers should realise that during these activities introverted students are unlikely to be doing their best work and may be more exhausted and more stressed, leading to poorer learning outcomes. When an introvert is asked to do a piece of work jointly with a neighbour, the introvert switches out of learning mode and into social mode. The last thing on his or her mind is 'How can I do as well as possible on this piece of work?'

Of course, most people have a combination of introvert and extrovert tendencies, or may feel differently in different situations or when in different mental states. But a significant number (even if a minority) of the students in any classroom will score highly on tests for introversion, and they pose specific problems and have specific needs if they are to fulfil potential at school and have good wellbeing.

The special requirements of introverts – and how to provide them:

- A school day, being noisy, busy and high pressure, and involving almost constant social interaction and expectation, is likely to be exhausting for introverted students. They need options for time out, to replenish their energy levels and reduce cortisol.

  - Ensure that your school has a place where students know they can find peace during break times. Offer time and explicit permission. When talking about this avoid terminology that suggests that students who need this are in any way more fragile than others. (This is not the same as a safe space. It is simply acknowledging that noise and social intensity are not good for some people.)

- Many students and staff have a poor understanding of introversion and may fall into the common trap of valuing introverts less highly than the social, seemingly confident extroverts. This can lead to low self-esteem for introverts and teasing by others.

  - Share understanding among students and staff of what introversion is. Of course, some staff will have introvert tendencies and this can be used to help understanding. Ensure that equal value is placed on introversion and extroversion, and that students can value the strengths that each other brings to all situations.

- Students need to learn skills to succeed in the extrovert world, including being able to stand up in front of peers and express oneself. Avoiding the things we fear is not the best way to overcome them.

  - While acknowledging that public performance may make introverted individuals more anxious and uncomfortable, teach that these skills can be learnt and that practice and familiarity make them easier. Expose students to challenging situations step by step, gently and respectfully. Encourage them to be proud of their achievements and to see the challenges as achievable and worth aiming for.

- Collaborative work is likely not to suit introverted students, but collaboration is necessary in schools and in life.

  - There are ways for teachers to manage collaborative situations to the value of all students. Cain's 2013 work (op cit) offers examples. Teachers should consider: assigning suitable team roles; allowing students to choose partners; offering choices for reporting and work sharing; sensitively facilitating turn sharing; joint presentations.

- Answering a question in public or sharing one's work with the class is likely to be very stressful for introverted students, yet this is a necessary part of schoolwork.

  - If students are aware both of the need for contribution and why it can be difficult, they can be armed with useful and often simple strategies. For example, they can prepare questions in advance, offer their contribution early in the lesson to get it over with and acknowledge pride in their achievement when they rise to the challenge.

  - Teachers can be encouraged to create an environment in which all students feel able to contribute without fear that they will be teased if they get it wrong or right. One useful idea is to tell students that no one should put their hand up for a certain amount of time after the question is asked; this gives introverts time to test their answer internally and extroverts time to think more carefully.

Strategies for schools

We see that stress can be a huge factor in teenage lives and can negatively affect their wellbeing and performance, despite its biological function being to encourage peak performance. What can and should schools do about this? How can you help students to manage stress so that it becomes genuinely performance enhancing, something that they can thrive on, not just survive with?

It is impossible to provide a complete guide to stress management in this space but the resources at the end of the chapter will guide you further. It is important also to share these with parents, so that they can reinforce the messages at home.

1. Educate about the biology of stress: what stress is; how it affects us (each somewhat differently); recognising symptoms; simple strategies to deal with each of the three categories of negative stress.

2. Ensure that no students or staff think stress is a weakness. Encourage openness and respect.

3. Reinforce the message that relaxation is not a luxury but essential for wellbeing and improves performance. Managing stress is as important a part of health and wellbeing as eating the right (and right amount of) food, having physical exercise and good quality sleep.

4. Teach instant calming strategies such as belly-breathing. This is sometimes called diaphragmatic breathing or abdominal breathing and refers to the fact that when we are stressed our breathing tends to become shallow and move to the upper chest. If we can learn to shift our breathing towards the abdomen, we immediately notice less tension and we feel better. Although it is simple, students should practise this so that it is easy to activate at moments of extreme stress or in a panic attack.

5. Provide 'time-out' every day and encourage students to build this into their own day/evening. For some, this will be a place where there is peace and quiet; for others it will be somewhere they can let off steam with physical activity.

6. Be deliberate about this time-out: when we expect a result, we are more likely to notice and experience it; so, if we take a break, do some exercise, read a book deliberately as a stress management activity, we are likely to experience greater benefit than if we were not so conscious and deliberate.

7. Provide good sleep education (see Wiseman, 2015). Understand the importance of sleep and how it is not only essential for mental and physical health and wellbeing but also for learning. Direct students to good advice about 'sleep hygiene', the term used to describe the things we should and should not do in the hour or so before sleep.

8. Emphasise the importance of a quiet, technology-free hour before bedtime.

9. Encourage daily exercise for pleasure: something each student can enjoy, whether team sport or solo exercise, energetic or not.

10. Encourage reading for pleasure. Understand and share the strong evidence (see The Reading Agency, 2015) of many benefits, including stress reduction and sleep improvement.

11. Give clear routes for students to talk to someone they trust. Keep these routes open and repeat regularly. Ensure that some staff have counselling skills and, ideally, mental health first aid training. Crucially, ensure that students understand that there is help for them.

12. Understand introversion and share that understanding among adults and students. Make sure you cater for and value introverts and extroverts equally.

13. Educate about the downsides of attempting to multi-task: worse performance and concentration, greater stress and exhaustion. Teach (and model) the importance of switching off devices when trying to concentrate. If devices are being used for a particular task, ensure that background or social media apps etc. are switched off and that only necessary software is open.

14. Model good stress management yourselves: students need to see a) that adults also have stress and b) that we deal with it proactively. Digital switch-off and making time for focused activities such as reading for pleasure are important for all ages.

15. Reinforce a message of 'active agency': the mindset that tells us that we can control a lot of our wellbeing by taking care of our diet, sleep, physical exercise and stress.

Learning to see failure as an opportunity

One consequence of moving from a performance to a learning orientation is that failure is viewed as both inevitable and desirable because it is impossible to grow as a human being without learning from failure. Humans are born with an instinct to learn from mistakes in a way that does not generate anxiety or stress. This changes if expectations are forced on young people to be successful, with performance and position counting for more than learning.

One of the purposes of the learner attributes is to encourage learners to be risk takers who have the confidence to take on new challenges and enjoy learning from mistakes. This requires learners to not be frightened to ask for support and help, and not to worry about losing face to their peers or teachers. Having intrinsic self-motivation is necessary for young people to become flexible, independent learners who are not dependent on extrinsic rewards. The resilient will have coping mechanisms to deal with failure, supported by the behaviour of individual teachers and the culture of the school.

Supportive parenting

It is very important to teach parents about the learner attributes. This helps them to understand the importance of having a learning rather than a performance orientation. This guide argues that doing this effectively will prepare young people for higher education, the workplace and life, as well as improving examination performance. For a helpful resource see the Queensland Research Digest (2014) listed in the Resources section.

According to Lahey (2013) schools need to have active strategies against over-protective parenting. He says: 'Year after year, my "best" students – the ones who are happiest and successful in their lives – are the students who were allowed to fail, held responsible for missteps, and challenged to be the best people they could be in the face of their mistakes.'

Lahey suggests teachers help by:

- creating a classroom culture where failure, setbacks and disappointment are expected and form the basis of future learning

- establishing and reinforcing an atmosphere where students are praised for demonstrating good learning habits, perseverance and grit rather than grades

- holding students to account for producing their own work. If work is not completed or it is plagiarised, there is a direct consequence

- educating parents that supporting their children through failure builds resilience and will prepare them well for success in the future.

Mindfulness

Mindfulness is increasingly becoming recognised as an effective approach that supports social and emotional learning and the development of resilience and emotional intelligence. Kabat-Zinn (1994) describes mindfulness as 'paying attention, in a particular way, on purpose, in the present moment, and non-judgmentally'.

Mindfulness practices are aimed at helping people to accept and respond skilfully to events as they happen. Adolescents who are mindful, either through temperament or training, tend to experience greater wellbeing, and mindfulness correlates positively with positive emotion, popularity and friendship extensiveness, and negatively with negative emotion and anxiety (Miners, 2008, cited in Weare, 2013).

While scientific evidence is currently limited, a number of well-conducted studies have produced promising results (see Weare, 2013). One significant project currently in progress is the MYRIAD (2015) mindfulness and resilience in adolescence study.

References

Bayne, R. (1995). *The Myers-Briggs Type Indicator: A Critical Review and Practical Guide*. Cheltenham, UK.

Blakemore, S-J. (2014). *The Teenager's sense of social self*. [online] Edge.org. Available at: **www.edge.org/conversation/sarah_jayne_blakemore** [Accessed March 2017].

Cain, S. (2013). *Quiet: The Power of Introverts in a World That Can't Stop Talking*. New York: Random House.

Casey, B. J., Jones, R. M. & Hare, T. A. (2008). *The Adolescent Brain*. [online] US National Library of Medicine. Available at: **www.ncbi.nlm.nih.gov/pmc/articles/PMC2475802**

Dodge, R., Daly, A., Huyton, J. & Sanders, L. (2012). The challenge of defining wellbeing. *International Journal of Wellbeing*, 2(3), pp.222–235. doi:10.5502/ijw.v2i3.4. Available at: **www.internationaljournalofwellbeing.org/index.php/ijow/article/download/89/238**

Dunbar, R. (1997). *Grooming Gossip and the Evolution of Language*. London: Faber and Faber.

Freitas, D. (2017). *The Happiness Effect – How Social Media is Driving a Generation to Appear Perfect at Any Cost*. Oxford, UK: Oxford University Press.

Gazzaley, A. & Rosen, L. R. (2016). *The Distracted Mind: Ancient Brains in a High-Tech World*. Boston, MA: The MIT Press.

Kabat-Zinn, J. (1994). *Wherever You Go, There You Are: Mindfulness Meditation in Everyday Life*. London: Piatkus.

Kardaris, N. (2017). *Glow Kids: How Screen Addiction Is Hijacking Our Kids – And How to Break the Trance*. New York: St Martin's Press.

Lahey, J. (2013). *Why Parents Need to Let Their Children Fail*. [online] The Atlantic. Available at: **www.theatlantic.com/national/archive/2013/01/why-parents-need-to-let-their-children-fail/272603** [Accessed January 2017].

Levitin, D. J. (2014). *The Organized Mind: Thinking Straight in the Age of Information Overload*. London: Penguin.

MYRIAD, (2015). *What is MYRIAD?* [online] Available at: **http://myriadproject.org/what-is-myriad** [Accessed January 2016].

Morgan, N. (2007). *Blame My Brain – The Amazing Teenage Brain Revealed*. London: Walker Books.

Mullainathan, S. & Shafir, E. (2014). *Scarcity: The True Cost of Not Having Enough*. London: Penguin.

Romeo, R. (2013). *The Teenage Brain: The Stress Response and the Adolescent Brain*. [online] US National Library of Medicine. Available at: **www.ncbi.nlm.nih.gov/pmc/articles/PMC4274618** [Accessed January 2017].

Seligman, M. (2011). *Flourish: A New Understanding of Happiness and Well-Being – and how to Achieve Them*. London: Nicholas Brealey Publishing.

Stone, L. (2017). *Continuous Partial Attention*. [online] Available at: **https://lindastone.net/qa/continuous-partial-attention**

Suler, J. (2004). The online disinhibition effect. *Cyberpsychology & Behavior*, 7(3), pp.321–326. See also: **www.learning-theories.com/online-disinhibition-effect-suler.html**

The Reading Agency, (2015). *Reading for pleasure builds empathy and improves wellbeing, research from The Reading Agency finds*. Available at: **https://readingagency.org.uk/news/media/reading-for-pleasure-builds-empathy-and-improves-wellbeing-research-from-the-reading-agency-finds.html**

Weare, K. (2013). Developing mindfulness with children and young people: a review of the evidence and policy context. *Journal of Children's Services*, [online] 8(2), pp.141–153.

Available at: **https://mindfulnessinschools.org/wp-content/uploads/2013/09/Children-and-mindfulness-journal-of-childrens-services-weare.pdf**

Wiseman, R. (2015). *Night School: The Life-Changing Science of Sleep*. London: Spin Solutions Limited.

Other useful books

Aiken, M. (2016). *The Cyber Effect: A Pioneering Cyberpsychologist Explains How Human Behaviour Changes Online*. London: John Murray.

Alter, A. (2017). *Irresistible: Why We Can't Stop Checking, Scrolling, Clicking and Watching*. London: Bodley Head.

Blakemore, S. J. & Frith, U. (2005). *The Learning Brain*. Oxford: Blackwell.

Carey, B. (2014). *How We Learn: The Surprising Truth About When, Where, and Why It Happens*. New York: Random House Trade.

Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience*. New York, NY: Harper and Row.

Layard, R. & Clark, D. M. (2014). *Thrive: The Power of Psychological Therapy*. London: Penguin.

Mischel, W. (2014). *The Marshmallow Test: Understanding Self-control and How to Master It*. London: Corgi Books.

Morgan, N. (2005). *Blame My Brain: The Amazing Teenage Brain Revealed*. London: Walker Books Ltd.

Morgan, N. (2014). *The Teenage Guide to Stress*. London: Walker Books Ltd.

Morgan, N. (2017). *The Teenage Guide to Friends*. London: Walker Books Ltd.

Other useful resources

Nicola Morgan. Extensive, excellent resources including many free downloadable materials. There are also perpetual licences for classroom resources suitable for schools worldwide, such as Stress Well for Schools, Brain Sticks and Exam Attack.
www.nicolamorgan.com

See also her presentation slides at the Cambridge Schools Conference, Kuala Lumpur, 2016:
www.cambridgeinternational.org/images/346721-teaching-brains-in-your-classroom.pdf

Positive Psychology Center, University of Pennsylvania (M. Seligman)
http://ppc.sas.upenn.edu/learn-more/readings-and-videos

YoungMinds is the UK's leading charity committed to improving the emotional wellbeing and mental health of children and young people. There are resources and publications available on the website, including on building resilience.
www.youngminds.org.uk

Parents and teachers working together to foster children's learning
A research digest from the Queensland College of Teachers, Australia. Provides interesting insights that are widely applicable. (Number 10, November 2014).
www.qct.edu.au/Publications/Periodical/QCTResearchDigest2014-10.pdf

Chapter 6: Responsibility and engagement through community awareness, service and student leadership

> 66 As our society has become information rich, it has become action poor… As affluence has increased, the young person's environment has become impoverished for responsible and productive action, or any action that tests and develops them… There is more in us than we know if we could be made to see it; perhaps, for the rest of our lives we will be unwilling to settle for less. 99
>
> **Kurt-Hahn**, 1886-1974

Overview

This chapter considers ways that schools can broaden students' educational experiences through activities designed to nurture confidence, responsibility, compassion, wisdom, innovation and collaboration. It builds on some of the ideas considered in Chapter 5 on wellbeing and in Chapter 2 on the co-curricular programme.

Challenge education

Kurt Hahn was an influential educational thinker who inspired the development of the Round Square conference of schools, the United World Colleges, the Duke of Edinburgh's International Youth Award and the Outward Bound movement. Hahn believed that appropriate challenges beyond the classroom provided unique experiences for the development of character and compassion. Those challenges included community service, outdoor pursuits and craftsmanship. It is interesting to reflect on what Hahn would have thought of the modern global information age – the quote at the start of the chapter is from the 1960s, and even then he was expressing concern for student inactivity due to an abundance of information.

Most education in schools focuses on developing academic competencies. If the only learning contexts that students experience are classrooms, formal teaching, books and

the internet then students' development of all-round practical competencies will be constrained. Challenge education supports cognitive and affective development by challenging students to use critical thinking and problem-solving skills in contexts with which they are not particularly familiar, often working in teams, with powerful emotional engagement.

Challenge education, therefore, is an excellent way of supporting the development of collaboration and leadership. In completing a service learning activity or an expedition (or many other co-curricular activities such as team sport or playing in an orchestra) success is dependent on the whole group performing well. This often requires students to act as leaders, demonstrate resilience and practise their social skills.

Vygotsky's zone of proximal development, considered in Chapter 1, is primarily used for pitching academic tasks at precisely the right level of difficulty. The same concept can be applied to challenge education. Activities that fall comfortably within a student's current capabilities will not develop new competencies. Equally, schools have a responsibility to ensure that students can grow and learn through the experience and do not feel overwhelmed by expectations or situations that are too demanding.

The extent to which a school will wish to engage with these ideas depends on its vision and educational aims. It is perfectly reasonable for a school to have the sole aim of developing academic competences. That said there is much that can be achieved by small changes in orientation and practice. Challenge education does not have to involve expeditions to the great outdoors. Community awareness and service should prioritise local environments and much can be achieved through encouraging student participation in activities offered in the local community so that the school does not have to organise everything itself.

Responsibility involves cultivating wisdom

A responsible, wise person reasons on the basis of secure emotional states and their actions are based on positive personal values. In the learner attribute of responsible, the idea of wisdom is implicit. Wise people need to be knowledgeable, creative and intelligent, but they have the capacity to apply these responsibly based on positive

values, towards the common good. They make good choices, both for themselves and those around them. As Sternberg (2009, pp. 20–21) points out:

'Wisdom is not just about maximising one's own or someone else's self-interest, but about balancing various self-interests (intrapersonal) with the interests of others (interpersonal) and of other aspects of the context in which one lives (extrapersonal), such as one's city or country or environment.'

Being knowledgeable is usually associated with academic understanding. Being wise goes beyond this to include notions of living well, making good decisions, being compassionate and caring about the community and others. The first place to start nurturing wisdom and responsibility is in the school, with the creation of a supporting learning environment and clear codes of behaviour. As always, the most important influence on students are teachers and school staff as role models. Schools must have a well-articulated and clearly understood value system across the entire community that forms the basis upon which the school functions and informs relationships both within and beyond the school.

In some cases schools market values and educational principles without sufficient attention to their implementation. Schools must attempt to put their values into action by clearly saying what they mean and meaning what they say. Beyond this it is possible to organise and create a co-curriculum that nurtures powerful learning experiences, the focus of this chapter.

Community service: service learning

The term service learning is sometimes used to describe experiential learning that occurs through meaningful, useful, structured and reflective community service. Some writers distinguish *service learning from community service*, emphasising the broad learning dimensions implied in the former including personal, social and cognitive development.

Good service learning programmes emphasise personal and community awareness as well as service. Students need to learn to understand how actions are based on personal values and to reflect on and question their own values. If learners are to grow as individuals, it is essential that they engage with their own values and do not see service as a requirement or chore. They need to spend time and effort understanding the

purpose of service learning, developing a more sophisticated understanding of the individual as part of the community, developing a sense of responsibility, for themselves and others, and an appreciation of the value and rewards of giving.

At the heart of all good service learning, therefore, is reflection. Students need to think critically and creatively, individually and in groups, about service learning expectations and experiences. The intention is to equally benefit the provider and the recipient of the service. It is important for students to understand that people from different backgrounds, in particular those less privileged, will have something to teach them.

Well-planned and managed service learning and community service programmes have a number of benefits to the community and the individual. These include:

- Developing a sense of wellbeing from helping others.

- Physical and mental health benefits, particularly in older volunteers (see CNCS, 2007), but starting young will help encourage students to see this as a life-long activity. Interestingly some research seems to suggest that the motivation for doing service is a critical factor in determining the health benefits to the giver. If the motivation is altruism the benefits are stronger than if it is obligation or duty.

- Engaging students with the community increases social awareness, self-awareness and a sense of responsibility.

- Developing communication, collaboration, leadership and other intra and inter-personal skills.

- Understanding social issues relevant to their communities and developing a greater understanding of and appreciation for diversity

- Enhancing students' applications to higher education and the workplace.

Service learning should be celebrated. The form this celebration takes needs careful thought and can vary depending on the age of students. Recognising student accomplishments through badges or awards can be a good motivator, but only if the student values their participation intrinsically rather than seeing it as an obligation that is imposed on them. Schools can celebrate service learning, and other valued co-curricular learning activities, by making them a regular part of school communications and discussion. Students who do creative and valuable things need to be appreciated,

not just those who are high academic achievers. The culture of the school needs to evidence regular, sincere and widespread dialogue around service learning. The important role teachers play in modelling this through their behaviour and actions cannot be overstated.

Service learning ideally should be linked to a student's passions, personal goals and ambitions. There are plenty of opportunities for those with particular skills to apply them to service learning. IT skills can be used to develop helpful IT products or to train others. Students with aptitudes in disciplines like languages and mathematics can tutor others. Performing artists can provide entertainment and have their art inspired from activities in the community. Student leadership and entrepreneurial experience can be nurtured.

'Under the sea' mural created by students at the British School in Colombo, Sri Lanka (*case study 11*)

Case study 11:

Using art to make a difference at theBritish School in Colombo, Sri Lanka

This case study focuses on Year 6 students at the British School in Colombo and their community service project. The project was multi-phased: children painted art murals and provided donations to the Lady Ridgeway Hospital for Children, a government-funded children's hospital in central Colombo. The Lady Ridgeway Hospital is one of the largest public hospitals in Sri Lanka, and the project focused on the ward in which children receive occupational therapy.

While the main objective was to assist the hospital, children were able to develop and strengthen all five Cambridge learner attributes by gaining a deeper understanding and awareness of the needs of their community, including the experiences of those from varied socio-economic backgrounds.

Why this project?
The project was chosen as it involved children and would benefit the Year 6 students personally, as well as providing outreach to an important service in the British School's direct community. Year 6 students were chosen to participate in the project, being the most senior grade in the Junior School, and it would provide a foundation for the many community service projects and societies they are exposed to in the Senior School. The ward required a 'new look' to make it more welcoming to the young patients. It was decided that the Year 6 students would paint a variety of murals depicting child-friendly themes such as 'Under the sea' and 'A drive through the countryside'. Rather than just collecting and donating money to the hospital, it was a unique opportunity for the students to engage in a hands-on project that directly benefited the community. It was also a way for them to interact and experience a new environment but put into practice the Cambridge attributes they have been developing daily at school.

Case study 11: continued

Attributes developed

Due to the multi-faceted and extensive nature of the project, all five Cambridge attributes were built upon and strengthened over the year. When the project was first introduced to the Year 6 students, they were immediately challenged with producing ideas for fundraising money for the paint and other necessary equipment. From the outset, student responsibility was demonstrated as they had to work independently or in small groups to devise their proposals for fundraising. The first fundraising event the students held was a bake sale in which they independently designed advertising posters, and then brought and sold food to their peers with minimal parent and teacher guidance. The bake sale increased community awareness of the project and gave all Year 6 students the opportunity to speak to their peers, teachers and parents about their assignment. After raising a significant sum of money, students then responded positively by volunteering in large numbers to visit the hospital and assist in the painting.

In the next stage of the project during the hospital visits, children had to organise themselves to be ready to leave school at the end of the school day. Once inside the hospital, children demonstrated responsibility by organising the paint, moving furniture, following instruction and painting the walls carefully. In order for the project to run smoothly, students put themselves into groups, developing leadership skills such as teamwork, independence, focus and decision-making. Students were also given the opportunity to reflect, not only on the task and the benefit to the wider community, but also the skills required for undertaking painting on a foreign surface in a new, unfamiliar setting. Self-awareness and monitoring was also developed, as children had to conduct themselves maturely and not disrupt the running of the hospital.

Year 6 students: Using art to make a difference

Case study 11: continued

Student perspectives

The Lady Ridgeway project benefited student growth and development. It was a rewarding experience in which children gained satisfaction and a greater awareness of the society in which they live.

Eugene, a student who was new to the school, began fundraising by selling cake and stationery in her apartment building with the help of her family and friends. She said: 'When I was in the Lady Ridgeway Hospital, I didn't just feel the joy of painting but the happiness of helping a hospital for children. It was my first project – volunteering and helping out the hospital is one of my biggest achievements in Sri Lanka. I will never forget the experience.'

Adithi, another student who worked on the project throughout the year, said: 'I felt as though I was making an impact. To be able to paint the walls with bright, uplifting pictures and to then see the children who were there to receive therapy in the ward look curiously and happily at the improved ward was one of the most memorable and beautiful feelings. The Lady Ridgeway project was one of the best things that happened in Year 6 and the amount of work we had done made me feel proud.'

The partnership between the Lady Ridgeway Hospital and the British School in Colombo is ongoing, with current Year 6 children also contributing to the project. Students receive an enriched, broader learning experience by having the opportunity to participate in the project. By allowing students to independently fundraise and participate, with little teacher guidance, they were able to strengthen and further develop their Cambridge learner attributes.

Community awareness and service in the school

Community awareness and service must start in the school. Schools are made up of a number of communities ranging in scale from classrooms, year groups, houses or sections and school divisions to the whole school community including parents and the local community. Creating a positive learning culture, which we considered in earlier chapters, involves developing a sense of responsibility and engagement in these communities. People need to be able to relate to actions, to understand its immediate impact in relation to their own and the school's values.

Excellent service learning programmes within schools:

- Involve students in the creation and implementation of codes of behavioural expectations and codes of conduct. These are better if they accentuate the positive rather than focus on negative behaviours. The learner attributes could form the heart of a school's code by exploring how students should display confidence, responsibility, reflection, innovation and engagement. It is much more powerful for students to be expected to work on these rather than just provide pre-digested solutions and expect compliance.

- Encourage teachers to find opportunities to bring aspects of service learning and personal reflection into the subject areas they teach and other aspects of school life.

- Use qualitative forms of self-evaluation and reporting to complement traditional summative performance measures such as grades.

- Provide opportunities for student service in the school. Some of the best service projects are school based and include peer-tutoring, students being trained then acting as mediators when other students have disagreements, students working occasionally as classroom assistants for younger children, and helping staff in support roles such as maintaining the school grounds and environment.

- Involve classroom activities linking with service opportunities within or beyond the school. Examples include evaluating a local need and designing a product (physical, IT based or creative/artistic) that meets a local need.

- Provide opportunities to bring all members of the school community together and explore partnerships with parents and alumni.

- Involve students in school government through organisations such as a student council.

The characteristics of excellent outreach community service programmes

Being part of a wider community, schools can offer students learning opportunities that benefit the community, as well as students, in familiar, accessible settings. The fact that students are required to interact with people they may not know in the local community might take them outside their comfort zone, allow them to see things from a different perspective and provide more challenge than activities organised by the school. It can help students to develop sensitivity and compassion for others as they learn their personal stories and understand their circumstances.

As schools will have resources including classrooms and IT, they can offer opportunities for outreach programmes by bringing the local community into the school, as well as opportunities for students to go into the local community.

The concept of service learning can be broadened to include work placement activities where students experience and contribute to real work settings. This can help them explore future work options.

Excellent outreach community service programmes:

- Offer relevant and meaningful service in the community. Schools and partners must see that the service provided by students meets the immediate needs of those they serve or the goals of the organisation.

- Give students challenging, real service that engages them actively rather than as observers so that they feel that they are making a positive contribution and receive necessary support and appreciation from supervisors.

- Allocate enough time to have a developmental impact.

- Can involve students in developing products (for example, physical, electronic, artistic) in the school, which are then used in the community.

- Require students to apply what they have learnt in class to real-world situations and what they learn in service to activities in school. Examples might include learning from older people about their experiences, or understanding the chemistry and biology of substance abuse.

Examples of community service programmes

There are numerous opportunities for community service; a few are outlined in Table 15. Service is normally best organised over a sustained period of time. Some schools timetable a fixed amount of time for community service and other co-curricular activities, for example one afternoon a week. Other schools expect this to be completed after school hours.

Service can also be organised as an activity over a fixed short period of time. Some schools suspend the regular schedule for a period, requiring students to complete a programme. This can work well for some activities such as work placement or project-based learning that might be scheduled at appropriate times of the year that disrupt the schedule the least (for example, after examinations have finished or before the regular school year starts).

Some schools offer international service learning opportunities. A few organise service learning opportunities during school holidays or gap years after a student has graduated, before they attend university.

Table 15: Some examples of service learning and community service activities

Activity	Examples
Innovative: overcoming barriers	• Researching then designing and/or developing solutions, products or services, for example for those with disabilities, improving environmental sustainability, renewable energy • Building simple databases or IT solutions, apps that serve a community function • Raising community awareness of health/environmental issues through research and communication/presentation of findings
Creative and performance	• Student choir, drama, artistic activities in the local community • The local community is brought into the school where artistic activities such as singing, drama and art are organised • Students organise local community participation in artistic activities
Instructional	• Students lead training in IT skills for the local community, in particular older citizens who may lack basic skills, using the school IT facilities and classrooms • Students tutor other students or community groups in languages, mathematics or other subjects • Students participate as classroom assistants or assistant sports instructors
Active service	• Assisting in care homes, hospitals, schools for special needs • Assisting in an animal welfare centre
Environmental	• Environmental club in the school monitors wastage, organises recycling and suggests better environmental practices • Students are involved in local conservation work
Leadership/management	• School council, classroom representative, prefect
Work related	• Work secondments • Research projects with relevance to the workplace completed and communicated
Working through external agencies	• Organisations such as Oxfam and Habitat for Humanity (see Case study 16) can provide service opportunities
Related student-led co-curricular activities	• Model United Nations • Amnesty International

Case study 12:

Community service: Successful and sustainable projects at the British International School, Ho Chi Minh City, Vietnam

The British International School (BIS) has 2145 students representing 51 nationalities across three campuses in Ho Chi Minh City (HCMC). BIS started to develop community service projects around eight years ago and since then, the number of projects and activities has increased dramatically. This case study illustrates the important considerations when trying to make a community partnership sustainable and successful, with particular reference to involving the whole school community.

Community service at the BIS, HCMC

Community service is an integral part of life here. We have a dedicated, full-time community department which organises community projects, clubs and events across our three campuses. At BIS, HCMC, students continue to develop their skills and understanding throughout their time here. From the early years stage and all the way to the sixth form, each year group has a specific community project that teachers will endeavour to embed into the curriculum. In addition to this, a plethora of optional clubs and school events take place all year round. The community projects are not designed to just raise money; the goal is to develop students' sense of social responsibility towards other people and the environment. They learn that they can have the biggest impact on our community projects by spending their most precious resources: time and energy.

The main aim of the community projects is to create opportunities for students to develop the learner attributes outlined in our aide memoire. Similar to the Cambridge learner attributes, BIS has identified six traits: integrity, care, respect, reflection, enquiry and perseverance. We have a commitment to the holistic development of every child and we feel that the projects play a key role in nurturing global citizens ready to take on the challenges of the modern world in a considerate and caring manner.

Thien Phuoc Foster Home for Disabled Children

One of our longest running projects is with Thien Phuoc Foster Home for Disabled Children. We first became aware of Thien Phuoc in 2007, when a teacher at BIS was looking for an organisation to support. Thien Phuoc is a residential centre that provides healthcare, rehabilitation and education for children with epilepsy, cerebral palsy and Down's syndrome.

Projects with Thien Phuoc were initiated as a way for students to increase their understanding of disabilities, as well as teaching them to not shy away from people who are different. As the relationship between BIS, HCMC and Thien Phuoc grew, we found areas where students, teachers and our parent teacher group (PTG) could become more involved with sustainable, meaningful projects.

Year 12 student at Helping Hands with Thien Phuoc club (2016)

Case study 12: continued

We now have a cross-campus programme involving both primary and secondary students who spend their time with the children at Thien Phuoc, as well as long-term financial support that comes from our PTG.

Support of the whole school community

It can take years for partnerships like Thien Phuoc to become fully effective – this is why BIS created a programme that has a commitment to long-term partnerships with the community on a global, but mostly local, scale. The key to having a sustainable community project is ensuring the commitment from the whole school community – students, teachers, staff, parents and the community partner themselves.

PTG with children from Mai Tam House of Hope (2014)

Parents

BIS parents have shown a keen interest in supporting our partners financially by holding fundraising events throughout the year. This allows us to delegate this important aspect of the project to the PTG and focus on providing the students with a more profound learning experience.

Teachers/staff

Teachers always take on an essential role in the realisation of new projects and their enthusiasm and commitment are essential to its success. At BIS, teachers are encouraged to not just supervise the activities, but to facilitate them. At the beginning of each academic year, community INSET afternoons are organised to give staff first-hand experience of working with our community partners. Some staff travel off-site to visit a local partner, while the remaining staff plan and host activities for partners who visit us. These visits can highlight the difficulties of community service in international schools, such as language barriers and cultural differences. By overcoming these barriers, teachers gain a new perspective and are better prepared to support their students who will face similar challenges. Not only does the INSET set the foundation for their current community year group projects, it can also inspire teachers to run new community clubs or events at school.

Students

Students are the pioneers of a good community project. Community Clubs are a great way for students to dedicate more of their time to a community initiative that they are interested in. Enthusiastic students are encouraged to start their own student-led clubs. The carefully designed progression of year group projects that the children experience as they move through the school provide them with the platform to develop and organise their own community service activities.

Case study 12: continued

Preparation and reflection

Students are given time ahead of projects to develop their understanding of a partner, and to consider any issues or feelings they may have relating to the project. This is particularly crucial when students are exposed to new situations which may be daunting to them, such as meeting other local children with disabilities. Time is also allocated during and after a project for students to reflect not only on its success, but also their involvement in the activities and their personal growth. Reflection can be seen in the form of a written piece or a whole-class/peer-to-peer discussion. In our Year 8 project, the students gave a reflective presentation during assembly, which in turn supported their peers with their own preparation.

Summary

Setting up an activity with a local organisation and children in our school is relatively straightforward. We have ample facilities to host exciting events and a fleet of buses to transport students and staff to and from different locations. Creating a series of community projects that are meaningful to all parties is a much more complicated affair. At BIS, HCMC, we are developing a strong tradition of building relationships with our partners that benefit them in a sustainable manner. Our PTG is instrumental in planning and funding initiatives that use the amazing wealth of expertise and enthusiasm present in our parent community. Teachers understand the progression of skills that the children acquire during these projects and buy into the vision set out in our mission statement. They are led by a senior leadership team who prioritise resources and staff allocation in support of the community projects. Most importantly of all, the children who attend this school gain experiences that take them out of their comfort zones and challenge them to engage with the world purposefully, compassionately and effectively.

Case study 13:

Developing global competence – Christel House Art Project at The Perse School, Cambridge, UK

The Perse School has developed a meaningful and growing relationship with Christel House Charity schools. Christel House transforms the lives of impoverished children around the world to break the cycle of poverty. Through a combination of fortnightly enrichment programme sessions and a weekly extra-curricular lunchtime club, we have developed a variety of student cross-cultural art projects between our schools which also function as fund-raising activities.

Case study 13: continued

The initial project was a sketchbook exchange that was completed by our community art enrichment students in conjunction with students from Christel House School India and Christel House School South Africa. The 10 pupils taking part in each school, ranging from Year 11 to upper sixth, were given a sketchbook in which they worked on one of four themes: identity, family, school and recreation. The pupils were paired up with one student from each of the other two schools and worked in response to their partner's work. Once each theme was completed, the sketchbooks were posted to the next school in rotation. The exchange worked as a visual stimulus, and pupils from all three schools benefited from being inspired by their partner school's artwork, as well as developing an understanding of the cultural similarities and differences. The final work was compiled into a photo-book with copies sent to each participating school.

In Christel House Club, pupils have created a range of literacy resources, children's books and illustrated alphabets for the kindergarten pupils at Christel House School Bangalore. Pupils were encouraged to write their own children's story, illustrate it and manage their own team of illustrators. In an effort to promote the charity, pupils have run a stand at our Christmas fair to raise money by selling items from those made both in India and at the Perse. Pupils have led an assembly, produced a film, auctioned their artwork and are now currently developing a Christel House Newsletter to aid fundraising. They each have particular roles, for example, editor, photographer, proofreader. Students have interviewed Perse staff who have contributed to raising money for Christel House and some Christel House employees.

From the connection with Christel House School and the artwork they have produced together, pupils have learnt a variety of skills, time management, team building, independent thinking and problem solving – all within the context of helping others less fortunate than themselves.

Case study 13: continued

Community awareness and service – enrichment programme

Year 11 and sixth form students spend one afternoon a fortnight doing enrichment activities as part of their core curriculum. The aim is to provide something different from the experience of normal classroom lessons, enabling students to have opportunities for leadership, develop new interests, learn new life skills and challenge themselves.

Year 11 and lower sixth enrichment focuses on co-curriculum and 'self-enrichment', with practical courses and activities, academic non-examined courses, and also some non-examined subjects which pupils would not otherwise have time to do. Options include first aid, history of art, journalism, photography, TEFL and young entrepreneurs.

Upper sixth students all undertake community service, with almost all working with older people or with primary school pupils through our primary schools partnership.

We believe that we have the responsibility to play a full part in the life of the local community, and that such active participation is of equal benefit to us and to our partners. Through these links our pupils learn the importance of selfless service, develop a sense of social responsibility and acquire interpersonal skills.

Two groups work with older people. One group runs a six-week 'Digitstart' course for older people wanting to learn how to use the latest technology, from Skype to online shopping. Another works with Dementia Compass to run a choir for dementia sufferers and their carers.

Each fortnight Perse staff and students can be found working with teachers and pupils in one of 17 local primary schools with which we have a partnership. Each primary school specifies the kind of support they would like – from one-to-one maths sessions to stretch their brightest young mathematicians, and coding workshops, to helping children for whom English is a second language, teaching French or running a Latin club.

We also run a mentoring programme with two local primary schools, the Fitzwilliam Museum and the Museum of Archaeology and Anthropology. The aim of the eight-week course is to raise primary pupils' aspirations, develop skills and enhance their confidence. Created with an art history education organisation called The Bigger Picture, the programme uses history and art history to spark pupils' curiosity, with sessions also hosted by King's College and Gonville and Caius College. Working closely with education officers at the museums, Perse students run fun workshops with the Year 5 and 6 pupils, using masterpieces such as Michelangelo's Laocoon to encourage pupils to think and speak analytically. The year's sessions culminate in the primary school pupils producing a presentation and delivering it to their peers in an assembly at their school, alongside their Perse student mentors.

Student leadership

The School Council at the Perse provides a forum for all students to improve their school. It in turn is run by the Senior Council (Years 11–13), who organise half-termly meetings where each form can feed back via their form representatives. The senior members then liaise with relevant members of staff to communicate issues and ideas and request changes where appropriate. Pivotal to the success of the structure is that it is seen to achieve meaningful results – the simplest ideas are often the best and these can be implemented quickly and fed back to students via assemblies and tutorials. Senior Council Leader Emily Deane (upper sixth) explains more in the video below.

Watch the video at
https://vimeo.com/228212787

Student leadership and responsibility

Leadership is a process, not a position of authority. It has a moral purpose based on a deep sense of respect and responsibility for oneself and others. Unlike much of what students are required to do in terms of academic learning, leadership affects other people and is inherently collaborative in nature. Involvement in leadership activities can improve students' own learning as well as helping them to develop the broader competencies needed for success beyond the classroom.

Student leadership:

- starts with 'knowing yourself' and developing self-confidence, empathy, communication skills, resilience and resourcefulness

- is about virtue: making a positive difference

- requires emotional thought and engagement, intra- and inter-personal competencies as much as cognitive skills

- as a process (rather than a position of responsibility), should involve every member of the community being encouraged to lead at appropriate times through reflective leadership actions based on situational understanding

- should see those who have positions of responsibility focusing on getting the best out of the team by encouraging others to lead at appropriate times

- should be shared and distributed with collective responsibility and accountability

- should respect and encourage quiet leadership – often the most effective leaders get things done without acknowledgement or recognition

- should respect the culture and context of the school – different cultures have important protocols and conventions that need to be understood and respected

- involves students in meaningful school development activities so that they are involved in helping to get the best out of the system.

Case study 14:

Cambridge learner attributes develop confident and responsible leaders at The Heritage School, Cyprus

By Year 12 student Eleni Socratous

What does student leadership mean? Some may think it is merely a concept, an idea, yet it is so much more. Being a leader means having confidence in yourself. It means learning how to apply your skills and help others work together in a way that produces the desirable outcome for the team. Cambridge learner attributes encourage intellectual curiosity, perceptiveness and self-reflection, assisting students to nurture their inner leader. My Cambridge IGCSEs provided the foundation and cultivated the necessary skills for me to develop my leadership. From personal experience I can say with certainty that The Heritage Private School instils the Cambridge learner attributes through its academic and extra-curricular activities, thus helping all of us in our school community of many different nationalities and backgrounds become well-rounded international citizens, and excellently prepared for the many opportunities that the future holds.

All the activities in which I have participated have helped to shape me as an individual, but have also created memories that I will forever cherish, and given me friends I will never forget. Having the opportunity through our school to be a part of the Cyprus Youth Parliament was perhaps one of the most enriching experiences I have ever had. This two-year service deepened my knowledge of my country's problems and the laws affecting children, and as a result I felt empowered to help those children whose voice could not be heard. Similarly, through taking part in the Model United Nations sessions in both Nicosia and The Hague, my awareness broadened from local to global issues. These events gave me the confidence to state my opinions in public, forming speeches and resolutions. Being naturally shy, giving speeches has never been my forte, but through my Cambridge IGCSEs and now Cambridge International A Level

Case study 14: continued

subjects, I developed the skills necessary to succeed in these activities. Especially through English, History and Business Studies, I enhanced my critical reading, analysis and evaluation capabilities, which not only trained me to debate effectively, but will doubtless be useful in other real-life situations.

Being a prefect absolutely requires leadership skills, and our school therefore arranges a leadership development and team building prefect training camp at the beginning of each academic year. This familiarises us with each other through team-building activities, and also helps us to realise and acknowledge the importance of our position. Being a prefect requires a great deal of team work as we are responsible for organising many school events. Organising events with my fellow prefects has been one of the most wonderful experiences during this school

year. It is stressful, especially when you are head of that event: the whole school depends on you planning the event properly for it to be successful. It is time-consuming because you also need to focus on your Cambridge International A Levels. However, it is also very beneficial, in the sense that it helps you manage your time effectively; it encourages you to practise the skills you have learned, and to balance your school work and extra-curricular activities. At the same time, though, especially if you are the head of the event, you have to remember that being a leader does not only mean being in charge, it also means becoming one with your team, inspiring them and working with them to ensure that the team performs efficiently and effectively.

Additionally, through physical extra-curricular activities, The Heritage Private School captures the importance of teamwork in a broader environment. Through being a hike leader as well as taking part in The Duke of Edinburgh's International Award (DofE), I learned not just how to use a compass, but suddenly that I was responsible for 10 other students. Taking part in the DofE Award, you have to learn

Case study 14: continued

how to cooperate with others. Such activities help you to not only develop your leadership but also teach you how to communicate, collaborate and negotiate in new situations.

Cambridge learner attributes are also engaged through the Junior Achievement Programme, which focuses on organisational and innovation skills. You not only have to devise and develop a product that is original and creative enough to be saleable, but you also have to learn the basic procedures of running a business. Being the finance manager of our candle company, Wicked Wonders, helped me immensely in acquiring an insider's view of how a business functions, and in particular the work of an accountant. I discovered how difficult the job of an accountant can be, which gave me a new respect for this role. The Junior Achievement Programme was another remarkable experience, and I was very thankful for this unique opportunity. It enabled me to apply the theory from my Business Studies syllabus by participating in a real scenario. It also gave all of us a better insight into future careers that we might be interested in pursuing.

Overall, I am very pleased that through the ethos, curriculum and wider activities offered by my school, and based on the Cambridge learner attributes, I have not only improved my leadership skills but have grown and matured more as a person. I believe this is of central importance, because an individual who has access to support and guidance in developing independence will be better equipped to set goals and know how to achieve them. In essence, the Cambridge syllabuses and the Cambridge learner attributes activate all of the attributes necessary to make the best future global leaders.

Case study 15:

Encouraging student leadership, innovative learning and community awareness at First Steps School, Pakistan

First Steps School of Arts and Sciences is a small private school in Faisalabad, Pakistan. The focus of the case study is children aged 13–14 in the 8th and 9th Grades because they are the most senior students and have assumed leadership positions in the school.

Initially, it is important to organise a structure. First Steps initiated a student council, with the purpose of asking students to assume responsibility for some administrative tasks. The students were divided into four houses, and each was assigned a house captain (captains were shortlisted based on an interview with the principal, after which an election was conducted in school where students voted).

These captains are responsible for marking attendance, guiding the younger children in extra-curricular activities such as sports day, and in helping to monitor children during break time. This student government has proved to be very successful, with the children automatically assuming a new level of maturity and leadership. They are diligent in their duties and take pride in the role that has been assigned to them. This has led to a marked improvement in their academic performance as well, due to the increase in confidence and because their ability to keep their leadership position depends on maintaining their grades. These leadership positions are not limited to students with exceptional academic ability. There are roles assigned to those who excel in sports for example, such as sports captain. By assigning this role to those who are known for their athletic ability, we aim to instil in them confidence and pride, which will translate to their academic work as well.

Morning assemblies are a great tool for fostering a sense of unity among students. Each week, a different class is responsible for the morning assembly, in

Case study 15: continued

which they can perform a play, read a dialogue or have a discussion about important events taking place around the world. The aim is to help the students to make connections with people around the world, and to foster awareness about global phenomena. By exposing our younger students to information like this on a daily basis, we set the foundation for the Cambridge Global Perspectives course, which is mandatory for our Grade 9 students. These assemblies can be instituted in a school of any size, and it is most important that the teachers take part. For example, on Earth Day, which is new and unfamiliar in Pakistan, a teacher prepares a presentation about the topic and helps to educate the students on how it is celebrated around the world.

Morning assemblies are also a great forum to raise community awareness. A large part of the mission statement at First Steps is to educate students on becoming better citizens and to assume a role in the betterment of their community. We held a fundraising drive for the Shaukat Khanum Cancer Hospital in Lahore, and the morning assembly was used to encourage students to participate and to give them a running total of the amount we had raised. This drive was extremely successful, and ended with First Steps raising the second highest amount in the whole country for the hospital. Another activity we have implemented is the '100th day of school' celebration. Every year, to commemorate the 100th day of school, we ask students to bring in 100 snacks, such as candies or cookies. They are packaged and donated to the children's hospital. These activities help the students reflect upon their role in the community.

As a Cambridge school, it is vital that we introduce innovative learning across the curriculum to make students reflective learners. In English for example, simply reading a poem to the class will offer them a single perspective. The use of videos exposes the students to various renditions of the same poem. This activity has been very successful, as students love watching the readings of the poem, and learn to the see the same text with different perspectives. In the sciences, First Steps

organises a science expo every year, where the entire student body participates by conducting experiments and presenting their projects at a large fair. The projects are studied by judges, and the students have to present their experiment to them. This expo allows them to see practical implementation of scientific theories and increases confidence.

Innovative learning is also challenging, as it forces students to step outside their comfort zone and experience new ideas and techniques. First Steps takes part in numerous competitions, like the national DAWN Spelling Bee and the International Kangaroo Math Competition. These have proven to be great tools in motivating the students to improve their personal results, as well as how they compare to international students. Many of our students have earned top positions in their city and country due to their hard work and the encouragement the school administration offers in preparing them for this competition. Our students also participated in the Oxford Big Read competition, and our students went on to win the regional competition. The Big Read competition happened in three phases, the first of which was to get the students to select books from their reading level and write reviews. The students with the best reviews were shortlisted and trained by the teachers and their reviews were then sent to the competition, where they received accolades. This is an innovative way to encourage reading, develop writing skills and help students reflect on how they can improve their comprehension and understanding of reading material.

By encouraging student leadership, innovative learning and community awareness, First Steps aims to produce reflective learners. These learners have the confidence to evaluate their peers (in peer evaluations conducted in class), and to evaluate their own improvement and growth. By introducing them to the concepts of community service and challenges, we hope to make them responsible for the role they play in school, in the community and in their own personal growth.

Case study 16:

The cultivation of the Confucian leader: Leadership and service in action at Confucius International School, Qingdao, China (CISQD)

Continued from Case study 7 in Chapter 2

A leader's primary purpose is to serve the people. Confucius highlighted the duties of a leader by explaining the proper way to think, act and make decisions in government positions. Most importantly, Confucius taught extensively on virtue and why leaders must be virtuous. Developing leadership potential is a gradual process that requires discipline, education and natural talent.

For the purposes of this case study, we will focus on the Confucian concepts of Li, Jen and Chun-Tzu.

The term Li has several meanings, often translated as propriety, reverence, courtesy, ritual or the ideal standard of conduct. It is what Confucius believed to be the ideal standard of religious, moral and social conduct. The second key concept is the principle of Jen. It is the fundamental virtue of Confucian teaching. Jen is the virtue of goodness and benevolence. It is expressed through recognition of value and concern for others, no matter their rank or class. In the Analects, Confucius summarises the principle of Jen in this statement, often called the silver rule: 'Do not do to others what you would not like them to do to you' (Analects 15:23). Li provides the structure for social interaction. Jen makes it a moral system. The concept is Chun-Tzu, the idea of the true gentleman. It is the man who lives according to the highest ethical standards.

CISQD strives to create an atmosphere that will nurture and empower leadership and active, caring citizens within the student body, rooted in the Confucian principles of Li, Jen and Chun-Tzu. The school has in place a number of systems that facilitate both formal and informal leadership. To be eligible for and to maintain one's position, all leaders must be of good academic and behavioural standing in the school community.

The school prefect

CISQD school prefects have an essential role in the day-to-day running of the school. Although they are perhaps most visible in the school, their other duties, particularly in the boarding house, are also very important. They must be able to command the respect of pupils, including their peers, and to exercise their authority in a responsible manner. School prefects are nominated by the faculty and current prefect body, and subsequently appointed by the headmaster.

Student council executives

The CISQD student council is comprised of student leaders elected by their peers to participate in designated areas of school government. Essentially, the student council serves as the voice of the student body. They participate with the school leadership, student welfare department and marketing department in the planning of school events throughout the academic year, inter-school events and events within the local community. The student council executive brings ideas, requests and feedback to the meetings, and a democratic process is used to give students a voice and make decisions in creating a year-long programme of activities. Students who participate in student councils, under the supervision of a teacher or administrator, learn about the democratic process, civic responsibility, leadership, problem solving and teamwork.

Tutor group representation

Every tutor group in the school is required to elect a tutor group representative. This individual serves as the tutor group representative on the student council, representing the tutor group at the weekly meeting of the student council, bringing the concerns of the tutor group to the full council and disseminating information, feedback and updates from the student council directly to the tutor group. This role

Case study 16: continued

enables even the youngest and newest members of the school community to assume a position of leadership and to begin the realisation of their leadership potential.

CISQD house system

The school is divided into sub-units called 'houses'. Each student is allocated to one house when they enrol. Houses may compete with one another at sports and in other ways, providing a focus for group loyalty, house spirit and a healthy atmosphere of inter-house competition and honour. The pinnacle of the house system is the awarding of the annual house trophy for the house that has secured the greatest number of house points in an academic year. House points may be awarded by all faculty and staff to students for a variety of reasons: exemplary well-mannered behaviour; demonstrating an exceptionally caring attitude towards peers; producing work of an exceptional quality; excellence in academic performance; acts of service to the school community; public performances; representing the school in competitions and events and situations.

Confucian ceremonies at Qu'fu, the birthplace of Confucius

Every year, all lower sixth students participate in a ceremony to honour and pay respect to Confucius in the city of his birth. This ceremony has very strong cultural and spiritual significance and is traditionally led by the founder of CIS, Mr Kong, board members, the headmaster and members of the senior leadership team. It is part of the school's graduation requirements.

Local and international community service programme

As part of our commitment as global citizens, CISQD students engage in a wide range of local and international community service initiatives. Locally, CISQD has entered into partnership with the Chinese Red Cross to form the Rose Alliance Charity to support local charities. Students actively engage in fundraising and in the activities of the respective charities. Internationally, CISQD students have participated in house builds with Habitat for Humanity in Cambodia and Anchorage, Alaska. Indeed, CISQD students were the first Chinese nationals to participate in a global house build with Habitat for Humanity in the USA. In collaboration with our sister school in Chengdu (CISCD), CISQD students participate in the annual Christmas community service project in Northern Thailand, where students participate in educational and construction initiatives with the descendants of the Free Chinese Brigade, Chinese nationals who fought alongside the Allies against the Japanese in Northern Thailand from 1942–1945, only to be abandoned as stateless people.

Habitat for Humanity community service

Hengdien film production

Each year, all newly enrolled students participate in two film production projects at China's Hengdien studios. In the semester prior to the actual film production, in collaboration with the English, performing arts and marketing departments,

Case study 16: continued

students engage in all aspects of preparation of the actual film production, including script preparation, auditions, casting, direction and rehearsal. Throughout the production and filming process, students play very significant leadership roles in the direction of the movie, supported by film production professionals from the Hengdien studios.

Model United Nations

Model United Nations, also known as Model UN or MUN, is an extra-curricular activity in which students typically roleplay delegates to the United Nations and simulate UN committees. Participation in this demanding club fosters and facilitates the development of more effective leadership skills, greater global awareness, enhanced public speaking skills, more developed time-management skills and the opportunity to exchange and interact with peers from all around the world.

National Debate League

In recent years the school's debating teams have dominated the National Debate League for the eastern seaboard of China. In recent years, school teams have secured first and second places, in addition to best public speaker at two of the last three annual debate competitions for the eastern seaboard. These teams have then progressed to represent the eastern seaboard in the National Debate League.

Extra-curricular activities programme

The school operates an extra-curricular activities (ECA) programme comprising of our 50 clubs and activities. Each faculty member is required to actively support and engage in two weekly ECAs. In each of these ECAs students serve in leadership roles at club level, collaborating with the respective teachers in the weekly functioning of the club or activity. Each ECA is required to reflect one of the Confucian Six Arts.

School sports

As part of the school's commitment to the provision of as wide and diverse leadership opportunities as possible, as well as our commitment to the formation of well-rounded individuals, the school engages in a wide range of athletic competitions and tournaments. It is very much part of our 'work hard, play hard' school culture and this is evident in the fact that some of our most active student leaders also serve as school ambassadors on our respective sports teams.

Student exchange programme

CISQD students have the opportunity to apply for participation in the CISQD student exchange programme which allows them to live in one of our sister schools in the UK or with Loughborough Grammar School, one of our student exchange partners.

CISQD student ambassadors and facilitators

Every year, student leaders assist the school in hosting a number of large public events, the majority of which attract schools and student participants from all parts of mainland China. Included in these are:

- The National ASDAN Business Simulation Competition. Coordinated by ASDAN UK, this annual business simulation attracts a great deal of interest from international and Chinese schools alike and has proved to be a highly competitive and rigorous tests of student leadership and business acumen.

- The British Council University Tour. For the past four years, CISQD has been the British Council's venue of choice for its university tours in the Shandong Province, thanks to the reputation secured by those students who have acted as hosts, facilitators and translators at such events since 2013.

References

CNCS, (2007). *The health benefits of volunteering: A review of recent research.* [pdf] Washington, DC: Corporation for National and Community Service. Available at:. **https://www.nationalservice.gov/pdf/07_0506_hbr.pdf** [Accessed March 2017].

Sternberg, R. J. (2009). *Academic intelligence is not enough. WICS; an expanded model for effective practice in school and later in life.* [pdf] Worcester, MA: Mosakowski Institute for Public Enterprise. Available at: **http://www2.clarku.edu/aboutclark/pdfs/Sternberg_wics.pdf**

Contacts and resources

Duke of Edinburgh's International Award:
http://www.intaward.org

The Award was created in 1956 by HRH The Duke of Edinburgh and Kurt Hahn, for young people in the UK. By 1971 the Award was operating in 31 countries and today it is delivered in over 140 countries. The Award is open to any young person between the ages of 14 and 24, and aims to equip 'young people for life regardless of their background, culture, physical ability, skills and interests. Doing the award is a personal challenge… it pushes young people to their personal limits and recognises their achievements.'

There are three levels to the Award – bronze, silver and gold – and each level has four sections (service, skills, physical recreation and adventurous journey). In order to get the gold award, the young person has to also complete a residential project.

The Award has a positive impact on the lives on young people in a number of ways including improved health and wellbeing, educational attainment and social inclusion. The award is widely internationally recognised as evidence that a student has completed an excellent co-curricular programme that will have challenged them and nurtured the development of desirable character traits and qualities.

Genesis Debate Programmes:
www.genesisdebateprogrammes.com

Genesis Debate Programmes (GDP) empowers teachers from across the curriculum to use debating in their classroom, and provides opportunities for students to learn how to debate through their innovative debating programmes. These range from week-long summer schools, to weekend or three-day debating festival workshops.

Genesis programmes provide opportunities for students to become independent, thoughtful learners who communicate well with each other, engage in the curriculum and with the world around them in a meaningful way. The GDP methodology, led by top university students, recent graduates and qualified teachers, teaches communication in an innovative, engaging and enjoyable way that supports the development of skills and competencies needed to flourish in the modern global world. It also provides a highly enjoyable way to develop spoken English. Genesis contact: **info@genesisdebateprogrammes.com**

Habitat for Humanity:
www.habitat.org

Habitat for Humanity is an organisation that provides housing for people in need. Founded by Millard and Linda Fuller, its vision is to 'put God's love into action by bringing people together to build homes, communities and hope'. Habitat for Humanity has built or repaired over 800 000 homes and served more than 4 million people worldwide since its creation in 1976. Their vision is 'a world where everyone has a decent place to live', and they achieve this by constructing new homes and regenerating neighbourhoods. It is active in about 70 countries and there are many ways to volunteer with the organisation.

Model United Nations (MUN):
www.una.org.uk/get-involved/learn-and-teach/model-un-portal

Provides an opportunity for students to develop negotiation, diplomacy, leadership and critical thinking skills. MUN originated in the USA and the model has spread worldwide with conferences held in many countries. Students take on the role of a delegate at a simulated UN committee and each represents a national government. The delegates then negotiate a particular issue, having researched it first.

Oxfam:
www.oxfam.org

Oxfam is a coalition of 19 organisations working together in over 90 different countries. Their primary focus is on fighting poverty – both the cause and the impact. There are many ways to support the work of Oxfam including campaigning, volunteering and fundraising through initiatives such as Trailwalker.

Chapter 7: Developing the Cambridge learner attributes through Cambridge Global Perspectives and Enterprise

> " It is widely recognised that we live in an increasingly digitised and interconnected world. The means by which we access information and the pace with which this takes place are profoundly changing the way we learn, communicate and work. Increasingly, young people are faced with access to a multiplicity of competing ideas. In such an information-rich society, young people need the skills and dispositions to be able to think critically.. "
>
> **Extract from Cambridge International A Level Global Perspectives syllabus 2017–19**

Overview

This guide has argued throughout that the learner attributes need to be at the heart of approaches to teaching and learning in all disciplines and activities the school provides. This chapter focuses on two programmes that Cambridge offers that complement a discipline-focused curriculum. They are specifically designed to support habits and skills development associated with preparing students for the modern global information age and the world of work.

Cambridge Global Perspectives

Cambridge Global Perspectives is an interdisciplinary programme, currently offered through Cambridge IGCSE , Cambridge International AS & A Level and Cambridge Pre-U syllabuses. It focuses on the nature of argument and evidence, develops research and information literacy skills and encourages understanding and respect for the perspectives of others. Global Perspectives will become available for Primary and Lower Secondary (5–14 year olds) for first teaching from June 2018.

Students learn to appreciate alternative perspectives on global issues where ideas and interests compete and there are no easy answers. They learn how to evaluate arguments, in particular the evidence and reasoning used to support them, as well as improve the quality of their own arguments.
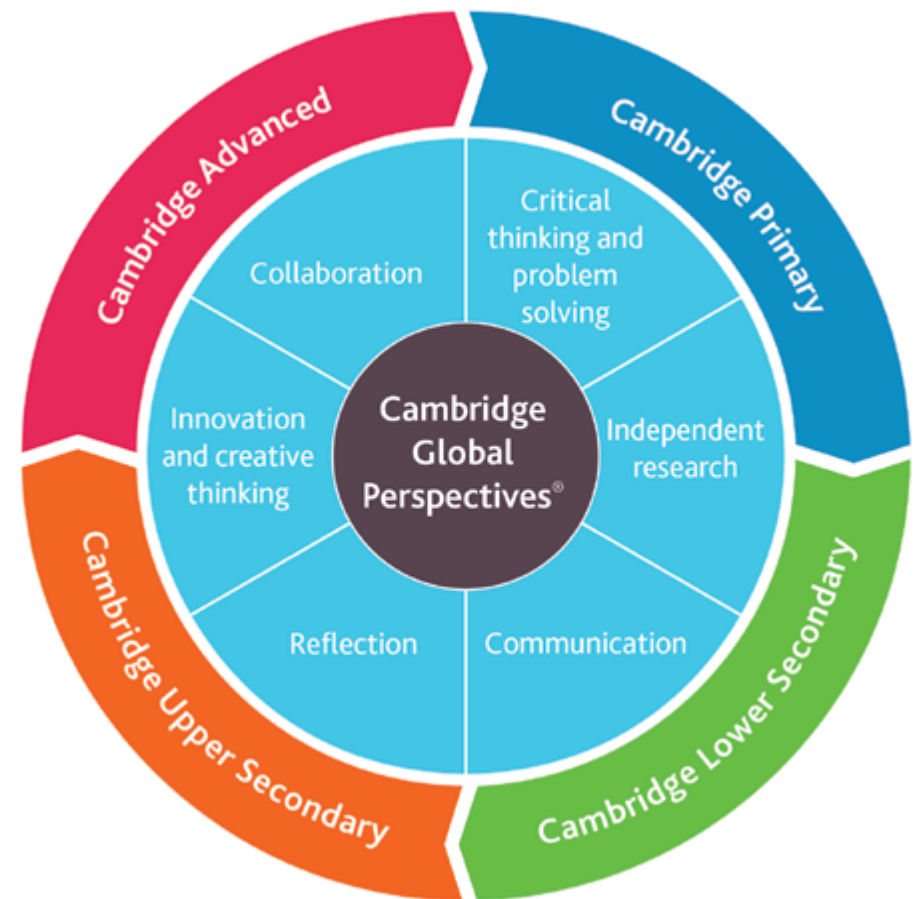
Through studying a variety of authentic and significant case studies students become better informed about the world and better able to make informed and sensitive judgements. The course develops the skills of flexible, reflective, creative and critical thinking, and students learn how to research issues and arrive at well-reasoned and evidenced conclusions. They also learn to work collaboratively with others and effectively communicate and critique ideas so that they become, in support of the Cambridge learner profile, more confident, responsible, reflective, innovative and engaged.

Specifically Cambridge Global Perspectives aims to develop learners who:

- understand the nature of evidence in a variety of forms and effectively evaluate evidence in deciding what conclusions can be reasonably reached
- can support their own arguments with sound reasoning and the appropriate use of evidence
- enquire into and reflect on issues both independently and in collaboration with others from a variety of cultures, communities and countries
- generate and express clearly in written and spoken forms their own well-reasoned arguments
- use disciplined and scholarly research skills to investigate issues of global significance
- consider issues from personal, local, national and global perspectives, and analyse the links between them
- communicate sensitively with people from a variety of backgrounds, empathising with the needs and rights of others
- can transfer their thinking and planning skills to unfamiliar contexts
- develop a sense of their own responsibility as active citizens.

For a video introduction to Cambridge Global Perspectives, go to **www.cambridgeinternational.org/globalperspectives**

Watch a higher education perspective on Global Perspectives at Cambridge International A Level and Cambridge Pre-U by Stuart Schmill, the Dean of Admissions at the Massachusetts Institute of Technology in the US at: **www.youtube.com/watch?v=CPxRtu7Ed_M&index=53&list=PLi4xGU_ d7k_J-9Oi8Z56q7wNf_RXDGBwP**

Case study 17:
Cambridge Global Perspectives at Suffern School, New York, USA

Two students and two teachers from Suffern High School, New York, reflect on how they find Cambridge Global Perspectives valuable in the videos below:

Hannah Conciglio - the importance of lifelong learning; Global Perspectives for international perspectives

Watch the video at **https://vimeo.com/232474032**

Alex Fernandez - skills gained from Global Perspectives

Watch the video at **https://vimeo.com/232473739**

Jarrod Gelb - collaboration peer review

Watch the video at **https://vimeo.com/232474113**

Bob Wilson - the importance of challenging students

Watch the video at **https://vimeo.com/232473942**

How critical thinking, information literacy, reflection and research are supported and assessed through Cambridge Global Perspectives

The Cambridge Global Perspectives curriculum continuum is based on a developmental spiral of learning. At all stages, students are required to critically engage with information and source material to improve their information literacy (in developmentally appropriate ways reflected in course standards, activities and requirements). At all levels students are required to complete research and to communicate their ideas both in writing and through spoken presentations.

Schools have the opportunity to make Cambridge Global Perspectives a core curriculum activity so that learning that takes place across the curriculum in other subjects is linked to Global Perspectives themes. This reinforces students' ability to make connections between all the disciplines they are learning, reinforces learning and helps students transfer skills and understandings from one context to the next. Alternatively schools can choose to teach Global Perspectives as a discrete subject.

A web-based learning platform is available for all schools who register for the programme. This Online Learning Area has extensive materials specifically for Global Perspectives and is freely available to all Cambridge centres delivering or considering delivering Global Perspectives. The Online Learning Area provides online structured courses, with guidance for both students and teachers, and multimedia resources, together with teaching and learning activities. Secure personal journals encourage higher level thinking among students as they engage with and reflect on the materials and activities. Spaces with forum discussions allow for collaboration between schools, in topic-based groups and within students' own class groups. Teachers and learners can also collaborate with other Global Perspectives teachers elsewhere in the world. Students can use ePortfolio tools to gather together and share their research, and gain feedback from peers and teachers.

Teachers and students can access the Online Learning Area using any connected device, including tablets, laptops and desktop machines. We suggest that teachers request student accounts, thereby providing students with access outside the traditional classroom environment.

The Cambridge IGCSE requires students to collaborate in groups to agree an aim and then to plan, research and produce a shared outcome. Students are assessed collectively on how well they collaborate and how well their outcome communicates their research. They are also assessed individually on a reflective paper they produce which analyses and evaluates the project and reflects upon the process of collaboration and their own contribution to the project. The video available at **www.youtube.com/watch?v=YB7qD-w4vVw** demonstrates one example of a collaborative project completed by a group of Cambridge IGCSE students at the Singapore International School in Hong Kong.

Figure 8 gives an overview of the critical path methodology that forms the core of the Cambridge International AS Level, A Level and Pre-U programmes. Standards and expectations at this stage are high, reflecting the qualification standard, but the general

Figure 8: The critical path in Cambridge Global Perspectives
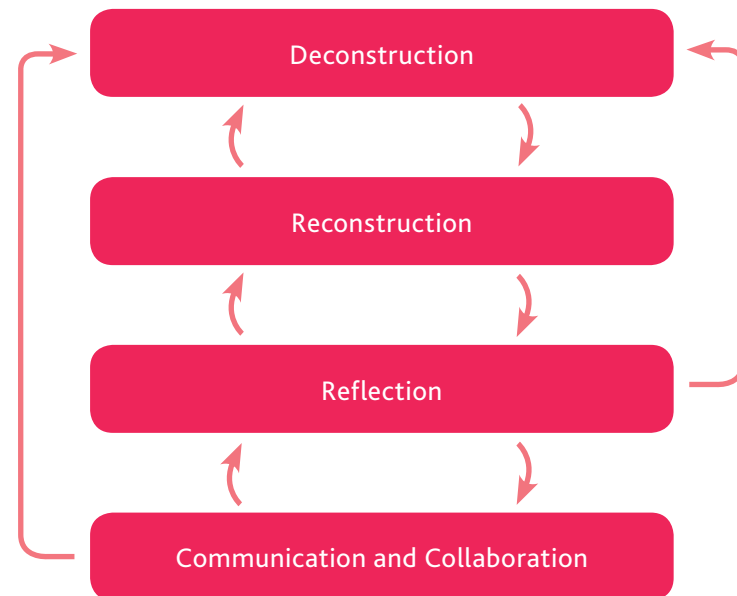
approach is the same at lower levels so that this represents a natural progression. Clearly developing the habits, skills and understanding needed to perform the critical path well provides an excellent preparation for students engaging with ideas in other subjects and preparing them for higher education and the workplace.

The learner attribute of reflection is at the heart of the programme. Students are required through assessment objective 2 (reflection) to:

- research and consider alternative perspectives objectively and with empathy
- consider the ways in which personal standpoints may have been affected by the research process
- evaluate the impact of alternative perspectives and conclusions on personal standpoints
- identify the need for further research in light of the research findings
- reflect on the scope, nature and limitations of their own research report (Cambridge International A Level only).

Students who want to take Global Perspectives to a full Cambridge International A Level or Pre-U standard will complete a research report as the Cambridge International A2 Level component of the Cambridge International A Level. You can download a comprehensive guide for learners at **www.cie.org.uk/images/385159-a-learner-s-guide-to-the-cambridge-research-report.pdf**

Read an example of a completed student project at: **www.cambridgeinternational.org/images/413316-example-candidate-responses. pdf**. This report, called *To what extent does globalization contribute to higher unemployment?*, considers a global problem taking an interdisciplinary approach, including economic, social and political viewpoints.

Case study 18:

Linking the World's Largest Lesson with Cambridge Global Perspectives at the Southland Girls' School, Invercargill, New Zealand

The World's Largest Lesson launched in September 2015, when world leaders committed to the 17 goals for sustainable development (read about them at **worldslargestlesson.globalgoals.org**).

Connecting our Global Perspectives learning with the global goals through the World's Largest Lesson has allowed us to focus on the learner attributes in a real-life context, with a particular focus for this case study on confident, responsible, reflective, innovative and engaged learners.

Our Global Perspectives class is a Year 9/10 class in our Year 7–10 Global Minds programme at Southland Girls' High School. In 2015 our lesson was selected as one of eight worldwide to help launch the World's Largest Lesson. The focus of our submitted lesson was building a link between the Millennium Development Goals and the new Sustainable Development Goals. The World's Largest Lesson has a growing resource base to help support learning across all year levels and contexts. The global goals have become embedded in our Global Minds course.

We use the goals to link our local actions to global targets, giving learning deep relevance and a sense of purpose. We start with considering the global goals to help us to understand the issue at hand, then transfer our new learning into our Global Perspectives group and individual projects. This has allowed us to consolidate, challenge and extend our students' conceptual understanding. Connecting learning in class to the global goals, students are encouraged through collaborative learning tasks to reflect on how their understanding has changed and discuss what has affected the change.

We have inSiGHtS (SGHS being an abbreviation for Southland Girls' High School) groups so students are in responsive social contexts to deepen their

Case study 18: continued

global competency skills. The Cambridge Global Perspectives skills are the scaffold we use to structure these sessions to deepen understanding of global issues. We

plan open-ended discussions around, for example, the global goals Twitter feed. We challenge students' understanding, encouraging them to act on issues of global significance. We do this using tools such as global thinking routines from the Visible Thinking project at Harvard Project Zero, and reflection prompts that draw on the solo taxonomy.

Students then reflect on themselves as learners and plan next steps to transfer new understanding into their Cambridge tasks.

Collaborating with schools through the World's Largest Lesson network allows our students to form creative ideas based on wider perspectives. Students appreciate and understand the cultural complexity in communicating with others and evaluating whether their innovative ideas will be successful across different groups and local, national and global contexts.

Students are engaged because they are motivated by the collective impact of their ideas. In addition, their personal passion for issues is given a real-life context. A strong focus and reason for connecting to this initiative has been the focus on using our personal gifts and talents to make a positive difference in our world, both now and in the future. We actively discuss that the skills we are developing are about equipping us to be leaders prepared to connect and align future decisions to achieving the global goals. Although students may be working on their independent research study they are at all stages connecting to a global community. This allows them to dig deeper into key concepts and evaluate possible scenarios. Our class has created a wiki site (**stepup2sdg.wikispaces.com**) to share learning with other New Zealand schools because they have become so engaged and passionate about students using their learning to make a difference, and they see the power of going one step further and aligning outcomes of their inquiries to targeted collective actions.

Case study 18: continued

Using technology to open up creative possibilities to share new learning has also been a focus of our learning. Students enjoy sharing new understanding and what it means to them in creative ways. Technology also allows us to share learning with a wider audience, building a community of learners.

Through being part of the World's Largest Lesson and aligning the global goals to our Global Perspectives syllabus we have strengthened the attributes of being a confident and responsible learner. Through the real-life, real-time resources students are emotionally connected to issues of global significance. This learning means actions planned for service and raising awareness are informed and targeted.

Through increased opportunities for cross-cultural collaboration enhanced by a shared language of the global goals our students have a more authentic appreciation of how their actions will affect others.

Sharing our learning via our class Twitter account (@GlobalMindsSGHS) also allows students to gather real-time feedback, which enhances motivation further.

As a way to reflect on our learning and set new challenges for the following year we hold a Year 7–10 World Café. This allows the students in an informal environment to share changes in understanding, make connections between each other's learning and provide new insights for future learning.

All these learning opportunities have uncovered the importance of a combination of values, dispositions, attitudes, knowledge and skills that have an impact on global competency learning. Understanding learning as a lifelong disposition and building the capacity to be a leader of change has allowed all our students to experience success in a personal context relevant to them and their learning goals within Cambridge and beyond.

Video link:
www.youtube.com/watch?v=7hddEzzgyx8&feature=youtu.be

The Cambridge Primary and Lower Secondary Global Perspectives programme (piloted 2016–18, launched for first teaching in June 2018)

This programme will be added to our offering of English, English as a Second Language, Maths and Science in the Cambridge Primary and Lower Secondary curriculum. Global Perspectives will provide a carefully structured enquiry-based approach to learning that will complement and be supported by the development of knowledge, literacies and learning habits in the other subject areas. The programme will:

- Involve six Challenges a year, two a term. Each Challenge is six hours long, subdivided into a range of activities. The Challenges are designed to be used in one-hour blocks with flexibility as to how they are scheduled. There are 24 topics to choose from, at Primary and Lower Secondary.

- Build and develop, through iteration, the skills, knowledge and habits defined by the Global Perspectives continuum.

- Be taught through a wide range of topics using a personal, local and global perspective. The teacher helps the learner to look at a range of topical global issues that give a range of contexts.

- Involve challenges that will include activities such as projects, presentations, reports, logs, posters, questionnaires, written work and blogs that are both team based and individual. The challenges support five skills strands: research, evaluation, analysis, reflection, collaboration and communication.

- Be delivered digitally through our Online Learning Area. All the Challenges are located in the Online Learning Area, with support provided for a student's ePortfolio and Reflective Logs. In addition areas for collaboration and communication will be available in accordance with our age-appropriate eSafety policy.

- Be assessed: all Challenges are self, peer and teacher internally assessed, to help teachers in the formative assessment of their learners. There are also teacher-assessed Cambridge-moderated Checkpoint assessments at age 11 and 14 which are available twice a year, and graded Gold, Silver or Bronze.

Case study 19:
Cambridge Primary Global Perspectives pilot, Escuela y Liceo Elbio Fernández, Uruguay
(extract adapted from the Pilot Forum)

We chose to work with the theme 'helping people to belong' because we thought it would be very useful for our group of learners. This project would help make our students reflect on the concept of 'belonging to a group'. We implemented it in Grade 4, in classes of approximately 25 students. We are part of a very big school in Montevideo, so we thought that this topic could be especially meaningful for our context.

While doing this challenge, students had to think hard about several questions: Why is it important to belong to a group? What is belonging? These reflections generated a warm, meaningful and memorable environment where students expressed thoughtful ideas.

My students were able to show development of their communication skills, strengthening their personal strategies through interviews and surveys. They had to talk among themselves and formulate questions to later ask to other members from other teams or their own families and friends to identify different groups, find out specific information and collect data. They also listened to other groups' findings. They discussed, compared and shared data. They wrote in copybooks, on the whiteboard and designed new mind maps.

They made descriptions, improving their writing skills. They read them aloud, introducing their families and friends, with real pictures and photos. They enjoyed the learning process, making learning easier. When they relate content provided by the teacher with their real lives and personal experiences, learning becomes fun and natural. Students were exposed to memorable and meaningful activities, where they felt engaged and motivated to continue researching, improving their understanding and learning successfully. Students were always asked to self-assess their learning process, as well as the experience in general, and they were given the chance to suggest new ideas and possibilities to improve the project. We had a wonderful experience with this challenge.

Cambridge Enterprise

Cambridge Enterprise is offered as a Cambridge IGCSE and Cambridge O Level syllabus at Cambridge Upper Secondary level. It encourages candidates to develop their understanding and the practical skills associated with the work environment and the running of a small enterprise. The syllabus provides the basic knowledge an entrepreneur requires and an opportunity for candidates to apply this knowledge in a practical and engaging way when running their own enterprise project or activity. We encourage candidates to study enterprise in a local as well as a global context, while enhancing their skills of investigation, analysis, interpretation, evaluation and practical problem-solving.

The aims of Cambridge Enterprise are to:

- make effective use of relevant terms, concepts and methods when discussing enterprise and enterprising behaviour
- develop an understanding of what it means to be enterprising, and the skills that requires
- develop the ability to work in an enterprising and independent manner
- develop and apply knowledge, understanding and skills to contemporary enterprising issues, in a range of local, national and global contexts
- appreciate the roles and perspectives of a range of other people and organisations involved in enterprise, and the importance of ethical considerations
- investigate the world of work and entrepreneurial organisations
- develop the ability to communicate effectively, in a variety of situations, using a range of appropriate techniques.

One of the key aspects of Enterprise, which is assessed by Cambridge through a portfolio submitted by each candidate, is the planning, implementation and evaluation of an enterprise activity (see Case study 20).

Candidates should carry out their own enterprise project or activity, either on their own or as a member of a group (usually of no more than six candidates). Candidates working on their own will take sole responsibility for carrying out a small, relatively simple project or activity. Candidates working in groups should carry out a larger, more complex project or activity that allows each person to play a separate, defined role. Candidates may work as part of a group when planning and running their activity but the work they present for assessment must be completed individually.

Case study 20:

Enterprise at Chisipite Senior School, Zimbabwe

Watch the video at:
https://vimeo.com/230900327

Why does Chisipite Senior School teach Cambridge IGCSE Enterprise?

The school sees Cambridge IGCSE Enterprise as having a real benefit for the vocational studies which the students undertake in Sixth Form. The curriculum offers the students the opportunity to develop business skills and knowledge and also develops their life skills, encouraging them to work as part of a team and communicate with their peers and also with wider groups. The school also thinks that the syllabus encourages the students in their thinking skills and problem-solving approaches as they have to consider what will and won't work in the ideas and proposal that they are considering. The students especially enjoy running and participating in business meetings and seeing the final results of the activities they have undertaken.

Case study 20: continued

How does Chisipite Senior School teach Cambridge IGCSE Enterprise?

Students currently take Cambridge IGCSE Enterprise in a year, with six hours of teaching each week. They also undertake activities outside the classroom as part of their coursework. The subject is taken by vocational students in the Lower Sixth Form who have just completed Cambridge IGCSEs. The girls then progress to Cambridge International AS Level Business Studies in their Upper Sixth year.

The girls begin the course by researching a local business person to gain a first-hand insight into the unique challenges faced by entrepreneurs in Zimbabwe. Each pupil prepares a business plan which is presented to the head teacher. This presentation is followed by a verbal question and answer session where the girls justify their ideas.

Many pupils choose to use other students as their market and carry out surveys and pilot projects to test the viability of their products. This has been invaluable in encouraging them to question their preconceptions of a market they thought they understood. In addition, they learn to recognise the need for careful research.

The pupils often have innovative ideas but putting them into practice provides more challenges than they realise. The time constraints of a busy school term combined with organising the finer details, where and when to sell their product, as well as the unique issue of there being little physical cash in the country, offer obstacles that they have to negotiate. As teachers we see their growth in how they deal with these challenges on a weekly basis and an increasing focus on organisation skills.

The school is also seeing the emergence of leadership qualities within the cohort of students undertaking Cambridge IGCSE Enterprise. They feel that this will have an impact on their progress in the school where all students in the Upper Sixth Form are given the opportunity to serve as 'senior leaders'.

This programme aims to encourage, enhance and exploit the leadership potential of all the students, to give them valuable management experience that will be relevant throughout their lives.

Final thoughts

We hope this guide has helped you think about how you might use the Cambridge learner attributes to help develop teaching practice and shape a curriculum which belongs uniquely to your school.

We are very grateful to the 17 schools who have shared some of their experiences through providing case studies for this guide. What is clear from reading these case studies is how every school engages with the learner attributes in different ways.

Cambridge International is committed to helping schools improve. With approximately 10 000 schools in over 160 countries using our educational programmes and qualifications – often combined with national or other curricular components – our role is to support you in making the right decisions for your school. Excellent schools understand their own culture and context, and constantly strive to improve teaching and learning taking these factors into account.
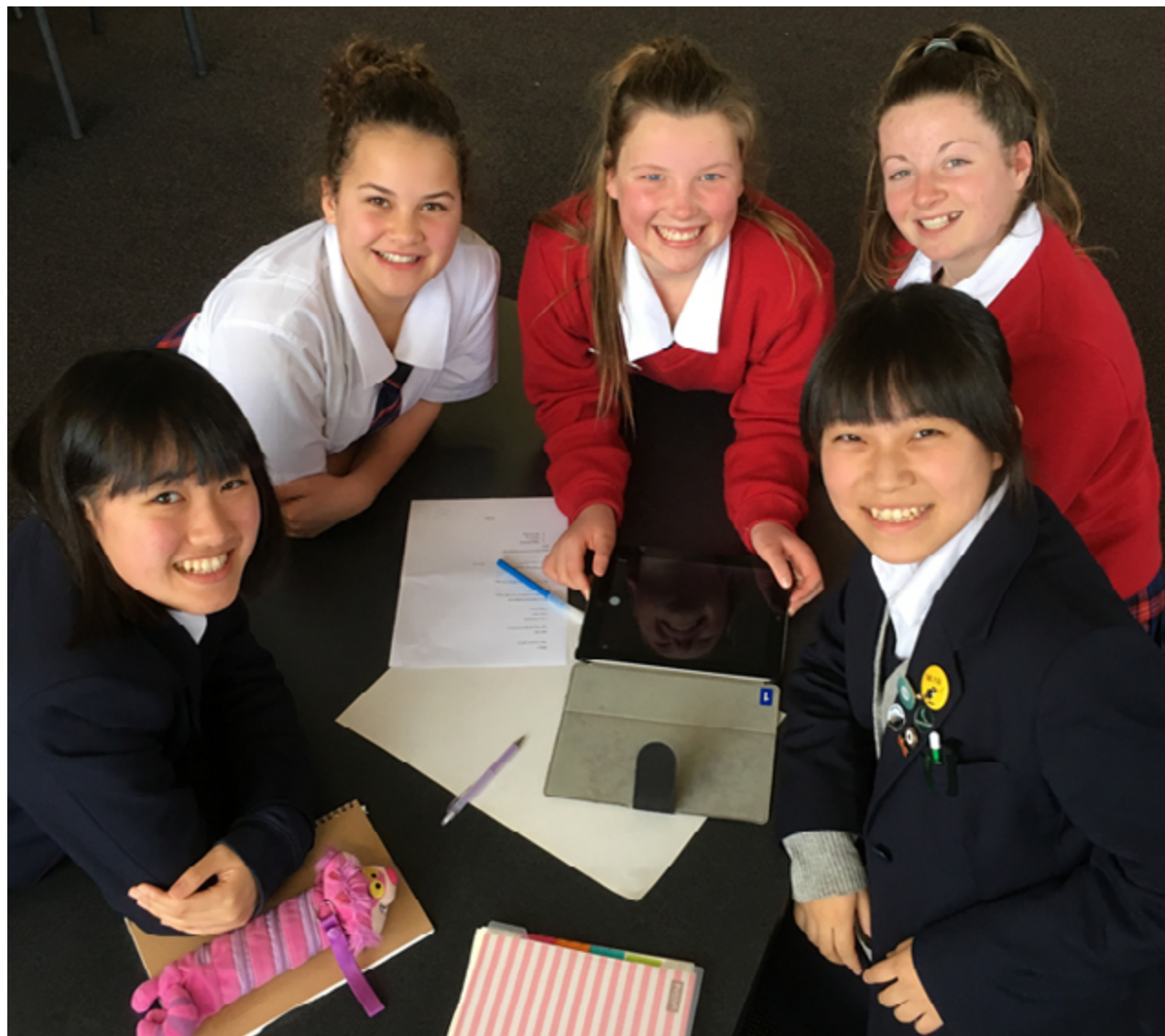
Students at Southland Girls' High School, New Zealand (*case study 18*)

Appendix 1

How developing the learner attributes can help students to prepare for success in further education and the workplace

What are universities looking for in undergraduates?

Universities want knowledgeable students with good learning habits who are passionate about the discipline they are studying, able to apply their understanding to new questions and contexts.

Knowledge and understanding need to be backed up by effective learning habits. A study conducted by Cambridge Assessment Research Division (Dale, 2011), interviewing admissions officers and academic tutors from a number of universities in a wide range of subjects, identified 10 generic competency areas: active enquiry, open thinking style, motivation, self-discipline, organisation, coping with demands, resilience, self-reflection, emotional control and organisation citizenship. Table 1 taken from the study illustrates responses to the question: What do students performing at different levels at university do differently?

Guy Claxton (2014) illustrates this with an example taken from the University of Cambridge admissions interview. Students are given extremely searching questions by the interview panel. What they want to see is evidence that the student can 'flounder intelligently'. This strategy is widely used by top universities that interview students as part of the application process. Often the question will not have a correct answer. Good candidates will display the list of characteristics in the top category in Table 1. They probably will not give the correct answer but the way they attempt an answer will tell a great deal about their potential.

Universities often complain that learners have been 'spoon-fed' information and lack the requisite thinking skills to progress successfully to higher education. The following comments reflect this:

'At interview we are observing how students behave when they are struggling, and how they respond to advice. Many students have always been "good at maths" and can't cope when they are finally challenged.'

Table 1: Categories of undergraduate students

Top	Average
Intellectual magpie. Engaged with the subject. Critical and questioning. Makes connections. Integrates material. Self-directing. Confident, will try new things. Works through problems and setbacks. Proactive, finds out what is needed. Focuses on the right things. Strong sense of purpose. Thinks and arranges things in a systematic way. Can reflect on how they are doing and learning experiences.	Absorber, takes things in, but less questioning. Wants to know what it is they have to do to get a good degree. Step-by-step approach to learning. Planned approach to work. Takes on board criticism and self-aware of their progress. May need pointing in the right direction. Achievement oriented, may re-direct energies if they feel they are not doing well enough on the course.
Struggling	**Problem**
Passive, does not ask questions or otherwise participate. Linear thinking, over-focused on a single answer. Waiting for you to help them. Can work harder and harder, rather than smarter. Wants to please but can try too hard. Gets very upset if they make a mistake. Listens but seems unable to make changes. Can become a solitary learner. Easily discouraged.	Highly critical of staff and other students. Problems with authority figures. Lacks a sense of responsibility. Always has extenuating circumstances. Poor work ethic. Self-defeating, decides not to try in case they fail. Lacks insight and can be over-confident. Everyone else is the problem. Not a team player. Cannot take feedback. Easily frustrated.

Admissions interviewer, Faculty of Mathematics, University of Cambridge

'I'm looking for students who have the following:

- an ability to think flexibly and adapt arguments in the light of new information

- a willingness to weigh up the relevance of different points of view

- the desire to go beyond "textbook" knowledge and see the limits of what we know

- evidence of an ability to work independently.'

Dr Andrew Thompson: Admissions Tutor and Director of Studies in History, Queens' College, University of Cambridge

Cambridge learner attributes and 'core skills for employability'

Schools are the critical channel through which young people acquire skills that improve opportunities for good jobs. Many key employability skills, such as critical thinking and problem-solving, are dependent on deep content knowledge and cannot be taught in isolation. So teaching such skills requires innovative ways of delivering the academic curricula; it is not about developing a core skills curriculum. The question is how best to integrate these skills into core academic content.

According to the Confederation of British Industry (CBI, 2010), 'a positive attitude is the key foundation of employability… Employers are clear that they are looking to the education system to develop confident, motivated young people, with the attitude, knowledge and skills to succeed in life and in the world of work.' It is critical that schools nurture and develop a broad set of employability skills necessary for all work, which includes teamworking, problem-solving, communications, business and customer awareness and self-management in addition to literacy (including IT) and numeracy.

'Young people's careers will be characterised by change, flexibility and lifelong learning. Business needs its current and future workforce to have the transferable skills and attitudes necessary to succeed in this environment, underpinning the development of job-specific and technical skills' (CBI, 2010).

Like the CBI, the International Labour Organization (ILO, 2013, pp. 14–15) highlights the importance of a high-quality education in preparing young people with the

fundamental skills that employers across the world are looking for. The ILO proposes a detailed framework, *Core skills for employability,* which groups these skills into four broad skill categories: learning to learn, communication, teamwork and problem-solving.

The development of Cambridge learner attributes directly contributes to the development of these skills, allowing learners to develop as confident, responsible, reflective, innovative and engaged young adults, preparing them well for their future career (see Table 2).

Students at The Heritage Private School, Cyprus (*case study 14*)

Table 2: The Cambridge learner attributes mapped to the ILO core skills for employability

Cambridge learner attributes	International Labour Organization core skills for employability
Confident in working with information and ideas – their own and those of others. Cambridge learners are confident, secure in their knowledge, unwilling to take things for granted and ready to take intellectual risks. They are keen to explore and evaluate ideas and arguments in a structured, critical and analytical way. They are able to communicate and defend views and opinions as well as respect those of others.	**Learning to learn:** think abstractly; interpret and communicate information; conduct systematic inquiry and follow through with answers; select the best approach for tasks; adaptable **Communication:** write to the needs of an audience; listen and communicate effectively; articulate own ideas and visions **Team work:** respect the thoughts and opinions of others in the group; value others' input **Problem-solving:** think creatively; solve problems independently; test assumptions; identify problems; take the context of data and circumstances into account; adapt to new circumstances; ability to identify and suggest new ideas to get the job done (initiative)
Responsible for themselves, responsive to and respectful of others. Cambridge learners take ownership of their learning, set targets and insist on intellectual integrity. They are collaborative and supportive. They understand that their actions have impacts on others and on the environment. They appreciate the importance of culture, context and community.	**Learning to learn:** pursue independent learning; take responsibility for own learning; manage own learning Team work: interact with co-workers; work within the culture of the group; work in teams or groups; accountability for actions taken; manage oneself at work; value others' input; accept feedback

Cambridge learner attributes	International Labour Organization core skills for employability
Reflective as learners, developing their ability to learn. Cambridge learners understand themselves as learners. They are concerned with the processes as well as the products of their learning and develop the awareness and strategies to be lifelong learners.	**Learning to learn:** use learning techniques to acquire and apply new knowledge and skills; pursue independent learning; conduct systematic inquiry and follow through to find answers; take responsibility for own learning; manage own learning; is willing to learn
Innovative and equipped for new and future challenges. Cambridge learners welcome new challenges and meet them resourcefully, creatively and imaginatively. They are capable of applying their knowledge and understanding to solve new and unfamiliar problems. They can adapt flexibly to new situations requiring new ways of thinking.	**Problem-solving:** think creatively; solve problems independently; test assumptions; identify problems; take the context of data and circumstances into account; adapt to new circumstances; ability to identify and suggest new ideas to get the job done (initiative)

Table 2: The Cambridge learner attributes mapped to the ILO core skills for employability *continued*

Cambridge learner attributes	International Labour Organization core skills for employability
Engaged intellectually and socially, ready to make a difference. Cambridge learners are alive with curiosity, embody a spirit of enquiry and want to dig more deeply. They are keen to learn new skills and are receptive to new ideas. They work well independently but also with others. They are equipped to participate constructively in society and the economy – locally, nationally and globally.	**Learning to learn:** pursue independent learning; conduct systematic inquiry and follow through with answers; take responsibility for own learning; manage own learning **Team work:** interact with co-workers; work within the culture of the group; respect the thoughts and opinions of others in the group; value others' input; plan and make decisions with others and support the outcome; build partnerships and coordinate a variety of experiences; work toward group consensus in decision-making **Problem-solving:** think creatively; solve problems independently; test assumptions; identify problems; take the context of data and circumstances into account; adapt to new circumstances; ability to identify and suggest new ideas to get the job done (initiative)

References

Claxton, G. (2014). *Building Learning Power*, presentation at the Cambridge Schools Conference, Homerton College, Cambridge, 2014.

Confederation of British Industry (CBI), (2010). *Fulfilling potential: The business role in education.* [pdf] Available at: **http://mei.org.uk/files/pdf/fulfilling_potential_2010.pdf** [Accessed December 2016].

Dale, L. (2011). Generic competencies in higher education. A *competency framework for students progressing to Higher Education.* OCR's Higher Education Bulletin, Cambridge Assessment Research Division (autumn 2011).

International Labour Organization (ILO), (2013). *Enhancing youth employability: What? Why? and How? Guide to core work skills.* [pdf] Switzerland: ILO. Available at: **http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_213452.pdf**

Appendix 2

Schools providing case studies

The British International School, Vietnam

The British International School is the largest international school in Vietnam and has 2145 students, ranging in age from 2 to 18 and representing 51 nationalities. Based across three campuses in Ho Chi Minh City, the school has nurtured an environment where students work hard but also take risks and try out new ideas. There is a strong focus on the school's Global Network and on the community involvement of the pupils.

The British School in Colombo, Sri Lanka

The British School in Colombo is a co-educational day school and has 1200 students, ranging in age from 2 to 18. Established in 1994, the school strives to enrich the lives of young people by providing a holistic educational experience that allows students to grow to become global citizens. There is a strong focus on social awareness and community initiatives.

Bromsgrove International School, Thailand

Bromsgrove International School is a private international school located on the outskirts of Bangkok. It has 393 students, ranging in age from 2 to 18 and representing 27 nationalities. Founded in 2002, the school conducts admissions screening to determine student placement but is ultimately non-selective and proud of its inclusive ethos. The school strives to produce respectful and ambitious students.

Chisipite Senior School, Zimbabwe

Chisipite Senior School was founded in 1954 and was the first inter-denominational private girls' school in Central Africa. It has 550 students ranging in age from 12 to 18. The school aims to provide a broad and balanced education, and provides a learning environment which both motivates pupils to achieve their full academic potential and encourages them to think creatively, critically and independently.

Confucius International School, China

Confucius International School, Qingdao, was founded in 2009 by the direct descendant and current head of the Confucius family. It is the first educational initiative of its kind to unite the best practices in Western teaching with Confucian teaching and principles. Confucian education is concerned primarily with what constitutes the makings of the 'man of quality' and with the tools that the leaders of today and tomorrow must master.

Doha College, Qatar

Doha College is the leading British curriculum international school in Doha and has more than 1800 students, ranging in age from 3 to 18 and representing more than 70 nationalities. Established in 1980, the college subscribes to High Performance Learning, a pedagogy that requires teachers to instil in the students thinking skills and a growth mindset. The college also has a rich and diverse extracurricular programme.

Escuela y Liceo Elbio Fernández, Uruguay

Escuela y Liceo Elbio Fernández is in Montevideo, the capital city of Uruguay in South America, with approximately 1500 students. It was the first private school in Uruguay, founded by the pedagogist José Pedro Varela. It has always been a school where new paradigms and freethinkers are promoted and where secularism is paramount to guarantee equality and fraternity among students.

First Steps – School of Arts and Sciences, Pakistan

First Steps – School of Arts and Sciences embodies a deep commitment to the provision and advancement of high-quality education. It is a 'Lighthouse School of Excellence' for Faisalabad, which models academic rigour and high student performance. Using whole-child instruction, the curriculum strives to meet individual needs and assist the development of children in all developmental domains: intellectual, social, emotional and physical. The faculty and administration take pride in holding their students to high academic, behavioural and ethical standards. The well-rounded students of First Steps

develop the character traits of honesty, integrity, responsibility and respect as they prepare for further leadership roles.

Frensham School, Australia

Frensham School is a single-sex boarding school in New South Wales. Founded in 1913, the school provides an outward-looking academic programme for girls in Years 7–12. The school offers an enriched and extended curriculum across all year groups. The school began the Jamieson Programme in 1986. The Frensham motto, 'In love, serve one another', encourages students to be active and compassionate in recognising the needs of others and to respond with generosity, demonstrating leadership by example and integrity.

The Heritage Private School, Cyprus

The Heritage Private School is an English co-educational, academically selective school for almost 1000 students aged 2 to 18, with an intake from a wide variety of cultural backgrounds. Founded in 1987, the school provides an education based on the UK national curriculum. In addition to its academic courses, the school also actively involves students in national, European and international educational and community projects to extend experience and learning.

Parkside Middle School, Virginia, United States of America

Parkside Middle is one of 18 middle schools in a highly diverse school division. It is the only middle school in Virginia to be classified as a Cambridge School and it offers the Cambridge ethos, beliefs and philosophy to their entire student population of 1253 6th–8th Grade students. It is also the first Cambridge PDQ School in the USA and currently offers the Certificate in Teaching and Learning to its teaching staff.

The Perse School, UK

The Perse School is an independent secondary co-educational day school in Cambridge, for students ranging in age from 3 to 18. The school was founded in 1615 by Stephen Perse and has an enrolment of more than 1500 students. The Perse has been listed as the top-performing co-educational school for GCSE and Cambridge IGCSE results in national newspapers for the past three years but is committed to a broad and balanced education in which extracurricular and sporting activities play an essential part in the development of its pupils and the success that the school enjoys.

Shenzhen College of International Education, China

Shenzhen College of International Education is a selective UK national curriculum school for predominantly Chinese citizens. Established in 2003, the college teaches Cambridge IGCSE and Cambridge International AS & A Level, and each student attends at least one extracurricular activity per term. The college has a strong focus on educational attainment and on creating successful global citizens.

Southland Girls' High School, New Zealand

Southland Girls' High School is the only state school for girls aged 7 to 13 in New Zealand and has an enrolment of 1200 students. Located in Invercargill and established in 1879, the school has a long history of academic excellence and the students have access to an innovative curriculum. The school has a global outlook and contributes to the World's Largest Lesson.

St Andrew's Scots School, Argentina

Founded in 1838 by Scottish settlers, St Andrew's Scots School in Buenos Aires is the oldest bilingual school in the world. Serving around 1950 students from 2 years of age until secondary school, most of them Argentine, St Andrew's features an extensive bilingual programme with a wide variety of sports and extracurricular activities, and has offered Cambridge examinations for more than 50 years.

Frensham School, Australia

Frensham School is a single-sex boarding school in New South Wales. Founded in 1913, the school provides an outward-looking academic programme for girls in Years 7–12. The school offers an enriched and extended curriculum across all year groups. The school began the Jamieson Programme in 1986. The Frensham motto, 'In love, serve one another', encourages students to be active and compassionate in recognising the needs of others and to respond with generosity, demonstrating leadership by example and integrity.

The Heritage Private School, Cyprus

The Heritage Private School is an English co-educational, academically selective school for almost 1000 students aged 2 to 18, with an intake from a wide variety of cultural backgrounds. Founded in 1987, the school provides an education based on the UK national curriculum. In addition to its academic courses, the school also actively involves students in national, European and international educational and community projects to extend experience and learning.

Parkside Middle School, Virginia, United States of America

Parkside Middle is one of 18 middle schools in a highly diverse school division. It is the only middle school in Virginia to be classified as a Cambridge School and it offers the Cambridge ethos, beliefs and philosophy to their entire student population of 1253 6th–8th Grade students. It is also the first Cambridge PDQ School in the USA and currently offers the Certificate in Teaching and Learning to its teaching staff.

The Perse School, UK

The Perse School is an independent secondary co-educational day school in Cambridge, for students ranging in age from 3 to 18. The school was founded in 1615 by Stephen Perse and has an enrolment of more than 1500 students. The Perse has been listed as the top-performing co-educational school for GCSE and Cambridge IGCSE results in national newspapers for the past three years but is committed to a broad and balanced education in which extracurricular and sporting activities play an essential part in the development of its pupils and the success that the school enjoys.

Shenzhen College of International Education, China

Shenzhen College of International Education is a selective UK national curriculum school for predominantly Chinese citizens. Established in 2003, the college teaches Cambridge IGCSE and Cambridge International AS & A Level, and each student attends at least one extracurricular activity per term. The college has a strong focus on educational attainment and on creating successful global citizens.

Southland Girls' High School, New Zealand

Southland Girls' High School is the only state school for girls aged 7 to 13 in New Zealand and has an enrolment of 1200 students. Located in Invercargill and established in 1879, the school has a long history of academic excellence and the students have access to an innovative curriculum. The school has a global outlook and contributes to the World's Largest Lesson.

St Andrew's Scots School, Argentina

Founded in 1838 by Scottish settlers, St Andrew's Scots School in Buenos Aires is the oldest bilingual school in the world. Serving around 1950 students from 2 years of age until secondary school, most of them Argentine, St Andrew's features an extensive bilingual programme with a wide variety of sports and extracurricular activities, and has offered Cambridge examinations for more than 50 years.

Suffern School, United States of America

Suffern High School is a public 9th–12th Grade school in Suffern, New York, serving approximately 1500 students. Suffern High is ranked in the top 500 high schools in the United States and was named a 2017 New York State High Performing Reward School. Suffern offers a large number of electives through programmes such as Advanced Placement, Cambridge, and numerous local colleges. Ninety eight percent of their students continue into post-secondary educational institutions.

United World College South East Asia (UWCSEA), Singapore

UWCSEA is an international school with more than 5500 students, representing more than 90 nationalities. Established in 1971 and spread over two campuses, the school provides a learning programme consisting of five interlinking elements: academics, activities, outdoor education, personal and social education and service. It is part of the United World Colleges movement