3. Approaches to teaching and learning

This chapter considers approaches to instruction that have the highest impact on students' learning and performance and support the development of the Cambridge learner and teacher attributes.

Further reading about the ideas in this chapter is available in:
- The *Developing the Cambridge learner attributes* guide
- Chapter 4 of the '*Developing your school with Cambridge*' guide and;
- Other resources in the '*Teaching Cambridge at your school*' area of the Cambridge International website

3.1 The Cambridge teacher

Excellent teaching – including the development of the learner attributes – is the single most significant factor impacting on learners' academic performance and personal growth that a school can influence. Successful schools, and successful school systems, develop and nurture highly skilled teachers who are encouraged to be creative professionals working in a collaborative culture.

It is important to stress that there is no single recipe for excellent teaching, and that different schools, operating in different countries and cultures, will have strong traditions that should be respected. However, there is a growing, evidence-based consensus that a certain number of powerful practices and approaches help learners fulfil their potential and be prepared for modern life.

Understanding cannot be transmitted from one person to another; it is always constructed in learners' minds. In order to develop a learner's understanding, their existing mental models must be challenged and extended. Teachers have to listen to the voice of the learner, in the classroom and as evidenced in the work they produce, and engage with it to support learning to help the learner develop their own understanding. This process helps to develop independent learners as they start to model the teacher's approach.

The most effective teaching practices and learning environments challenge learners' thinking beyond what they could achieve independently. The role of the teacher is to support (sometimes referred to as 'scaffold') student learning in what Vygotsky (1978) described as the 'zone of proximal development'. This is the area of challenge beyond what the learner can manage on their own but achievable with the help of a skilled other person. As a collection of practices and principles, Cambridge International describes this as 'active learning'. The word 'active' refers to learners' being actively engaged in learning rather than passive recipients of teaching. Teachers also need to be active leaders of learning rather than transmitters of knowledge or facilitators of learning. This involves constantly challenging student thinking, monitoring the impact of their instructional approaches and adjusting what they do based on feedback. See the '*Getting started with Active Learning* guide'.

Teaching and learning strategies

Teachers need to employ a variety of teaching strategies in the classroom. This will normally include carefully-designed individual learning activities, group work and whole-class instruction. The key element is the quality of learner engagement and the opportunities provided for feedback between the learner and teacher to guide the next learning steps. Whole class instruction can be a highly effective instructional approach if it includes discussion and learners have the opportunity to respond and contribute.

Teachers should apply assessment practices that regularly inform them whether learners are reaching their objectives. These assessment techniques also allow learners to understand where they are on their learning journey and how they can improve (see the '*Getting started with Assessment for Learning* guide').

3. Approaches to teaching and learning

Teachers as role models

Outstanding teachers model the Cambridge learner attributes. They are confident, responsible, reflective, innovative and engaged because they:

- **Have mastery of their subject area**. They can relate concepts and skills in such a way that students learn to understand and appreciate the nature of the academic discipline they are studying, and what constitutes excellence for the developmental stage they are teaching.

- **Teach for understanding as well as coverage**. They have the ability to engage with learners' mental ideas about the really important concepts, and take them on a journey of discovery. This approach requires learners to revisit concepts over an extended period of time and within different contexts. This spiralling strategy reinforces learning and leads to deeper levels of understanding.

- **Connect learning to the real world**. They connect learning to other topics in the subject, other disciplines and the experience of learners – making learning relevant.

- **Scaffold learning**. Teachers need to constantly challenge student thinking in the proximal zone of development. The optimal level of performance for a learner is the level that they can reach when they receive expert support, as distinct from the functional level, which they can achieve independently. Scaffolding learning helps to close this gap.

- **Have a learning rather than a performance orientation**. Chris Watkins (2010) points out that too many schools and teachers are more concerned about students looking good rather than learning well. There is considerable evidence that learning to learn is an effective strategy at raising student performance and preparing them to be independent, self-regulated learners equipped for modern life.

- **Are able to model problem solving and consider themselves as mentors as much as teachers**. They are concerned with the holistic development of the learner and understand the critical role that attitudes, emotions and self-confidence play in learning. They communicate a love of learning and believe every learner can achieve.

- **Understand, and can apply, assessment for different purposes**. They have an excellent grasp of summative assessment practices, but they also understand how to use assessment to support student learning. This is the process of identifying what the learner has or has not achieved in order to plan the next steps in learning and provide appropriate support.

- **Use a variety of different teaching strategies and activities**. This includes whole class instruction, collaborative group work and creative assignments and activities, as well as overseeing individual learning.

- **Are reflective and creative practitioners** engaged in ongoing effective professional learning.

- **Are collaborative and supportive of their colleagues**, the school and the school's community.

In order to support schools, Cambridge has developed a set of teacher standards which define the key professional characteristics and practices that teachers should develop to enable effective student learning in Cambridge schools. The standards can help to provide benchmarks against which teachers and their schools can evaluate their current practice and plan future development. They can show how the Cambridge Teacher and Cambridge Leader attributes are demonstrated in practice and they can contribute to the development of a shared frame of reference within which schools can work to improve the quality of teaching and leadership. The standards are flexible and have been developed so that they can be used to best effect in each school context providing a benchmark of what Cambridge considers to be teacher quality. See here:

3.2 The Cambridge learner and teacher attributes

Schools want their learners to combine both a deep understanding of their own culture and nation, with the skills to be global learners who are able to contribute and adapt to the uncertainties of the modern world. Cambridge introduced the learner/teacher attributes (Table 8), which recognise that a

3. Approaches to teaching and learning

meaningful curriculum is more than a collection of different subjects. Learners need to develop the academic abilities, life skills and attitudes needed to be successful in higher education and in the world of work.

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 and 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.

Table 8: Learner and teacher 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 that 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	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 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.

3. Approaches to teaching and learning

These attributes are not intended to be exhaustive. Schools may want to supplement them with others derived from the school's vision. To make the learner attributes more meaningful, school leaders should actively engage the school community with them, helping people understand why they matter and how they fit in with the school mission.

Subject curricula are more than subsets of knowledge to be taught and assessed by teachers and learned by students. They are the basis for the teaching and learning programmes that teachers use to express and deliver their wider expectations of learners. When planning lessons, teachers can build in opportunities for students to participate in learning activities and events that help grow and advance the development of learner attributes – consistent with the active learning approach described in the previous section.

The learner attributes apply across the curriculum and need to be supported both through the school's curriculum and co-curricular programmes.

When designing the school curriculum, it is important to ensure a breadth and balance of subjects and educational activities that contribute to cognitive, creative and psychomotor development. Some subjects lend themselves particularly well to collaborative work, creative expression and developing learner research skills, whether individual or collaborative (for example Cambridge Global Perspectives).

Having a rich selection of co-curricular activities will provide learners with opportunities to develop the inter- and intra-personal skills described in the attributes.

The school's environment, culture and the unacknowledged learning that permeates the school community beyond the classroom, will also have an important role in nurturing these attributes. Hence, the whole school community needs to be engaged with them.

In every school there will be some discrepancy between planned learning outcomes and the experience learners actually receive. It is extremely important to monitor and evaluate the experienced curriculum to see if what learners actually experience corresponds to what was intended. School evaluation procedures involving learners, teachers and parents can provide insightful feedback (see Chapter 4).

> ❝ **Becoming a reflective learner also requires being confident, responsible, innovative and engaged.** ❞

3.3 Becoming a reflective learner

The reflective attribute highlights the importance of learners understanding themselves as learners. This requires them to constantly reflect on their learning and accurately judge their own progress. They are able to employ a range of strategies to overcome the learning challenges they will inevitably face. Becoming a reflective learner also requires being confident, responsible, innovative and engaged. All of the learner attributes are interconnected.

3. Approaches to teaching and learning

Reflective learners:

- are effective at planning and managing their work and performance and accurately evaluating their progress

- understand themselves as learners and the nature of the knowledge they are learning

- apply their understanding to performance, constantly monitor what they are doing and produce appropriate responses

- are able to think both critically and creatively so as to overcome barriers to learning and engage with subject content deeply

- learn from mistakes and see failure as a learning opportunity

- are emotionally resilient when confronted with setbacks

- are confident, but not arrogant, in working with others and sharing ideas

- care about the learning of others and realise that learning is social and collective.

While most schools would agree that learning how to become a reflective learner is critical, many assume that learners will develop these skills independently and so it is not considered as part of the curriculum.

All teachers should prioritise and understand their role in helping students to learn how to learn. Some schools have tried to teach learning/reflective/study skills as an extra course. Separate classes tend not to be very successful because learning strategies and reflective practice are best developed in the context of the learning students experience in their classes.

Effective learners understand that learning is an active process involving questioning, discovery of barriers, devising strategies to overcome the barriers, constantly evaluating progress and changing what they do if it does not work.

Less effective learners often take a passive approach. When trying to revise, for example, they read and re-read books and their notes, trying to absorb the material. This is based on the false premise that understanding can be transmitted from a text (or a person) to the memory.

Active learning has to be deliberately practised in different contexts, and supported by the school and individual teachers who understand and model the practices themselves. This will not happen unless it is emphasised as a curriculum competence and supported by structures and systems that emphasise:

- clearly identifying learning aims and objectives in each subject

- the development of concepts (and therefore language) that help individuals understand and describe the learning process they are going through

- emphasising a holistic understanding of each academic discipline, building bridges between what is learned in one context and in another

- ongoing professional development for teachers and the creation of professional learning communities that support teaching practice.

Reflection and learning to learn are considered in more detail in chapter 3 of the '*Developing the Learner Attributes*' guide.

3.4 Disciplinary and inter-disciplinary approaches

Schools usually, and for good reason, design the school curriculum around the provision of a balance of different subjects appropriate for each age group. However, there are many areas of overlap between subjects. The school curriculum should therefore enable students to develop a holistic understanding of themselves as learners, and to reflect on the similarities and differences between different subject approaches.

The main reason for including academic disciplines in the curriculum is that they nurture the ability to think critically and solve problems with applications that are not easily acquired from everyday experience. Michael Young describes this as 'powerful knowledge' (see Young, 2013). The humanities, social sciences, science, mathematics, languages and the arts - when well taught and appropriately assessed - all develop the ability to think critically and creatively. They do this in ways that are not easily transferable to other contexts.

In order for students to become effective critical and creative thinkers in everyday life, they need to be able to reflect on and apply approaches they learn

in academic disciplines in an interdisciplinary way. Interdisciplinary understanding is extremely important. It refers to the ability - and confidence - to navigate between disciplines, make connections and develop a holistic appreciation of knowledge that provides new perspectives.

Disciplinary understanding needs to be the foundation on which a rigorous interdisciplinary approach is based. Without this foundation, learning can lead to superficial coverage and confusion. Teachers, backed by a supportive curriculum, can help make connections in students' minds between what they learn in one context and another.

Excellent schools support the development of interdisciplinary understanding by expecting teachers to plan collaboratively. Teachers need to understand what their colleagues are teaching to a particular year group in order to make connections with their own classes. Some schools identify interdisciplinary links in the curriculum. This may be done in an informal way with individual teachers sharing their teaching plans in the staff room, or during meetings scheduled for this purpose. One simple example of this would be where students have learned some statistical skills in mathematics, and the geography teacher makes them apply this knowledge to their geography coursework, thereby reinforcing the concepts.

Another way of reinforcing interdisciplinary links is to have curriculum coordinators examining the learning across particular age groups, helping to identify and support meaningful connections. This complements the work of heads of department, who oversee coherence and consistency within a vertical subject curriculum.

Curriculum planning is very important when it comes to choosing the activities, courses and qualifications that will enable learners to draw on their experiences across the curriculum in order to think in interdisciplinary ways. Learners need to be challenged, required to produce extended project work and make presentations on their findings, working collectively and individually on different assignments. This is the approach adopted in Cambridge Global Perspectives.

Cambridge Global Perspectives

Cambridge Global Perspectives is an interdisciplinary programme, offered at Cambridge Primary, Lower Secondary, IGCSE, AS & A Level.

Cambridge Global Perspectives focuses on the nature of argument and evidence, encourages understanding and respect for the perspectives of others, and develops a range of skills needed for success in higher education and the world of work in the 21st century.

Students learn to appreciate a variety of alternative perspectives on global issues where ideas and interests compete and there are no easy answers. They learn how to evaluate different arguments, in particular the evidence and reasoning used to support them, as well as to improve the quality of their own arguments. These important skills are transferable to learners' other subjects.

Through studying global topics, learners gain an international context in which they can develop their skills. Students develop flexible, reflective, creative and critical thinking. They learn how to research issues, arriving at well-reasoned and evidence-based conclusions. Students also learn to work collaboratively with others and effectively communicate and critique ideas so that they become more confident, responsible, reflective, innovative and engaged.

Cambridge Global Perspectives can be taught as a stand-alone subject. However, schools can also opt to use Cambridge Global Perspectives as the curriculum core. This places it at the heart of the school curriculum and emphasises its interdisciplinary nature. Teachers of other subjects would be made aware of its learning and assessment objectives and, where applicable, support them in the teaching of their own subject. Learner research and project work would be coordinated, with subject-expert teachers acting as mentors across the curriculum.

3.5 Using conceptual frameworks to support learning

Concepts are a way of categorising things to make sense of a complex and diverse world. Through this grouping we create a shared framework for understanding, communication and action. Each school subject involves a large number of concepts. Substantive concepts are part of the substance or content

knowledge in a subject, for example in geography these might include 'river', 'trade', 'city' or 'ecosystem'. Second-order concepts shape the key questions asked in a subject and organise the subject knowledge, for example second-order concepts in history might include 'cause and consequence', 'change and continuity', 'similarity and difference' and 'historical significance'. There will often be an overlap of substantive concepts between subjects. A student might learn about 'renewable energy' in science, geography, economics and politics. There may even be some overlap of second-order concepts, for example 'change' in both history and geography. It is the particular combination of substantive and second-order concepts that makes each discipline distinct and unique.

A threshold concept is one that, once understood, modifies learners' understanding of a particular field and helps them to make progress to the next

level. It helps them to go through a 'doorway' into a new way of understanding a topic or subject (Meyer and Land, 2003).

Part of effective teaching, supported by effective curriculum and assessment planning, is identifying which concepts are most important or 'key' for a particular developmental stage of learning. Cambridge syllabuses help scaffold learning through identifying important concepts. However, teachers need to adapt these to their own circumstances and incorporate them into their lesson planning and instructional design. Thinking carefully about key concepts can help teachers and heads of Department to better understand their subject discipline, and to support their learners 'progress.

Key concepts help create an understanding of the structure of a discipline, providing opportunities to link, review and put knowledge into context. This helps learners to progress, as well as to think and behave as a skilled mathematician, historian, chemist etc. A key concept will often link one topic to another, for example in economics, the concept of 'opportunity cost' links other areas of the curriculum such as production possibility frontier and the theory of comparative advantage.

For more guidance see the '*Getting started with Key Concepts*' guide.

3.6 Collaboration

Students need to learn to function effectively as team members and leaders, as this is an important ability 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. Individual responsibilities may change as progress or obstacles are met. The skills required to be an effective collaborator are different from those required to be 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. Collaboration is not the same as cooperation and this distinction needs to be understood by teachers planning group work.

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 Cambridge Global Perspectives and enterprise. The co-curricular programme provides opportunities for group work and collaboration.

3.7 Information literacy and using information & communications technology [ICT] in the classroom

Effectively using ICT resources is another essential skill all learners need to develop. Over the past decade, the use of digital technologies in classrooms has continued to expand. Desktops, laptops, tablets and smart phones are commonly used for learning, as educators find ways to employ today's technologies in school classrooms across all subjects. Including ICT-based resources and activities in teaching programmes can be challenging, but it is vital for today's generation of learners as they use ICT resources to access, process, evaluate and communicate information and data.

It is essential that ICT is used to support good classroom practice. Any technology used must enhance carefully planned teaching and learning goals - not replace them. One example of this is when teachers use technology, e.g. an interactive whiteboard, to develop understanding of new ideas in a way that engages the whole class as active participants rather than as another medium for the teacher to lecture. Cambridge offers professional development qualification courses and qualifications that focus on the optimum use of ICT in classrooms. See **here** for more information.

With an abundance of information on the internet information literacy has become critically important. Knowing how to access information is one skill but even more important is the ability to critically engage with the information and make balanced judgements about its meaning and reliability. This ability requires an understanding of the nature of the data and the area of knowledge to which it relates. For this reason information literacy needs to be at the heart of each discipline and an area of interdisciplinary inquiry. Information literacy, for example, is as the heart of Cambridge Global Perspectives.