4: Teaching Cambridge programmes

Learning happens when students have to think hard (Husbands 2014).

Improving teaching is the single most important intervention that a school can make to improve students' learning and performance. The written curriculum is produced in the school and is an interpretation of Cambridge syllabuses reflecting local needs. Schemes of work are either adapted from models supplied by Cambridge International or written by teachers and used to guide teaching. One indicator of excellence is that the written, taught, assessed and experienced curricula are well aligned. Good teachers constantly use feedback from students to fine tune their plans and activities (considered in detail in Chapter 5). The most effective approach to delivering Cambridge programmes is active learning. We briefly consider this here, giving links to other Cambridge resources. Excellent teachers are highly reflective and focus not only on the outcomes or products of learning, but also on the processes of learning. Differentiation centres on looking for patterns of needs in students. Existing and emerging technologies can be valuable teaching and learning resources if they are thoughtfully incorporated into planning.

4.1 The quality of teaching

Excellent teaching is the most significant factor that affects learners' academic performance and the development of the learner attributes (see Table 4). Successful schools develop and nurture highly skilled teachers who are encouraged to be creative professionals working in a collaborative culture. Good teachers have high expectations of the learners in their classrooms, and of themselves as learners of pedagogy and practice. They see their own development and learning as a continuous process.

What teachers do in the classroom has the biggest impact on student learning and outcomes. A good written curriculum by itself does not result in improved learner progress unless the teaching is also good. "A bad curriculum well taught is invariably a better experience for students than a good curriculum badly taught ... what matters is how things are taught" (Wiliam 2011, p. 13). Effective teaching increases the rate of learning. According to Wiliam (2011, p. 20), citing recent studies: "The most effective teachers generate learning in their students at four times the rate of the least effective teachers."

Coe et al (2014) define effective teaching as that which leads to improved student achievement using outcomes that matter to their future success. They identify six components of great teaching, all of which are important. The two with the strongest evidence of impact on student outcomes are pedagogical content knowledge and quality of instruction. Effective teachers have a deep knowledge of their subjects as well as an understanding of how students think about subject content at different developmental stages (pedagogical knowledge). They support this with a range of effective practices including:

- the effective use of questioning
- the effective use of assessment
- reviewing previous learning while progressively introducing and scaffolding new learning
- giving time to embed skills
- modelling good thinking.

Classroom climate and management moderately affect student outcomes, with teacher beliefs and professional behaviours having some evidence of impact.

Muijs et al (2014) consider key findings from 35 years of research on effective teaching. The quantity of academic activity is critical. Effective teachers manage the classroom environment. They maximise students' active engagement with learning, supported by an appropriate school calendar and timetable. There is a climate and culture of learning both in the class and the school. Effective teachers carefully structure lessons, beginning with overviews and objectives, explaining the content to be covered, identifying the most important ideas and reviewing key learning objectives. In this way they help students to understand the place of a particular piece of learning within the larger picture, helping them make connections.

Good teachers also instruct and talk much of the time. It is a misconception that they let students do most of the talking. Effective teachers spend much of the time asking focused questions, facilitating discussion and giving feedback rather than lecturing. Instruction and questions are carefully targeted to make students think hard. It is not enough for teachers to have good knowledge of the subject and the material they are teaching, although this is essential – they must make it understandable to learners. Planning the overall course thoroughly, as well as unit and lesson planning, is important so that the learning journey is clearly defined. Planning a variety of learning activities and developing an environment in the classroom that engages, stimulates and supports learners is important. Effective teachers check learners' understanding repeatedly and make sure that learners are able to use and apply their understanding in different contexts. They respond to the feedback learners give them by adjusting the way they are teaching. In this way teachers help to bring understanding and knowledge to a higher level than learners could achieve on their own – focusing on what Vygotsky (1978) describes as the **zone of proximal development**.

Muijs et al (2014) emphasise teachers' expectations of students as an important factor in teacher effectiveness. Pupils who teachers expect to do well actually do better. This is not just a matter of teachers accurately predicting student potential. Students are very sensitive to subtle messages and behaviours generated by teachers' expectations.

More recently there has been evidence identifying the importance of metacognitive awareness and strategies on students' academic performance (see Muijs et al 2014).

Metacognition, often described as thinking about thinking, is concerned with the learner managing their own learning. To be effective this is a complex process because the learner has to accurately understand their learning, different procedures, strategies and skills, and know when and how to use them. They also need to be able to self-evaluate the effectiveness of their actions, so self-regulate. It also requires students to have a disposition to behave in a certain way. Of particular interest is research that suggests that effective metacognitive awareness and behaviour might, up to a point, compensate for students' cognitive limitations in a discipline (Veenman et al 2006 in Muijs et al 2014). What teacher behaviours support the development of metacognitive skills?

Metacognition is closely associated with helping students become self-regulated learners – learning how to learn. It is essential that learning how to learn is naturally infused in the process of subject learning – it cannot be effectively taught in isolation. Good teaching has always supported the development of metacognitive awareness, and

the practices identified throughout this guide provide a good starting point. Having a higher-level overview of the subject and what constitutes excellence is important for learners as it provides a basis for them to understand their own work in relation to it. Supportive approaches include:

- effective feedback, using assessment as a tool that supports learning
- searching questioning that requires students to reflect on the processes, not just the products of learning
- teachers modelling effective thinking.

Students and parents need to be aware of the value of nurturing this capacity. It will help improve student academic performance as well as develop learning maturity, supporting students in further education and the workplace.

One distraction that is often presented is that skills are emphasised and presented as an alternative to content. As Hattie (2015, p. 14) argues, this is a false dichotomy: "*The art of teaching is to balance the need for surface knowledge with deep processing of this knowledge. Deeper thinking skills need content on which to work. You cannot use deeper thinking skills unless you have something to think about.*" As Hattie points out, when learning something new, the learner first needs to develop surface understanding based on knowledge and simpler applications of skills. Strategies like enquiry-based and problem-based learning should build on a solid foundation of surface-level understanding. Excellent teachers understand when to teach new ideas developing surface understanding, and when to extend these and go deeper. This is particularly important when planning lessons and schemes of work.

Another distraction for teachers can be ideas simplistically presented as effective approaches to teaching and learning. There is little evidence, for example, of the effectiveness of learning styles and multiple intelligences (Muijs et al 2014). Too often these complex concepts are misunderstood and misrepresented in terms of teaching approaches and applications.

4.2 Active learning

The approach to teaching and learning required for learners to achieve their maximum potential using Cambridge curricula and assessments is based on active learning. Active learning is often misunderstood. It does not mean that learners have to be involved in lots of activities in each lesson or that all activities need to be centred on student enquiry. It refers to processes that engage learners and promote the skills of analysis, evaluation, problem solving, synthesis, critical reasoning and creativity – in other words, requiring learners to think hard. So activities such as reading, writing, discussion (in groups or whole class), collaborative learning, problem-based learning, the use of simulations and case studies can all be used for active learning, provided they are well planned in relation to the learning objectives.

Teaching and learning have strong cultural dimensions. Sometimes schools new to Cambridge International worry about how they can implement active approaches to teaching and learning. Often these are schools working in cultures where the teacher is an authority and the student is not encouraged to question. While schools do need to engage with the concepts and strategies associated with active learning, it is important that they do this in a sensitive way, taking into account their own circumstances. We advise you to manage change in an incremental way. For example, a school could take only a few of the ideas presented in this guide and work on these during the initial years of school development planning. If the school is operating in a culture and community where student performance in examinations is the overriding imperative, then focus initially on developing formative assessment. This will be restricted to the purpose of feeding back into the teaching and learning process in support of Cambridge qualifications and assessments. (See Carless 2011 and Section 5.1 in the next chapter.) Doing this really well is an important first step for more ambitious approaches in the future.

The Cambridge learner attributes (see Table 4) are designed to support active learning. They encourage learners to take intellectual risks and recognise that the processes of learning are important, not just the products of learning. How this is done needs to be based on school culture and context. Cambridge learners will achieve more if they see learning as challenging and enjoy the act of striving for achievement, a necessary part of growth. There are many important habits that different cultures value, which should

be nurtured. Resilience – the ability to continue when finding work difficult and to learn from successes and failures – is vital for success. Deliberate and persistent practice is also critical for success. In certain contexts, memorising facts and texts will provide important surface knowledge that can be built on more actively in the future.

4.3 The written curriculum: Schemes of work

All teaching needs to be carefully planned. Schemes of work (sometimes called scope and sequence documents) show what topics, content, concepts and skills the teacher is intending to cover and the order in which they will be taught. They also provide an outline of the learning journey and may show the activities that will be incorporated into the lessons. Schemes of work provide the teachers' interpretation and plan for delivering the syllabus.

Cambridge International produces schemes of work to support many of its syllabuses. These present one way of delivering the course but they are neither prescriptive nor exhaustive in their content – teachers are expected to adapt them to their own purposes. Many teachers prefer to write their own, working with department heads and other responsible managers. For an inexperienced teacher or department, the Cambridge scheme of work provides useful support. It can reassure the teacher that they are covering the topics, content, concepts and skills required by the syllabus. The Cambridge schemes of work can be particularly helpful in demonstrating how to structure and sequence learning in a logical and coherent way, throughout a unit of work and a whole year's learning. Schemes of work are working documents and can be modified based on feedback as it occurs while delivering the curriculum. They need to reflect the local context of the school and be based on the school culture, timetable, vision and mission.

Planning is a process involving a number of stages (see Figure 3). Good teachers tend to design their teaching backwards (see Wiggins and McTighe 2005).

- The scope and sequence documents help identify the context – how a particular lesson or unit fits into the broader written curriculum expectations.
- Teachers identify the knowledge and skills learners need to master – the learning goals or priorities for a unit of work.
- Next, they decide the method learners will use to demonstrate learning – the success criteria or evidence that will be used to measure this.
- Then they plan the learning experience – the activities learners will use to master the content and skills being taught.

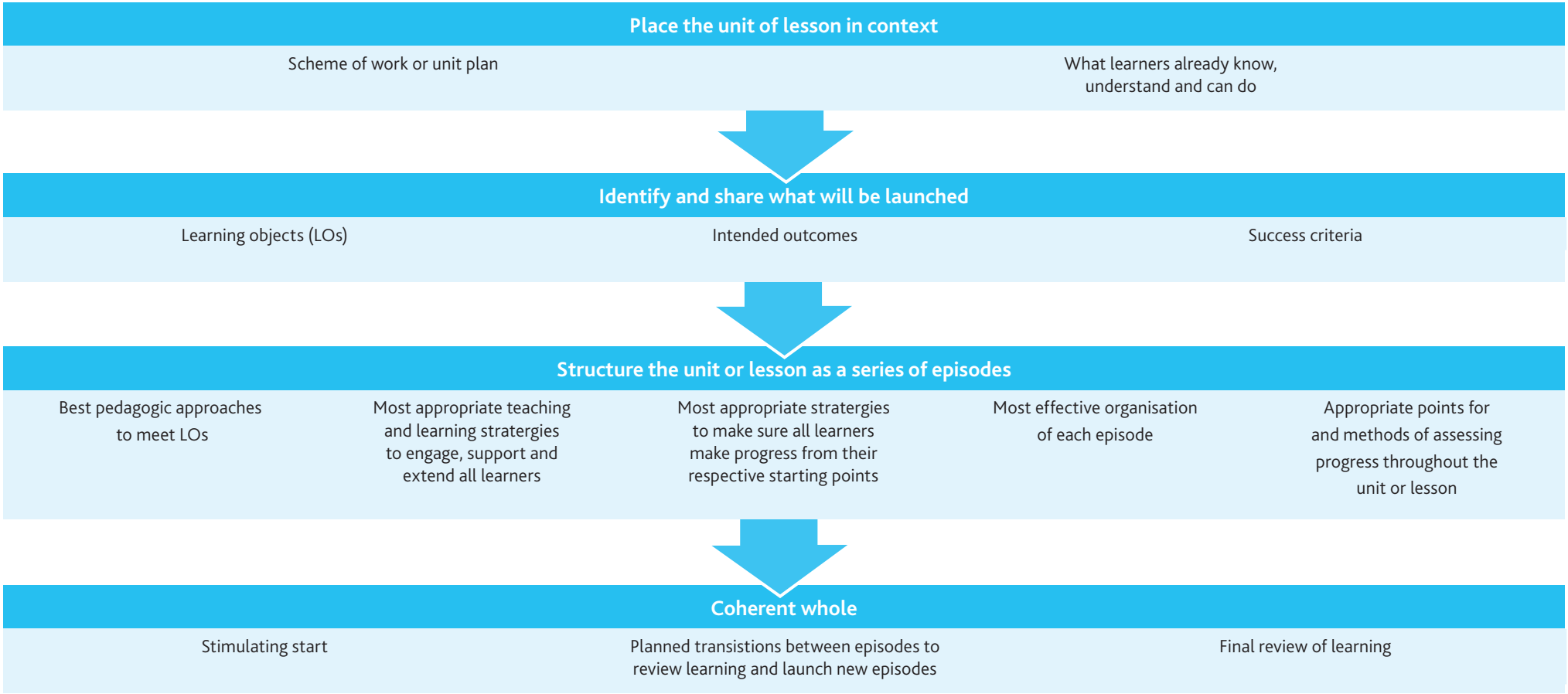
While planning is a process completed before instruction, actual teaching must be sensitive to learning that is actually happening, with constant checks on learners' understanding. Teachers need to constantly review and adjust their teaching, being prepared to adapt and change their plans based on the evidence of student learning. In this way the experienced curriculum can be aligned with the taught and the written curricula.

Evaluating the written curriculum, linking it to the taught and experienced curricula is an important part of teacher evaluation considered in Chapter 6.

Table 4: Cambridge learner and teacher attributes

Cambridge learners	Cambridge teachers
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 learners and their educational needs. They strive to communicate a love of learning and to encourage students to engage actively in their own learning.
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 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.	**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 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 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.

Figure 3: The planning process



4.4 Teaching skills and content

Cambridge programmes are designed to develop and consolidate student understanding of the subjects they are studying. This requires students to learn content knowledge, develop conceptual understanding and the skills needed to apply their understanding and solve problems. Skills are related to specific contexts and tasks and are developed through, and embedded in, subject content knowledge. The more demanding the qualification level, the more complex the material and the deeper the level of understanding students will need to demonstrate. Higher-order thinking skills are identified in Cambridge syllabuses and include analysis, synthesis and evaluation based, for example, on Bloom's taxonomy of educational objectives (Bloom et al 1956).

The development of understanding, supported by complex thinking skills, takes considerable time and practice. Skill development always occurs in a particular context and is not easily transferred from one situation to another even within a particular subject. When learning something new surface understanding needs to be developed first, including basic knowledge and simpler skills, before the student can proceed to more complex tasks. One implication for teaching and learning is that a spiral curriculum, where students frequently re-visit concepts and practise their skills at higher levels and in new situations, will help both consolidate and develop student learning. This is the approach Cambridge International supports.

Content and skills are described in syllabuses. These, together with specimen papers, teacher support materials and mark schemes, inform teachers about Cambridge curriculum and assessment standards. Understanding how Cambridge assesses student understanding, identifying what constitutes excellence in a particular qualification, is absolutely critical to effective teaching. It is vitally important that teachers new to Cambridge develop their understanding of Cambridge programmes and standards, not only through familiarising themselves with the materials Cambridge International provides but also attending subject-specific Cambridge professional development.

Cambridge teacher support material also provides important information to teachers and gives guidance about how the Cambridge learner attributes can be developed. Developing the learner attributes supports students to become independent and effective learners, thereby also improving their ability to perform well in Cambridge assessments.

Interdisciplinary curriculum mapping

It is essential to establish coherent and consistent planning processes to deliver Cambridge programmes. In addition some schools choose to go beyond this and map inter-disciplinary links between subjects. This involves horizontal planning across a particular year group to consider the relationship between what a student is learning in all their subjects at a particular point in time. In this way teachers can help students make connections between what they are learning in different subjects. This reinforces learning and helps students to see that human knowledge and understanding transcends individual subjects.

Coordinating the different schemes of work teachers are using enables cross referencing. In history a topic being taught might link up with a book being studied for English. The maths teacher might agree to teach a topic, for example statistics, at a time that reinforces what the science, business studies, economics or geography teacher is teaching. The possibilities are endless.

Interdisciplinary planning is often coordinated by a head of year who is responsible for examining the curriculum across all subjects and helping to establish links. Curriculum-mapping software is available that helps teachers view what others are planning and consolidates the whole curriculum. The results can then be examined for meaningful links.

Curriculum mapping does not need to be complicated. It is better to make a few meaningful links than to try and force links that are not natural. Another approach that can be adopted instead of, or together with, curriculum mapping is providing time in the calendar or timetable for students to work on interdisciplinary projects, facilitated by their teachers.

Cambridge Global Perspectives®, at both Cambridge IGCSE and Cambridge International A Level, is specifically designed to help develop interdisciplinary

understanding. By studying global issues, learners explore different and often opposing perspectives to develop critical thinking, research, communication and collaboration skills. The learner develops an informed curiosity and understanding of the world, becoming more able to transfer these skills to their other content-based subjects.

4.5 Developing a culture of reflective practice

Experience alone does not necessarily lead to learning; deliberate reflection on experience is very important (Loughran 2002, p. 9). Through reflection, learners can translate experiences into deeper learning that improves their overall effectiveness as learners. In Visible Learning (2009, p. 22), John Hattie argues that the "… biggest effects on student learning occur when teachers become learners of their own teaching, and when students become their own teachers". The self-regulatory attributes that Hattie argues are the most effective for learners, such as self-monitoring, self-evaluation, self-assessment and self-teaching, are also essential for teachers as learners.

In the reflective classroom the processes, as well as the products, of learning become an object of attention (see table 5 for some examples of teaching strategies that promote reflection). Teachers actively encourage learners to take time to step back and to:

- reflect on what they have learned
- compare intended and actual outcomes
- evaluate the strategies they have used
- establish and analyse connections and relationships with other areas of learning
- create meanings
- think about how to apply what they have learned to new situations.

Table 5: Some strategies for promoting the attitudes and skills of reflective learning with students

Reflection on assessment criteria. What does excellence look like?	Share the intended outcomes and success criteria with learners so that they can assess their own progress towards the objectives.
Scaffold learners' responses	Push learners to think more deeply through targeted questions and prompting.
Revisit, review and consolidate learning	Review learning and progress regularly, including providing opportunities for learners to restructure their newly acquired skills, knowledge and conceptual understanding into further evidence of learning, for example, short presentation, essay, revision notes.
Silent thinking	Give learners time to think and reflect independently before asking them to comment or to write in their log or journal about what they have learned from the activity undertaken.
Teacher models reflection	Teachers can help learners by sharing their own reflections on what they have learned from an activity, lesson or unit of work and so model the reflective process, including listening skills; thoughtful, exploratory questioning; and deep thinking.
Learner self-evaluation and/or Learning logs and journals	Ask learners to write a self-evaluation as part of the reporting process, explaining: • what they have learned about how they learn • what they need to do in order to improve • what challenges they have encountered • how they might overcome these. If used on a regular basis, learning logs and journals build in an expectation that the learner will reflect regularly, not only on what they have learned, but also on what they have found challenging, and strategies to improve learning.
Create steps towards problem solving	Involve the whole class in reflecting on the steps they took to solve a problem set and then 'build a ladder' of steps for the next time they undertake a similar activity.
Interviews	These might be peer-to-peer or teacher-to-learner interviews. They not only encourage learners to share reflections but also help to develop learners' skills of active listening, questioning and communication as well as deep thinking. This type of activity is particularly successful if the teacher models the thought process and encourages the whole class to design examples of effective questions to ask before learners engage in interviews themselves.
Reflective conversations	In small groups, pairs, or as a whole class, discuss the processes in which learners have been engaged. Teachers might ask learners to share their thought processes, detail the problem-solving strategies they used and reflect on the strategies to assess their effectiveness before reporting back to the whole class. These conversations should encourage learners to listen actively and to learn from others' reflective practices.

Reflective teachers constantly question, analyse and self-evaluate their effectiveness as teachers and use this to identify new knowledge and skills they need (see Figure 4). They ask themselves questions including:

- What worked in this lesson/unit of work?
- How do I know? What sources can I use to provide me with information?
- What would I do the same, or differently, if I was planning and teaching this lesson again? Why?
- What new knowledge or skills do I need to make improvements?
- How will I gain these? Research? Collaborate with other teachers?

Figure 4: The reflective cycle

Providing teachers with opportunities to reflect on practice, discuss their learning, learn from each other, and develop knowledge and skills collaboratively helps to foster this supportive climate for reflective practice that is so important for professional learning. Possible ways to encourage this practice may include:

- promoting a 'buddy' system for teachers to reflect and learn in pairs
- establishing cross-subject teaching and learning study groups, with sharing reflection on practice included as a regular agenda item
  encouraging specialist subject teachers to meet weekly or at the end of each unit of work to reflect on experiences together and to plan for improvements
- peer planning, observations of classroom practice and evaluation
- small-scale classroom studies of different teaching strategies and skills for promoting reflective learning
- developing case studies about the attitudes and skills of teachers and students as reflective learners.

Reflective teaching requires teachers to evaluate their own strengths and areas for development. This can be the starting point for creating a personal professional development plan (see Chapter 7). This process is also an integral part of the teacher evaluation processes that we consider in detail in Chapter 6. If teachers are used to the practices of reflection, self-evaluation and planning for improving their skills, they are likely to be more comfortable with, and supportive of, these practices as part of teacher evaluation systems. Personal professional development plans will also be useful when coaches work with teachers to help them concentrate on, and track progress against, identified and agreed areas for improvement.

4.6 Differentiated learning

"*Differentiation doesn't ask teachers to begin by individualizing instruction. In other words, it doesn't call for teachers to create 20 tasks for 20 students who will come to class tomorrow. It asks teachers to look for patterns of need*" (Tomlinson 2010).
One question that is often raised by Cambridge teachers concerns how to stretch all students in a large class, meeting the needs of the less able as well as the talented at the same time. How can teaching and learning be differentiated so that every student is working at their level, given work that is challenging for them but achievable given

their current level of understanding? There is no easy answer to this question. Cultural influences and expectations have a powerful influence on what happens in classrooms. Every school and every teacher must engage with this question because it is an important expectation in lesson planning and teaching that all learners can achieve their full potential.

Differentiated learning is characterised by having challenging objectives, ambitious individual and class targets, accurate, regular and robust assessment to check, track and support learning followed by prompt and targeted intervention where needed. Teachers should use ongoing formative assessment to identify learners' needs and to refine their teaching to meet these needs as learners change and develop. The following practices can be helpful in supporting differentiated learning:

- Use a variety of teaching strategies and approaches to engage all learners.
- Design activities that are interesting, stimulate deep thinking and challenge learners.
- Check learner progress on an ongoing basis and adjust strategies in response.
- Plan different ways for learners to engage in and demonstrate their learning.
- Try to include 'real-world' applications for what learners are learning.
- Use different groupings as appropriate e.g. whole class, small groups, pairs, individual, and change these as needed (flexible grouping).

It is possible to support differentiated learning during whole-class instruction provided all students are engaged. The reality in many classrooms is that teachers constantly select the same students to contribute to classwork. These students tend to be the most enthusiastic and confident. It is critical to develop a culture of learning in which all students understand that everyone's voice is important and incorrect answers are nothing to be embarrassed about. Through listening to students, as well as assessing their written work, teachers will be able to identify patterns of need.

Teachers should vary whole-class instruction with smaller groupings of students. These can be particularly useful for making learners more confident in working collaboratively. They might include:

- **Grouping according to need on a short-term basis.** For example, a teacher may group in order to address learners' specific reading or writing skills and strategies.
- **Structured or random grouping.** This makes sure that learners work collaboratively with different learners in the class to experience a range of views and opinions beyond their friendship groups.
- **Paired working to facilitate discussion.** One example of this is 'think, pair, share', where learners are given time to think individually. They then join with a partner to discuss and develop ideas, and finally share with the whole class.
- **Short-term regrouping across a whole grade or year group.** This allows choice and increases motivation, or makes the best use of teachers' strengths. For example, in physics, classes might be regrouped for a few weeks to study a particular unit with a teacher who has a particular interest and greater expertise in this area.
- **Guided learning groups.** This is where teachers target their support to small groups within the classroom and 'guide' their learning. A teacher will usually plan guided sessions over a sequence of lessons to make sure that all learners benefit from the approach. The approach can also be used to respond to immediate needs by intervening at the point of learning. For example, it may become clear through formative assessment that a group of learners has a particular barrier to learning that needs to be addressed. Teachers will, of course, need to make sure that they provide other learners with appropriately challenging work and a range of resources and self-help strategies to support them. It is also important that all learners are given time to reflect and then report on their learning and progress in the whole-class session.

When supporting teachers to plan for differentiated learning it is important to consider whether the learning environment is flexible enough to allow a wide range of teaching and learning activities. Are there areas in the classroom or corridors to provide working spaces for independent work or pairs? Do learners and teachers have easy access to learning resources? Can the furniture in the classroom be rearranged easily to allow for small-group working? Schools and teachers must create stimulating learning environments that support and promote active, differentiated learning.

4.7 Teaching with new technologies

Existing and emerging technologies can provide many stimulating opportunities to enhance active learning. However, they need to be carefully planned like any learning activity. In the information technology enabled classroom, providing additional sources of knowledge and information means learners are less dependent on the teacher. They

can use the technology to control and pace their own learning, taking an active role. They are able to make choices and decisions independently and collaboratively.

A critical competence that learners will need to develop in order to use technology effectively and wisely is information literacy. This is the ability to evaluate information and online material for its usefulness in answering particular questions, and use it in their own work in appropriate ways. One common mistake in classrooms is that teachers do not spend enough time helping students develop this competence, assuming everyone knows how to use the internet. Information literacy is an interdisciplinary skill. It can be supported simultaneously by a number of teachers in different disciplines teaching the same skills and expecting the same standards. Having an information technology policy will help identify responsibilities in this area. It should identify clear expectations, supported by an information literacy curriculum taught by a number of different teachers.

New technologies can be used to support teaching and learning by:

- giving learners more control of their own learning, more opportunities to set their own goals and providing support for reviewing and assessing their own learning
- providing opportunities for learners to learn in alternative and challenging ways, using a wide range of sources of information and techniques to support critical thinking
- providing additional opportunities for learners to demonstrate evidence of learning, for example a blog entry, wiki creation and use of multimedia
- providing vivid examples of 'real world' situations for learning that increase student engagement
- providing primary sources of data
- helping learners to work collaboratively, even when at a distance from their peers
- helping teachers to view, assess and provide feedback on learners' individual and collaborative work, in school and at a distance
- helping learners to see patterns and behaviours more clearly
- helping teachers to facilitate whole-class discussion regarding first-hand observations, and encouraging learners to consider issues raised by their observations within a wide range of contexts
- helping teachers to collaborate to improve schemes of work, unit plans and lesson design
- helping teachers to support learners to review, refine, re-draft and modify work in progress
- helping learners to improve their attainment through refining and presenting their ideas more effectively and in different ways
- supporting teachers and learners to improve their presentation of work.

There are also many advantages of using new technologies for teachers' own learning and for the support they give to learners. It is easy for teachers to share resources, expertise and advice with other colleagues within a school, between schools or even internationally, using online professional communities and social media sites. Using technology to interact and share resources can make sure that planning for active learning and its assessment is thorough and effective without taking too much teacher time. Teachers can design web-based assignments for schemes of work and unit plans collaboratively, and build formative and summative assessments into these. They can record electronically a learner's assessment data, the feedback the teacher has given, and the action the learner has taken in response. This makes tracking learner progress and setting individual and group targets for learning easier. Teachers and learners can email classwork and homework. Video-conferencing between schools can support student and teacher learning.

There are pre-conditions for using new technologies in and beyond the classroom. The most fundamental is that a fast, reliable internet connection is essential. It also requires learners and teachers to have easy access to new technologies, and this can be costly for the school. However, the use of BYOD (bring your own device) and low-cost tablets, and the availability of the cloud network (which eliminates the need for software installation, servers and local file storage) can help to reduce the impact on the school's budget.