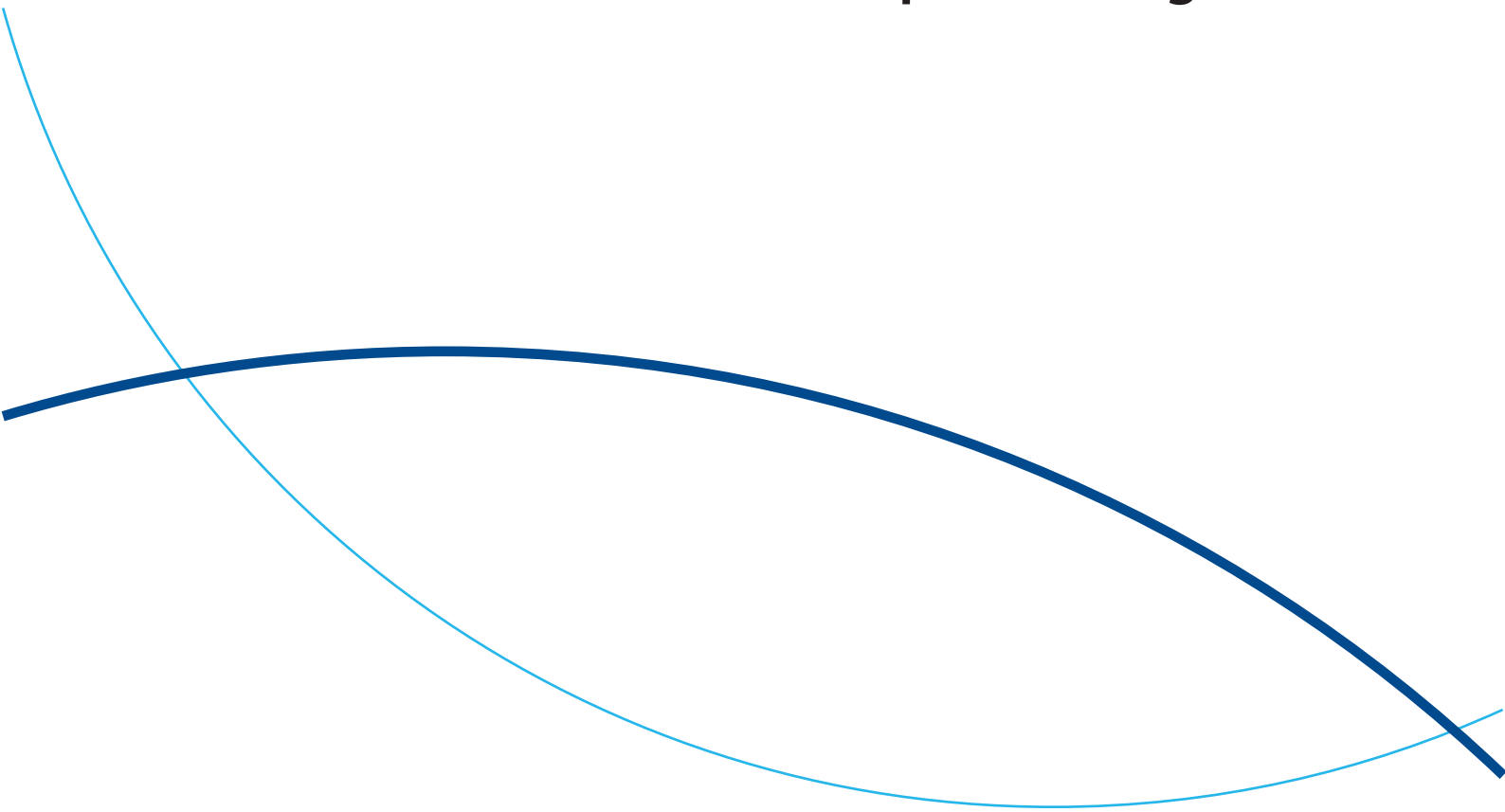
Diploma Programme

Approaches to teaching and learning in the Diploma Programme



International Baccalaureate®
Baccalauréat International
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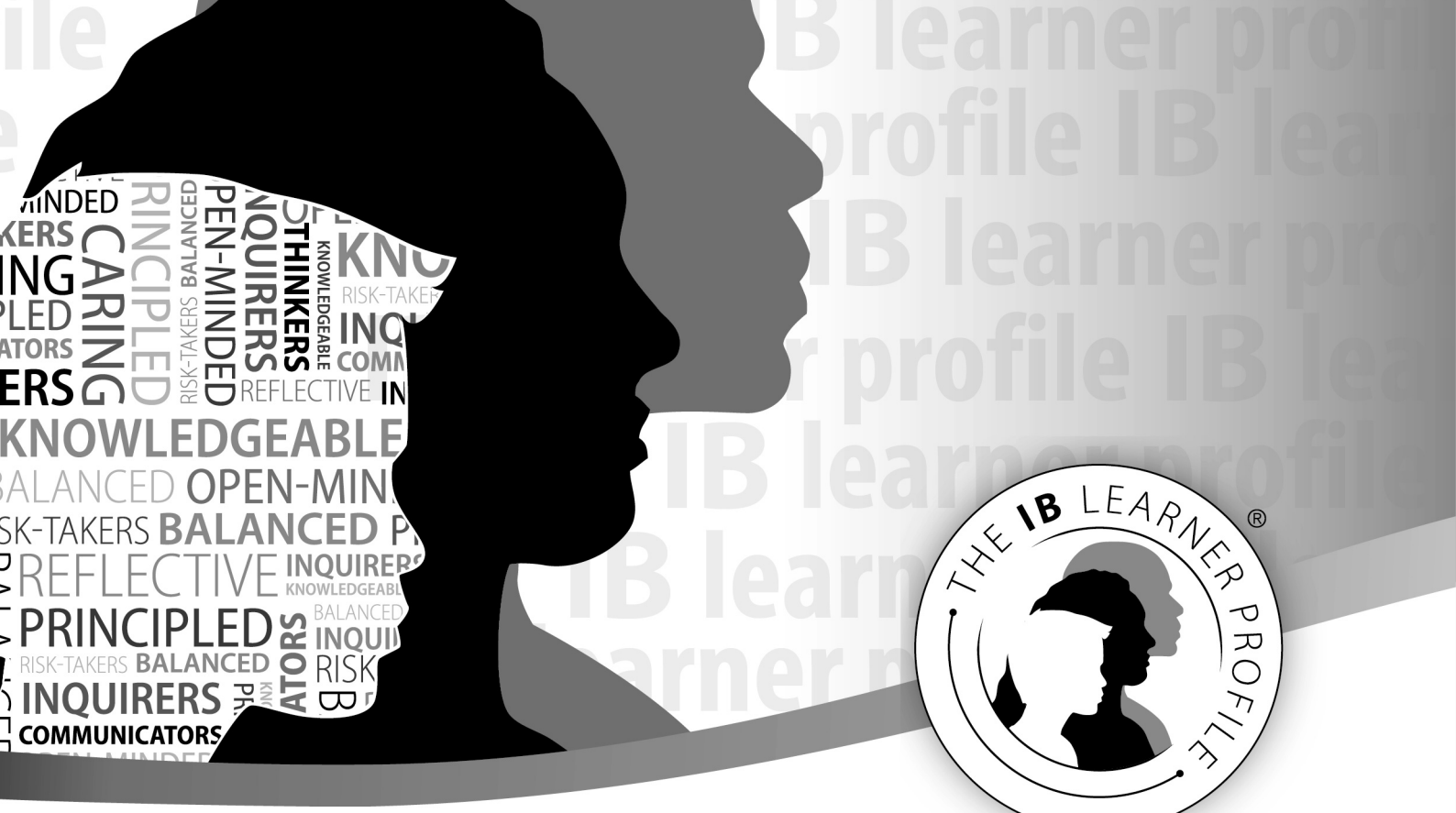
IB mission statement

The International Baccalaureate aims to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect.

To this end the organization works with schools, governments and international organizations to develop challenging programmes of international education and rigorous assessment.

These programmes encourage students across the world to become active, compassionate and lifelong learners who understand that other people, with their differences, can also be right.



IB learner profile

The aim of all IB programmes is to develop internationally minded people who, recognizing their common humanity and shared guardianship of the planet, help to create a better and more peaceful world.

As IB learners we strive to be:

INQUIRERS
We nurture our curiosity, developing skills for inquiry and research. We know how to learn independently and with others. We learn with enthusiasm and sustain our love of learning throughout life.

KNOWLEDGEABLE
We develop and use conceptual understanding, exploring knowledge across a range of disciplines. We engage with issues and ideas that have local and global significance.

THINKERS
We use critical and creative thinking skills to analyse and take responsible action on complex problems. We exercise initiative in making reasoned, ethical decisions.

COMMUNICATORS
We express ourselves confidently and creatively in more than one language and in many ways. We collaborate effectively, listening carefully to the perspectives of other individuals and groups.

PRINCIPLED
We act with integrity and honesty, with a strong sense of fairness and justice, and with respect for the dignity and rights of people everywhere. We take responsibility for our actions and their consequences.

OPEN-MINDED
We critically appreciate our own cultures and personal histories, as well as the values and traditions of others. We seek and evaluate a range of points of view, and we are willing to grow from the experience.

CARING
We show empathy, compassion and respect. We have a commitment to service, and we act to make a positive difference in the lives of others and in the world around us.

RISK-TAKERS
We approach uncertainty with forethought and determination; we work independently and cooperatively to explore new ideas and innovative strategies. We are resourceful and resilient in the face of challenges and change.

BALANCED
We understand the importance of balancing different aspects of our lives—intellectual, physical, and emotional—to achieve well-being for ourselves and others. We recognize our interdependence with other people and with the world in which we live.

REFLECTIVE
We thoughtfully consider the world and our own ideas and experience. We work to understand our strengths and weaknesses in order to support our learning and personal development.

The IB learner profile represents 10 attributes valued by IB World Schools. We believe these attributes, and others like them, can help individuals and groups become responsible members of local, national and global communities.

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Contents

Introduction

> Learning should not only take us somewhere; it should allow us later to go further more easily.
>
> (Bruner 1960: 17)

The IB Diploma Programme (DP) aims to prepare students for success in higher education and beyond; it encourages students to become "active, compassionate and lifelong learners" (IB mission statement). DP teachers therefore play a crucial role as teachers of learners, not simply teachers of content.

The DP was established in 1968, and the values and educational philosophies of its founding figures are still key influences on the IB today. A strong influence on Alec Peterson, the first Director General of the IB, was the British philosopher AN Whitehead. In *The Aims of Education* (1916), Whitehead was highly critical of education that focused too much on the passive reception of disconnected ideas and inert knowledge. Instead, he urged that students be encouraged to make ideas their own and to understand the application of these ideas within their own curriculum and their own lives. From its beginnings, the DP has adopted a broadly constructivist and student-centred approach, has emphasized the importance of connectedness and concurrency of learning, and has recognized the importance of students linking their learning to their local and global contexts. These ideas are still at the heart of an IB education today.

This document offers guidance to teachers and coordinators on approaches to teaching and learning in the DP. Approaches to teaching and learning are deliberate strategies, skills and attitudes that permeate the teaching and learning environment. These approaches and tools, intrinsically linked with the IB learner profile attributes, enhance student learning and assist student preparation for DP assessment and beyond.

These approaches to teaching and learning are also inextricably linked to the development of internationally minded students, a central aim of all IB programmes. Education for international mindedness "relies on the development of learning environments that value the world as the broadest context for learning" (*What is an IB Education?* 2013). Effective approaches to teaching and learning in the DP should therefore be developed within global contexts, with particular attention being given to promoting the three key elements—global engagement, multilingualism and intercultural understanding.

The emphasis on international-mindedness found in all DP courses is a reflection of the IB's mission, and of the belief that this "will give students the capacity to build those defences of peace that will make the world a better place" (Walker 2010: 7). The development of international-mindedness involves students developing a deeper undertanding of their own perspectives, beliefs and assumptions. It also increases students' awareness of the existence of multiple perspectives. In this way, international-mindedness is concerned with going beyond, rather than replacing, the student's own sense of cultural and national identity.

This document is intended to clarify and make more explicit the approaches to teaching and learning that underpin the DP. It consists of three sections.

- The first section focuses on approaches to learning (ATL).
- The second section focuses on approaches to teaching, and on the pedagogical principles that underlie the DP.
- The third section focuses on pedagogical leadership. It is aimed primarily at DP coordinators, and includes guidance on developing and implementing teaching and learning initiatives in schools.

This document is also intended to help schools identify strategies that support their efforts to meet the IB programme standards and practices. During the process of authorization, and again every five years at programme evaluation, schools are asked to provide evidence of their progress towards meeting the standards and practices. The development of approaches to teaching and learning addresses practices within all the standards, but schools will find the guidance here particularly useful as they consider standard C3: Teaching and learning reflects IB philosophy and standard C4: Assessment reflects IB assessment philosophy. For more detailed guidance on these standards and practices, please see the following IB publications: *Programme standards and practices* (2014), *The guide to school authorization* (2010), and *Programme evaluation guide and self-study questionnaire: Diploma Programme* (2010).

Throughout this document you will find suggestions for teaching activities relating to the area being discussed, specific examples from DP subjects, and links to other useful IB resources and publications. This document is also accompanied by a range of specific resources for the DP, including:

- example DP unit planners (templates and examples of completed unit plans)
- short case studies of initiatives from some of the DP schools who helped to pilot the ATL materials
- interviews with academics who are experts in the field of teaching and learning
- a “self-reflection” tool for teachers, designed to help teachers reflect on their current practice
- a suite of 26 short videos.

The videos are designed to illustrate how the ideas presented in this document translate into real DP classrooms around the world. Some of the videos show a DP lesson in action, exemplifying a particular approach to teaching or learning, and including interviews with teachers and students. The other videos focus more on pedagogical leadership in DP schools, including interviews with the pedagogical leadership teams talking about how they approach ATL in their particular context.

These ATL resources for the DP have been designed to provide teachers and coordinators with examples of how the ideas in this document can translate into practice. The resources are intended to provide ideas and inspiration that schools can then apply and adapt to their own particular context.

Approaches to learning

The development of skills such as thinking skills and communication skills is frequently identified as a crucial element in preparing students effectively for life beyond school. A 2007 survey of 400 hiring executives of major US corporations identified their top four requirements of new recruits as being oral and written communication skills, critical-thinking and problem-solving skills, professionalism and work ethic, and teamwork and collaboration skills (Trilling and Fadel 2009). Similar skills lists have been developed by the International Society for Technology in Education (ISTE) and the Organisation for Economic Co-operation and Development (OECD), and are also the subject of numerous books such as *The Global Achievement Gap* (Wagner 2010). Yet many students struggle with some of the basic skills of effective learning. For example, good note making has been positively correlated with academic achievement, yet research suggests that many university students have difficulty even with the fundamental skill of making notes from lectures or texts (Kiewra 1985, O'Donnell and Dansereau 1993).

Developing students' ATL skills is about more than simply developing their cognitive skills. It is also about developing affective and metacognitive skills, and about encouraging students to view learning as something that they "do for themselves in a proactive way, rather than as a covert event that happens to them in reaction to teaching" (Zimmerman 2000: 65). By developing ATL skills and the attributes of the learner profile, DP students can become "self-regulated learners" (Kaplan 1998). Self-regulated learners have learned how to set learning goals, ask good questions, self-interrogate as they learn, generate motivation and perseverance, try out different learning processes, self-monitor the effectiveness of their learning, reflect on achievement, and make changes to their learning processes where necessary (Zimmerman and Schunk 1989, de Bruin et al. 2011, Wolters 2011).

The term "skill" is therefore used in a broad sense in the DP to encompass cognitive, metacognitive and affective skills. Cognitive skills include all the information-processing and thinking skills, often called "study skills" in a school environment. Affective skills are the skills of behaviour and emotional management underpinning attitudinal factors such as resilience, perseverance and self-motivation, which often have a large role to play in educational achievement. Metacognitive skills are the skills that students can use to monitor the effectiveness of their learning skills and processes, to better understand and evaluate their learning. Although these skills may be in use when manifesting a certain natural ability or talent, they are different to both of these because proficiency in any skill can be increased through the deliberate use of techniques and strategies, feedback and challenge. Skills are therefore highly teachable.

In the DP, as well as in the Primary Years Programme (PYP) and Middle Years Programme (MYP), these cognitive, metacognitive and affective skills are grouped into the same five ATL categories.

Although these skills areas are presented as distinct categories, there are obviously close links and areas of overlap between them, and it is intended that these categories should be seen as interrelated. It is also the intention that these ATL skills should be seen as linking closely with the attitudes and dispositions identified in the IB learner profile. The learner profile is the IB mission statement translated into a set of learning outcomes for the 21st century. It is an easily communicated set of ideals that can inspire, motivate and focus the work of schools and teachers, uniting them in a common purpose.

The next five sub-sections of this document will explore each of the five ATL skills categories in turn. They will identify some of the specific skills that make up these categories, discuss what these skills look like in students, and discuss strategies for their development.

Thinking skills

> Concern with developing students' thinking, far from being a fad, is one of the most persistent and ambitious aspirations of education.
>
> (Swartz and Perkins, 1989: 5)

Developing thinking skills is a key feature of the constructivist approach that so heavily influences all IB programmes. In this approach, the teacher is seen as a facilitator who "guides the student, stimulating and provoking the student's critical thinking, analysis and synthesis throughout the learning process" (Briner 1999: 1). Being "thinkers" is explicitly identified as one of the IB learner profile attributes, and is defined in terms of exercising initiative in applying thinking skills critically and creatively to recognize and approach complex problems, and make reasoned, ethical decisions.

The DP prides itself on providing opportunities for students to develop thinking skills and also an awareness of themselves as thinkers and learners; something that is most explicitly apparent in the important place given within the DP to the theory of knowledge (TOK) course. TOK plays a special role in the DP, providing an opportunity for students to reflect on how we know what we claim to know. It is intended that the study of TOK will support, and also be supported by, the academic disciplines, and all DP subject guides provide teachers with suggestions for how they can make links to TOK in their subject.

Teaching idea: As part of their TOK course, DP students compare and contrast the methods used to gain knowledge in different areas (such as the natural sciences, history or the arts). Initiate a discussion with your students about the methods used in your DP subject. What are the methods used in your subject, and what is it about these methods that generates knowledge? What are the assumptions underlying these methods? What are the limitations/constraints on these methods?

The term *thinking skills* refers to a cluster of a large number of related skills, and in the DP particular focus is placed on skills such as metacognition, reflection and critical thinking. Many categorizations of thinking skills also emphasize related behaviours such as "curiosity, flexibility, posing problems, decision making, being reasonable, creativity, risk taking, and other behaviours that support critical and creative thought" (Costa and Kallick 2009). In this way, while a crucial element of developing students' thinking is helping them to build up a toolkit of skills, it is equally important to cultivate dispositions such as open-mindedness and curiosity.

Whether metacognition is a skill, a collection of skills or simply a state of mind is debatable, but in essence metacognition "refers to higher-order thinking which involves active control over the cognitive processes engaged in learning" (Hattie 2009). In many ways, improving metacognition is foundational for improving all other skills. Improving students' metacognitive awareness will help them to become more aware of the ways in which they process information, find patterns, build conceptual understandings, and remember key facts and ideas. Once they are aware that they are using techniques and strategies to perform even the most basic learning tasks, students can be encouraged to consider if there are more effective or efficient ways to achieve those same outcomes. They can then be encouraged to try new ways of learning and to evaluate the results.

Reflection

Like metacognition, reflection is a thinking skill that plays a particularly essential role in learning. The value of structured reflection activities in education is widely recognized, and elements are commonly incorporated into learning programmes in various forms. These activities may be written (for example, reflective essays, reading logs, case studies), oral (for example, presentations, video diaries, discussion) or artistic/creative (for example, photos or other images capturing scenes that can then be used to promote discussion). They may also encompass elements of more than one form (for example, student portfolios). Online tools. such as blogs (reflective journals), wikis (collaborative web pages), digital stories and podcasts, interactive micro-blogging and social networking also offer great opportunities for reflective activities.

It is crucial that reflective activities are meaningful for students, and do not become mechanistic and formulaic. Effective reflective activities should challenge students to think more deeply, and students need to be explicitly aware of the role of the activities. This does not necessarily mean introducing students to specific theories/models of reflection, although this can be helpful, but it does mean ensuring that sufficient time is allocated to appropriately designed reflective activities at all stages of learning—before, during and after. Another helpful approach can be to distinguish between different types of reflection. For example, the three elements of the DP core all have a slightly different emphasis in relation to reflection: in TOK, the prime

emphasis is on cognitive reflection; in the extended essay, the emphasis is on reflection on process; and in creativity, activity, service (CAS), there is a more affective emphasis to the reflection.

Higher order thinking

Discussions and categorizations of thinking skills often use the phrase *higher-order thinking skills*. This distinction between higher- and lower-order thinking skills is rooted in Bloom's taxonomy of thinking skills (1956). Bloom's taxonomy distinguishes between the lower-order skills of knowledge acquisition, comprehension and application, and the higher-order skills of analysis, synthesis and evaluation. Bloom's taxonomy was later revised and updated by Anderson and Krathwohl (2001) into a slightly less strict hierarchy that allows for more overlap between the categories.

Category	Associated thinking skills
1. Remember	Recognizing, recalling
2. Understand	Interpreting, exemplifying, classifying, summarizing, inferring, comparing, explaining
3. Apply	Executing, implementing
4. Analyse	Differentiating, organizing, attributing
5. Evaluate	Checking, critiquing
6. Create	Generating, planning, producing

(Anderson and Krathwohl, 2001)

DP subjects place a premium on the development of higher-order thinking skills rather than on simple memorization of content. This is clearly apparent in the aims of DP courses; for example, one of the aims of all group 3 courses is to "develop in the student the capacity to identify, to analyse critically and to evaluate theories, concepts and arguments about the nature and activities of the individual and society". The higher-order thinking skills DP subjects foster can be seen in the command terms used in DP examination papers, where questions ask students to "analyse", "evaluate", "compare", and so on. Most DP subject guides provide a list of command terms, and it is important that teachers familiarize students with these terms so that students have a clear understanding of what they are expected to demonstrate in their responses.

Teaching idea: When planning DP lessons, consider what higher-order questions you will ask your students to encourage higher-order thinking. Also be sure to plan time for students to think about their answers to questions, rather than engaging in rapid "ping-pong" questions and answers that do not give students time to think deeply about their responses.

Some of the most influential recent work on thinking comes from the "Project Zero" team at the Harvard Graduate School of Education. Their "Cultures of Thinking" project focuses on the importance of creating an atmosphere in the classroom where the "group's collective as well as individual thinking is valued, visible, and actively promoted as part of the regular, day-to-day experience of all group members" (Ritchhart et al. 2011). This approach emphasizes the importance of embedding thinking into the culture and everyday life of the school, rather than it being seen as an add-on. One practical teaching strategy developed by this project to help achieve this aim is that of "visible thinking" routines (Ritchhart et al. 2011), for example:

Connect, extend, challenge (Routine to help students make connections between old knowledge and new knowledge.)	**Generate–sort–connect–elaborate** (Concept-mapping routine.)	**I used to think ... now I think ...** (Routine to help effective reflection on how and why their thinking has changed.)
Headlines (Routine where students write a newspaper-style headline to capture the essence of an idea, event, topic, etc.)	**Claim, support, question** (Routine for exploring claims. Students make a claim, identify support for that claim, then ask a question related to that claim.)	**Think, pair, share** (Routine where students think individually, then share/ compare their thinking with a partner.)

Communication skills

> Most people do not listen with the intent to understand; they listen with the intent to reply.
>
> (Stephen Covey, 2004: 239)

Surveys asking hiring executives which skills they are looking for in potential future employees frequently report oral and written communication skills as being top of the list (see, for example, the survey in Wagner 2010). Students in the final years of their school-based education need to be very aware of this link, as the requirement for strong communication skills is often implied or explicitly identified in job descriptions (Krapels and Davis 2003).

Within DP schools, good communication skills are needed not only for success in every subject discipline but also to help form and maintain good interpersonal relationships both with other students and with adults, be they teachers, administrators or parents (Gallagher 1991). Good communication skills have also been significantly correlated with improved social self-efficacy (Erozkan 2013), self-esteem and self-confidence (Riggio, Throckmorton and DePaola 1990).

The term *communication skills* is very broad and consists of a cluster of different skills and forms of communication. The University of Melbourne, in association with Cisco, Intel and Microsoft, produced an influential white paper as the foundation document for their "Assessment and Teaching of 21st Century Skills" (ATC21S) project, in which they state that the most essential communication skills for adolescents are as follows (Binkley et al. 2010):

- The ability to communicate, in written or oral form, and understand, or make others understand, various messages in a variety of situations and for different purposes.
- The ability to listen to, and understand, various spoken messages in a variety of communicative situations, and to speak concisely and clearly.
- The ability to read and understand different texts, adopting strategies appropriate to various reading purposes (reading for information, for study or for pleasure) and to various text types.
- The ability to write different types of texts for various purposes. To monitor the writing process (from drafting to proofreading).
- The ability to formulate one's arguments, in speaking or writing, in a convincing manner and take full account of other viewpoints, whether expressed in written or oral form.
- The skills needed to use aids (such as notes, schemes, maps) to produce, present or understand complex texts in written or oral form (speeches, conversations, instructions, interviews, debates).

All of these communication skills play a crucial role in the DP. For example, within the three elements of the DP core, students need to communicate in a number of different ways: in TOK, students undertake both an essay and an oral presentation, and need to be able to formulate arguments clearly and coherently in both formats; in the extended essay, the skill referred to above of monitoring the writing process from drafting to proofreading is particularly vital; and in CAS, students often, for example, undertake service activities that require effective interaction and communication with members of the local community.

Teaching idea: When supporting students in planning their CAS activities, encourage them to carefully plan and reflect on the ways in which they will communicate with the people and communities with whom they will be working. Encourage them to think about what the potential challenges might be, as well as the positive opportunities for using their communication skills through activities such as advocacy.

Strategies to develop communication skills

There are many simple strategies that teachers can use to help students develop their communication skills. For example, Mendler (2013) identifies eight simple tips for encouraging good communication in the classroom:

- Model a good conversation, particularly with students who struggle conversationally.
- Encourage physical cues.
- Challenge put-downs or hurtful comments.
- Ask open-ended questions.
- Put thinking ahead of knowing.
- Have informal conversations.
- Make eye contact.
- Encourage turn-taking.

(Mendler, 2013)

The link between communication and social skills

Communication is a two-way process that involves an exchange of ideas and information. This means that there is a particularly strong link between communication skills and social skills, which are the subject of the next sub-section of this document. For example, for many teenagers, the internet means connection with others—both communication and social interaction—whether by email, Facebook, Twitter, chat, blogs, gaming, and so on. This is today's participatory social culture where creativity, communication and collaboration, blended with media skills, are the currency of value. These skills are sometimes called "media literacy". In the US, studies show that 57% of online teenagers (around 12 million people) create content for the internet. They create blogs and web pages for school, friends or organizations, they share original artwork, stories, photos or videos online, or they sample and remix other online content into new original creations. Lenhardt and Madden (2005) have identified that:

- 33% of online teens share their own creations online, such as artwork, photos, stories, or videos
- 32% say that they have created or worked on web pages or blogs for others, including those for groups they belong to, friends or school assignments
- 22% report keeping their own personal web page
- 19% have created their own online journal or blog, and 38% read them.

Online activities such as these can present exciting opportunities for the development of communication skills.

Social skills

To function effectively in the school environment, students need to be adept at both peer-related and teacher-related social communication and behaviour. These skills are closely linked to communication skills and also to attributes of the IB learner profile, such as being caring (for example, through students being aware of the impact of their behaviour on others).

Learning itself can also be seen to have a strongly social element. This idea is particularly associated with Vygotsky, who argued that "human learning presupposes a specific social nature and a process by which children grow into the intellectual life of those around them" (Vygotsky 1978: 88). In this approach, learning is a fundamentally active social process, and collaboration is a crucial way of constructing understanding and making meaning. (For further discussion of this pedagogical approach please see the "Teaching focused on effective teamwork and collaboration" section of this document.)

Specific training in social skills can have a number of other benefits, particularly for students with some form of pre-existing behavioural difficulty. Social skill deficiency in childhood has been found to be the single best predictor of significant problems in adulthood (Strain and Odom 1986) and it is more frequently found in teenagers with learning and behavioural problems than in the general student population (Elksnin and Elksnin 1998). In a 1991 study, 91% of a group of 99 social phobics reported adverse effects on their academic performance as a result, usually through lack of class participation, fear of assignments requiring oral presentations and group work (Turner et al. 1991).

Teaching idea: Promote appreciation of individual differences.

The IB mission statement encourages students to "understand that other people, with their differences, can also be right." Discuss with students why the IB might have included this in its mission statement, and discuss scenarios they have encountered/are likely to encounter where this skill is important.

The term *social skills* encompasses a broad cluster of skills; Walker (1983), for example, defines social skills as "a set of competencies that a) allow an individual to initiate and maintain positive social relationships, b) contribute to peer acceptance and to a satisfactory school adjustment, and c) allow an individual to cope effectively with the larger social environment" (Walker 1983: 27). However, a particularly crucial skill, within the category of social skills, is collaboration.

Collaboration

Collaborative learning has been found to improve understanding of facts (Fall et al. 1997), increase student motivation and engagement (Cumming 2010), improve academic performance for lower-ability students (Saner et al. 1994), and to produce higher satisfaction in learning (Klein 1992).

Another of the key advantages of collaborative activities is that they can be a catalyst to higher-order thinking. "Proponents of collaborative learning claim that the active exchange of ideas within small groups not only increases interest among the participants but also promotes critical thinking" (Gokhale 1995). Discussion and argument are key aspects of both critical thinking and many collaborative tasks. Generating creative ideas and problem-solving are also two examples of tasks where students are often stimulated to perform better when they engage in collaborative reflection. Johnson and Johnson (1983) "found that when students work cooperatively in groups, increased reasoning strategies and greater critical thinking competencies result than in competitive or individualistic settings" (in Costa and Lowery 1989: 17).

There is evidence that cooperative teams achieve at higher levels of thought and retain information longer than students who work quietly as individuals. In some cases, "working with others promotes academic engagement through the added responsibility of group performance, which causes individuals to persist at difficult tasks longer than they normally would (Lai, 2011: 22). Collaborative activities give students an opportunity to engage in discussion and to be exposed to alternative points of view, which means that "cooperative learning and critical reflection are natural allies" (Kagan 2003).

Teachers should provide explicit opportunities in the classroom for students to practise and develop their social and collaborative skills. Group formative assessment tasks can provide an excellent opportunity and incentive for students to improve their collaboration skills.

An example of a method that can be used to help plan effective collaborative tasks is the spider web discussion method created by Alexis Wiggins (2011). The name is an acronym, describing the specific aspects of the group task and its process.

synergetic—a collaborative, group effort with a single group grade

process—a process that must be practised and honed

independent—students work independently; teacher observes and gives feedback

developed—a developed, sustained discussion that aims to "get somewhere"

exploration—an exploration of ideas, texts or questions through discussion with a …

rubric—a clear, specific rubric against which the students can self-assess.

(Wiggins, 2011)

The word "web" then describes two aspects of the method. First, it describes the physical map of the discussion, which looks like a web. Second, it is a metaphor for the process—like a web, all participants must pull their own weight equally, or the web cannot be strong. Through specific processes such as modelling, coding, group grading and feedback sessions, activities such as these "train students to work together collaboratively in their problem-solving and to self-assess that process. The result is deep, high-level inquiry led and assessed by the students themselves, and the creation of authentic collaborators, communicators, and self-evaluators out of all students" (Wiggins 2011). Methods such as these develop social skills, for example, listening skills, conflict resolution, decision-making, problem-solving, negotiation and peer engagement, while also aiding deeper engagement with the subject matter under investigation.

Links to social and emotional learning

There are strong links between social skills and the affective skills associated with self-management. The Collaborative for Academic, Social, and Emotional Learning (CASEL), for example. has identified five core social and emotional competencies (see figure 1).

Figure 1

CASEL core social and emotional learning competencies (2013)
(Image reproduced from http://www.casel.org/social-and-emotional-learning/core-competencies)

This approach emphasizes elements such as the ability to take the perspective of others and the ability to form effective relationships. However, it also emphasizes the importance of students developing the ability to

regulate their own emotions and behaviours. This links strongly to the affective skills associated with self-management skills.

Self-management skills

This skill category breaks down into two separate areas.

1. Organization skills—managing time and tasks effectively, goal-setting, etc.

2. Affective skills—managing state of mind, self-motivation, resilience, mindfulness, etc.

Organization skills

One of the most crucial skill sets needed for success in the DP are organizational skills, and within that the particular skill of time management. Students at both secondary and tertiary levels are very aware of their own deficiencies in this area, but often do not have effective strategies to overcome them (Weissberg et al. 1982).

Good time management is a feature of self-managed or self-directed learning (McCombs 1986): it can alleviate stress (Lay and Schouwenburg 1993), increase academic performance (Campbell and Svenson 1992) and contributes significantly to successful "strategic" study (Kirschenbaum and Perri 1982). Time management is not something we can assume that students will do naturally—as with all ATL skills, it is a specific skill that must be taught and also modelled. If we expect our students to be well organized and punctual, to work methodically throughout the year and to meet all deadlines without last minute panic, then we must model strategies to help them achieve this goal. DP teachers can help students organize their time by coordinating their deadlines for students so that assessments are well spread throughout the school year. If teachers also help their students learn how to break down assignments into achievable steps and to timeline each step, plan out revision and study plans for tests and examinations, and build study timetables, then much poor time management will be alleviated.

Teaching idea: To model good organization and avoid unnecessary student stress, coordinate assessment dates for assignments, tests and internal assessments with colleagues from all other subjects in the DP.

One reason that has been suggested for poor time management among students is perceived *control of time* (Macan, Shahani, Dipboye and Phillips 1990). Some students feel that control over their time is something that is out of their hands, and consequently feel more stressed, procrastinate more and produce poorer quality work. In these situations, it is not the lack of time that is the key factor—it is the perception of control. Performance improvement in this area, therefore, comes partly out of time-management strategies themselves and partly out of attitude and perception, both of which can be influenced by affective skill development.

Affective skills

The development of affective skills is a key part of the development of self-management skills. This can enable students to gain some control over their mood, their motivation and their ability to deal effectively with setbacks and difficulties. There is also an important link between this area of ATL and the crucial area of student health and well-being, which historically has tended to be "mostly separated from other aspects of school life" (Konu and Rimpelā 2002).

Affective self-management skills are teachable and they can make a huge difference to a child's motivation, resilience and, indeed, academic success; for example, relaxation training can help reduce examination anxiety and increase grades (Hembree 1988). For DP students, three important affective skills that are needed to handle the challenges of this level of study are resilience, self-motivation and mindfulness.

Resilience

Resilience appears to be the affective concept that is most inclusive of almost all other desirable affective elements of the successful DP student. The resilient learner is mindful, persevering, emotionally stable and self-motivated. Through focusing on developing resilience with respect to learning, teachers may find that many other important affective skills are practised and developed as well. The optimal conditions for learning

do not seem to be created by goals that are too easy or too difficult, but by goals that are challenging but achievable (Csikszentmihalyi, Rathunde and Whalen 1993). For the resilient learner, any challenge entails the possibility of failure and frustration, but it is this possibility that makes the challenge interesting and intrinsically motivating (Alfi, Assor and Katz 2004).

An important connection to highlight between ATL skills and the learner profile is the connection between resilience and the learner profile attribute of being "risk-takers". Resilience is a vitally important part of self-management, and it includes learning from mistakes. DP students are often under a great deal of pressure to succeed, particularly given the high stakes nature of DP assessment, which can make them reluctant to ever risk failure. Kathryn Schulz, author of *Being Wrong: Adventures in the Margin of Error*, is critical of the largely negative view of error, commenting that "Of all the things we are wrong about, this idea of error might well top the list. It is our meta-mistake: We are wrong about what it means to be wrong. Far from being a sign of intellectual inferiority, the capacity to err is crucial to human cognition" (Schulz 2011: 5). Risk-taking is therefore closely linked to the idea of failing well (King 2009), and it is important that teachers create an atmosphere where students do not feel that they have to get things right first time. Regarding learning as a process of gradual improvement through reflection on mistakes can encourage students to ask questions, take risks, be more adventurous in their thinking, and be more creative with their ideas.

Self-motivation

Self-motivation is also at the core of successful learning. As Alfie Kohn points out in *Punished by Rewards* (2000), no one can ever really motivate anyone else; the only true motivation is self-motivation (Brandt 1995). All we can ever hope to do as teachers is to arrange the variables that we have some influence over to help self-motivation to arise and then to facilitate its development. Interestingly, the research into intrinsic motivation shows that classroom environments that actively help develop students' autonomy and self-direction are also those that increase students' intrinsic motivation and help improve their efficacy as learners (Deci 1975), whereas classroom environments that use tangible rewards for performance outcomes tend to undermine intrinsic motivation (Deci, Koestner and Ryan 1999).

Mindfulness

Psychological techniques, such as mindfulness, focus on the practice of mental relaxation, and in an educational context there is evidence that mindfulness training can lead to improvements in the functioning of the brain (Brown, Ryan and Cresswell 2007), with improvements being reported in reading comprehension and working memory capacity (Mrazek et al. 2013), digital memory span (Chambers, Lo and Allen 2008) and visual/spatial processing efficiency (Kozhevnikov et al. 2009). *Mindfulness* means simply becoming more aware of your own perceptions as they happen, and in your thinking as it occurs.

Helping students learn how to "stay in the moment" can help them to overcome distractions, increase attention and improve concentration (Brefczynski-Lewis et al. 2007). Most students—at all levels of schooling—and most parents as well, acknowledge that the ability to deal with distractions, and to focus and concentrate on schoolwork is probably the single biggest issue to overcome in order to improve academic performance. Of all the skills we could possibly help our students with, learning to concentrate has to be one of the most important and may be worthwhile putting some training into developing.

Teaching idea: Explore the possibilities for improving students' concentration through training in mindfulness or other similar techniques.

Research skills

> Most students think of researching as putting key words into a search box which leads them to undervalue the importance of other methods.
>
> (Nichols and Mellinger 2007)

The development of research skills is given a central place in the DP, as can be seen, for example, through the importance placed on the extended essay. The extended essay provides the opportunity for students to undertake personal research into the study of a topic of their own choice, yet with the support and guidance of a supervisor. The extended essay is a demanding task, which is intended to help students to develop sophisticated research and writing skills. Yet the completion of such a task in a school environment, with the support and guidance of a supervisor, is intended to serve as excellent preparation for university studies, where students are likely to have to undertake similar tasks without the same level of structure, scaffolding and support.

Research skills are also at the heart of inquiry-based pedagogy, which heavily influences all IB programmes. "It is acknowledged that this type of pedagogical approach requires advanced information literacy capabilities in students, and that there is a need to support the development of information literacy in inquiry-based learning curricula" (McKinney 2014). (For more information on this approach, please see the "Teaching based on inquiry" section later in this document.)

There is also an important connection between effective research skills and academic honesty. While the IB does see some cases of students engaging in deliberate academic malpractice, it sees a far greater number of examples of students unintentionally committing malpractice because they, for example, lack research skills such as citation and referencing skills. All DP students are expected to acknowledge fully and in detail the work, thoughts or ideas of another person if they are incorporated in work submitted for assessment. The IB does not prescribe which style(s) of referencing should be used by students; this is left to the discretion of the school. However, it is expected that students will use an appropriate style, and use this consistently. More information on academic honesty can be found in the document *Academic honesty*, available on the online curriculum centre (OCC).

Teaching idea: Promote research skills and critical-thinking skills by explicitly asking students to discuss and reflect on the value and limitations of the resources they chose to use when researching an assignment.

Research skills in the 21st century

Good-quality research skills have always been at the heart of academic endeavour, but the mechanisms used and media of information have changed enormously in the last 30 years. In 1981, Marland broke research skills down into nine sequential stages: formulate and analyse needs; identify and appraise likely sources; locate individual resources; examine, select and reject sources; interrogate sources; record and store information; interpret, analyse, synthesize and evaluate information collected; present and communicate resulting work; and evaluate what has been achieved. All of these skills are just as valid today as they were then; however, the presence of the electronic library and the internet makes some of those skills much broader in application than they once were (Barry 1997).

Research today often requires much more comparing, contrasting and validating available information, and winnowing down the volume of data into a manageable quantity. However, fundamental research skills, such as formulating focused and precise research questions, are as crucial today as they always have been.

Teaching idea: When setting assignments that involve the student giving an oral presentation, use the opportunity to discuss the importance of academic honesty and clear referencing of source materials in all tasks, including oral presentations. Many students forget that it is just as crucial to acknowledge their sources in an oral presentation as it is in a piece of written work. There are a number of ways in which students can effectively do this, such as verbal or written acknowledgments throughout the presentation, or by including a bibliography on the last slide of a PowerPoint®.

For most students today, the independent, self-regulated research involved in inquiry-based learning involves internet-based research. The internet is fast becoming the most important information source in contemporary society, and internet skills can now be considered as vital personal assets. Although they are often seen to be the most prolific of internet users, teenagers are not all equally proficient in the internet skills they need for effective self-directed research. Teenagers often have less well developed search skills than adults, and only rudimentary techniques and strategies for simple searching, hypertext and hypermedia navigation. Four key internet research skills most students need training in are browsing, being aware, searching and monitoring (Bates 2002):

Browsing (or surfing)—this is the skill that most students already have in abundance, characterized by a general initial direction of inquiry followed by a willingness to be distracted in almost any other direction at all. The problem with browsing is that it often takes place when more directed research needs to be carried out.	**Being aware**—this is more of a critical-literacy skill, and essentially means being aware of all the unsolicited information in our environment, scanning it for relevance but not paying specific or direct attention to it. As a part of DP language and literature courses, students are encouraged to develop this skill.
Searching—using Boolean operators and search limiters to refine searches through search engines of the general type (Google, Yahoo) and the more specific or scholarly type (university library, commercial database, Google Scholar).	**Monitoring**—employing RSS readers to collect together all internet content (feeds) relevant to school subject lines of inquiry, scanning through all collected feeds on a regular basis looking for topics of value, finding the relevant information and downloading, sharing, posting or filing the important data.

Research and information literacy

Training in information-literacy and media-literacy skills is vital for every student who is engaged in any form of inquiry learning. Feeling overwhelmed by information is a common concern of students, but by developing their research skills students can learn to narrow down the scope of their researching and cope with the volume of information they produce. This is particularly the case with internet-based research, as “In the Internet world, the ease of finding *something* obscures the difficulty of finding the *right thing*” (Gustavson and Nall 2011: 291). In many cases, the people in schools best equipped to help students develop their research skills are librarians. Various strategies may be employed, ranging from librarians team-teaching with subject teachers, offering short courses/seminars, or workshops on specific technological applications and tools. More advice on collaborating effectively with colleagues such as librarians can be found in the “Enlisting allies: Involving the wider school community” section of this document.

Teaching idea: Find some good online magazines, newspapers, blogs and discussion groups for your subject and encourage all students to set up RSS feeds to gather all the current subject-related ideas. Don’t give the students too many, just pick two or three feeds to begin with. Students can then build up their own feeds and share and recommend them between themselves as the year progresses.

Although there is a close link between technological literacy and information literacy, it is important to distinguish between the two. *Information literacy* is a wider term, often used to refer to the complex set of abilities “which enable individuals to engage critically with and make sense of the world and its knowledge, to participate effectively in learning, and to make use of and contribute to the information landscape” (Hepworth and Walton 2009: 10).

It is also important to remember that research skills do not exist in isolation. They are often intimately linked to other skills, such as communication skills, and these can also be developed alongside any research skill practice.

Approaches to teaching

This section will firstly explore the main pedagogical principles that influence and underpin IB programmes, along with associated teaching strategies. It will then offer further guidance on five key areas related to approaches to teaching in the DP:

- Teaching with ATL in mind
- Pedagogy or andragogy?
- Effectively using technology
- Every DP teacher is a language teacher
- Planning

Pedagogical principles underpinning the DP

> What is of paramount importance in the pre-university stage is not what is learned but learning how to learn … What matters is not the absorption and regurgitation either of fact or pre-digested interpretations of facts, but the development of powers of the mind or ways of thinking which can be applied to new situations and new presentations of facts as they arise.
>
> (Peterson 1972)

From its beginnings, the DP has adopted a broadly constructivist and student-centred approach, and has emphasized the importance of connectedness and concurrency of learning.

There are six key pedagogical principles that underpin all IB programmes. Teaching in IB programmes is:

1. based on **inquiry**
2. focused on **conceptual understanding**
3. developed in local and global **contexts**
4. focused on effective teamwork and **collaboration**
5. **differentiated** to meet the needs of all learners
6. informed by **assessment** (formative and summative).

This document will examine each of these six principles in turn.

Teaching based on inquiry

One of the pedagogical principles that underpin all IB programmes is that of teaching based on inquiry. Being inquirers is one of the attributes of the IB learner profile, where the process is seen as involving the development of students' natural curiosity, together with the skills needed to enable them to become autonomous lifelong learners.

DP courses often specify a large amount of content, with the area of study often defined in considerable detail, which means that the way in which this content is presented to students in class is critical. One of the most important considerations for DP teachers is, therefore, how to design teaching practice to produce effective inquiry learning given the quantity of important information in each subject area that needs to be addressed, the pressure of ongoing formative assessment and the culminating measure of a student's academic performance being an examination-based summative assessment.

The inquiry learning cycle (figure 2) is recommended as the basis for both the design and the implementation of classroom teaching practice in the DP, and in IB programmes more generally.

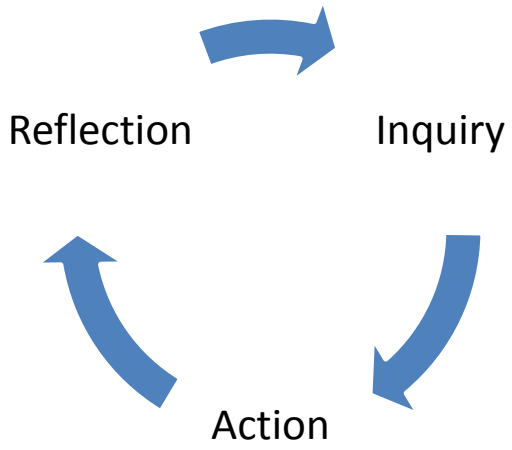

Figure 2

Inquiry process from What is an IB education? *(2013)*

Inquiry-based learning and teaching takes many forms; for example, "Structured Inquiry, Guided Inquiry and Open Inquiry" (Staver and Bay 1987) or "Process Oriented Guided Inquiry Learning, POGIL" (Lee 2004). There are also a number of other methods that have their own structure, but which owe their essential design to inquiry learning, such as experiential learning (Kolb 1984), problem- and project-based learning (Prince 2004), case-based learning (Fasko 2003) and discovery learning (Prince and Felder 2007). Whichever approach is adopted, what is essential is that each student is actively engaged in classroom activities, and that there is a high degree of interaction between students and the teacher, and also between the students themselves.

What matters is, therefore, not whether DP teachers adhere to any particular model, but that they focus on making sure their students are engaging in inquiry, on finding their own information and constructing their own understandings, as often as possible in their classrooms. In an inquiry-based approach, learning is self-directed "because it is driven by students' own decisions about appropriate ways in which an issue or scenario might be approached. They bring to bear on the topic any existing knowledge or experience relevant to the issues … The process is student-centred, with the onus always on the student to take initiatives, propose routes of enquiry and follow them thoughtfully" (Hutchings 2007: 13).

Two particularly well known inquiry-based approaches are experiential learning and problem-based learning.

Experiential learning

Experiential learning is an approach based on "learning activities that engage the learner directly in the phenomena being studied" (Cantor 1997). It is a type of inquiry often structured around site visits, field trips, work experience placements, exchange programmes, projects, service learning, and so on. However, it can also occur very effectively within a normal classroom environment.

In experiential learning, students learn from their experience by following the four steps in figure 3.

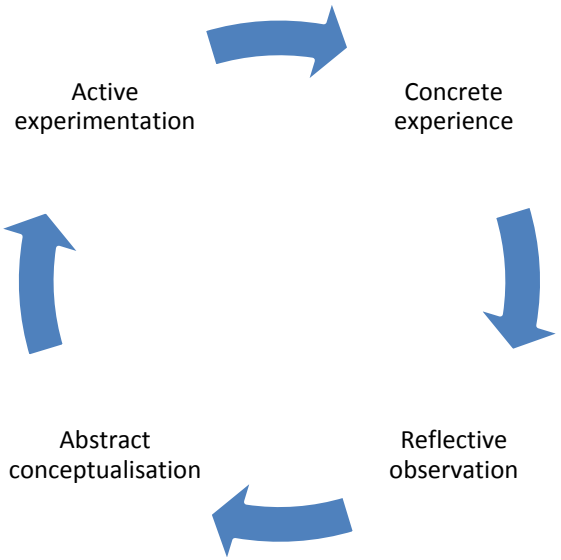

Figure 3

The four phases of experiential learning (Kolb 1984)

Experiential learning is most powerful when the experience is something new for the student, where there is challenge and action, and where the reflection step is well set up and thoroughly applied. It is, therefore, crucial that time is dedicated to careful design and planning of experiential activities. As Dewey (1997: 25) commented, "the belief that all genuine education comes about through experience does not mean that all experiences are genuinely or equally educative."

Problem-based learning

Another popular inquiry-based approach is that of problem-based learning (PBL). In PBL, students analyse and propose solutions to a real-world problem that is usually presented to them in an unstructured and often open-ended manner. PBL originated in medical education where it is still extensively used today, but it has also found application in many other fields. The main advantages of PBL are that it has been found to lead to improvements in information processing, skill proficiency (Prince 2004) and the development of a variety of skills, including problem-solving, reasoning, teamwork and metacognition.

As Prince and Felder (2007) identify, in PBL, the students usually operate in teams or collaborative groups and work through a problem-solving process to:

- define the problem precisely
- find out what they know and what they need to know
- decide how to proceed to find out what they need
- gather all the information—this can be provided by the teacher, or not
- analyse all the information gathered
- create possible solutions
- work through the feasibility of each one
- narrow the possibilities down to their best, justifiable solution (which may then be presented to the rest of the class, and a whole-class analysis of the possible solutions undertaken).

(Prince and Felder 2007)PBL can be a hugely powerful teaching strategy that promotes active learning and a student-centred pedagogy. It is important, though, to take care that students are exposed to a balance of both positive and negative scenarios in order to avoid an overly pessimistic focus on problems.

Teaching based on inquiry does demand a shift in teaching style from teachers whose primary role is to supply answers to teachers whose primary role is to promote questions. It also involves a shift in some of the responsibility for learning from teachers to students (Oliver-Hoyo, Allen and Anderson 2004). While this can seem a major challenge for some teachers, there are two key underlying principles that can help teachers to understand the change to inquiry-based methods.

1. Learning is constructed by a process that moves from real-world examples to concepts, ideas, theories and facts.

2. Students are responsible for finding much of the information themselves, and processing it to draw the important conclusions,

At a more practical level, simple things that teachers can do to introduce a more inquiry-based approach include:

- posing questions, outlining problems, setting challenges, giving clear measurable objectives
- putting students into small groups (3–4 students), assigning clear roles and allowing for role rotation within each group
- enabling and helping students to connect to the best subject-based resources
- focusing the students on both the answers they are finding and the research skills they are using
- viewing their own role as facilitators of students' journeys, rather than simply providers of answers.

The potential benefits of an inquiry-based approach can be seen in the example of DP science lessons, where adopting such an approach can help students to learn the process of scientific inquiry through being involved in an inquiry themselves: "students are presented with a challenge (such as a question to be answered, an observation or data set to be interpreted, or a hypothesis to be tested) and accomplish the desired learning in the process of responding to that challenge" (Prince and Felder 2007).

Example: The key steps of inquiry learning in a science lesson:

> engaging with a scientific question, participating in design of procedures, giving priority to evidence, formulating explanations, connecting explanations to scientific knowledge, communicating and justifying explanations.
>
> (Quigley, Marshall, Deaton, Cook and Padilla 2011)

Although these methods can require time and effort to set them up, they have the major advantage that learning by inquiry means that students are developing better skills of inquiry, which are the key skills of the self-managed, self-directed, self-regulated, lifelong learner who fulfills all the aspirations of the IB learner profile. By engaging in effective inquiry, students will develop skills in research, self-management, collaborative learning, communication and thinking, as well as problem-solving.

Teaching focused on conceptual understanding

DP courses have always had a focus on developing conceptual understanding but, within DP subject guides and teacher support materials, the focus on teaching through concepts is becoming increasingly explicit.

Concepts are broad, powerful organizing ideas that have relevance both within and across subject areas. Exploring concepts helps students to build the capacity to engage with complex ideas, and discussion of the "big ideas" behind a topic can help students get to the heart of why they are learning a particular unit or option. There is also a strong link between teaching through concepts and moving students to higher-order thinking; for example, it allows students to move from concrete to abstract thinking, and facilitates the transfer of learning to new contexts.

Some DP subjects explicitly construct their subject guides around key concepts; for example, the new DP global politics course. This can be an effective way of framing course content, as well as inspiring more explicitly conceptual assessment tasks. Other DP guides are arranged and framed in different ways. Whichever DP subject guide a teacher is using, and however that guide is presented, it can be a very powerful teaching strategy to teach through concepts, and all DP courses are designed to lend themselves to this type of teaching.

DP courses are based on an interrelationship of concepts, content and skills. The emphasis on this interrelationship is important because it helps to address the concern that concept-based curriculums focus on concepts at the expense of content, rather than in conjunction with content. These curriculum models "value a solid base of critical factual knowledge across the disciplines, but they raise the bar for curriculum and instruction by shifting the design focus to the conceptual level of understanding" (Erickson 2012: 4).

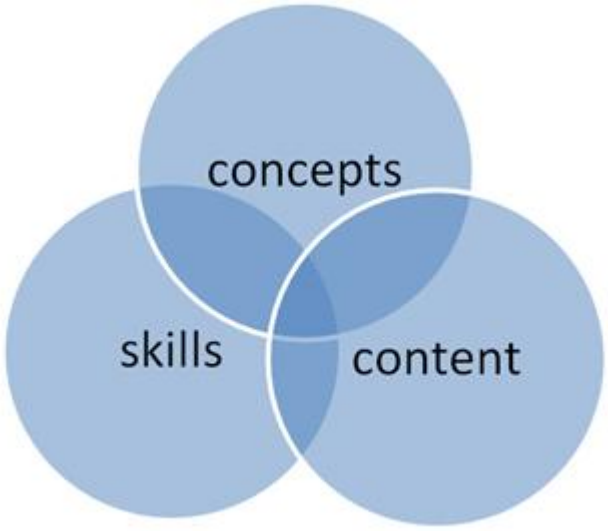

Figure 4

Interrelationship of skills, concepts and content

Anderson and Krathwohl, in their update to Bloom, argue that conceptual knowledge plays a crucial role in moving students from knowledge to understanding. They argue that "students understand when they build connections between the 'new' knowledge to be gained and their prior knowledge. More specifically, the incoming knowledge is integrated with existing schemas and cognitive frameworks. Since concepts are the building blocks for these schemas and frameworks, conceptual knowledge provides a basis for understanding" (2001: 70).

Teaching idea: When planning a unit for your DP class, explicitly identify the relevant key concept(s) and conceptual understandings. For example, a DP history unit on the causes of the second world war could focus explicitly on an exploration of the concept of causation. This should then enable students to transfer their conceptual understanding to new contexts—in this instance, their understanding of the underlying concept of causation aiding their understanding of the causes of other historical events.

Teaching developed in local and global contexts

> Learning is most significant and lasting when it is connected to the world around the student.
>
> (Judith Fabian, IB Chief Academic Officer, in Walker 2010)

There is a strong connection between contextualized learning and the approaches to teaching outlined in this document. Contextualized learning places an emphasis on students processing new information by connecting it to their own experience and to the world around them. In this approach, learning occurs when students "process new information or knowledge in such a way that it makes sense to them in their frame of reference … This approach to learning and teaching assumes that the mind naturally seeks meaning in context—that is, in the environment where the person is located—and that it does so through searching for relationships that make sense and appear useful" (Hull 1993: 41).

Grounding learning in real-life contexts is one of the six pillars Guy Claxton (2008) identifies as fundamental to student engagement. The other five are responsibility, challenge, collaboration, respect and choice (2008: 94). Grounding teaching and learning in local and global contexts can help to make it more authentic and more meaningful for students; the exploration of real-life problems, rather than the imaginary/pseudo problems often used in classrooms, can be more interesting for students because they are more relevant and authentic.

Another advantage of grounding learning in real-life contexts is that it helps students to see the "why", and the applications, of what they are learning. In *Making Learning Whole*, David Perkins (2010) argues that students need to see the whole picture, to see why they are doing what they are doing.

Teaching idea: Make use of real-life case studies.

Several DP subjects, for example, business management and global politics, explicitly ground their exploration of abstract concepts, such as power, in real-life case studies. Case studies are most often used in group 3 subjects but can also be used effectively in other subjects, such as the sciences. The use of case studies can help students to see things from multiple perspectives, as well as relating student learning to real-life contexts.

In addition to helping students to see connections between ideas, and helping to ground abstract concepts in real-life situations, there is also an important link between the contextualization of learning in global contexts and the development of international-mindedness. International-mindedness is at the heart of an IB education; this can be seen by the way it is presented as underpinning all IB programme models, including the DP model.

Exploring local and global contexts can help to develop international-mindedness in students by providing opportunities for sustained inquiry into a range of local and global issues and ideas, and opportunities to explore global concerns such as development, conflict, rights and the environment. The Global Engage website (globalengage.ibo.org) supports teachers in engaging with global issues, and includes information, resources, ideas and opinions, links and suggestions for action, as well as reports on actions undertaken by the IB community.

Teaching focused on effective teamwork and collaboration

A key focus of the teaching in the DP is on teamwork and collaboration. This principle applies to promoting teamwork and collaboration between students, but it also refers to the collaborative relationship between the teacher and students.

Collaborative learning is an approach deeply rooted in the work of Vygotsky and Piaget, both of whom saw learning as a social phenomenon. It is also closely associated with the approaches of shared, situated and embedded cognition, which view learning as the result of a complex interaction of minds within specific cultural contexts, and emphasize the social structures within which those interactions occur. In these approaches "knowledge is not something that is handed down from one partner to another. Rather, knowledge is co-constructed through interactions among collaborators" (Lai 2011).

Collaborative learning activities include activities such as group projects, debates, role plays, and other activities with shared goals. There are, therefore, extremely close links between social skills, such as negotiation, and collaborative learning. Across the world, students in IB schools are engaged in a wide range of collaborative projects and activities in every subject. These types of activities encourage students to engage with other students collaboratively and cooperatively. There are many websites teachers can visit for practical help in designing and developing collaborative projects for their students, many of which also provide opportunities to connect learners together, either locally, nationally or internationally.

One issue for teachers to consider when setting collaborative tasks is that of whether to award a group or individual mark. Awarding a single grade to a group of students for a group task can be concerning to teachers as they may worry that a student is receiving credit for work produced by other members of the group. However, assessing the individual contribution within a group can cause students to focus on their individual role rather than on the group goal, and can, in some instances, actually promote competition within the group rather than collaboration. The concept of taking collective responsibility is an important idea for students to grasp, and awarding the same mark to all members of a group encourages all students to take responsibility for the performance of the group as a whole.

In addition to fostering collaboration between students, collaboration is also at the heart of the relationship between DP teachers and students. McWilliam (2005, 2008) argues that there has been a shift from the role of the teacher being the "sage-on-the-stage" to the "guide-on-the-side", but that this shift does not go far enough and there needs to be a further shift to the role of the teacher being the "meddler-in-the-middle" (2005).

A key aspect of fostering a collaborative relationship between teachers and students is through encouraging effective dialogue and feedback on what students have, and have not, understood during their lessons. Encouraging students to give regular feedback on the things they have not yet understood gives teachers valuable information that can inform future planning and ensure that all understandings are being attained. This kind of feedback can be done by discussion, on paper or even by Twitter at the beginning or end of any lesson, week or unitFor example, a teacher could ask their students to read through the material covered that day and to tweet to them either a thoughtful question on anything they did not understand from the lesson, or an "all OK" signal. That way, the teacher can immediately see if the understandings they were looking for were achieved, or if there is any trend of misunderstanding. Any problems can then be addressed immediately in the next lesson, before the lesson sequence continues. This keeps all students up to speed and is also a way to encourage students to take responsibility for their own learning; it is up to the students to check and make sure they understand as they move through the syllabus.

Teaching idea: Developing collaboration skills through the group 4 project.

The group 4 project is an opportunity for students—and teachers—to collaborate across subject disciplines. Why not consider teaming up with another school to encourage students to collaborate not only with other members of their own school communities, but with other school communities too.

Teaching differentiated to meet the needs of all learners

> Differentiation is more than a strategy or series of strategies … it is a way of thinking about teaching and learning.
>
> (Tomlinson, 2000: 13)

Differentiation is "an approach to teaching that advocates active planning for student differences in classrooms" (Tomlinson and Allan 2000). It is a process of identifying, with each learner, the most effective strategies for achieving agreed goals so learning opportunities can be created that enable every student to develop, pursue and achieve appropriate personal learning goals. There is, therefore, an important link between differentiation and thoughtful and adaptive planning. There is also an important link with the idea that every DP teacher is a language teacher, as teachers also need to be consider each student's language profile when considering pedagogical approaches to meeting individual learning needs.

The IB identifies four important principles to promote equal access to the curriculum for all learners and to support the development of the whole person through differentiated teaching and learning.

Affirm identity—build self-esteem	Promote environments that welcome and embrace learners. Foster high but realistic expectations. Value and use the diversity of cultural perspectives. Liaise and collaborate with parents. Understand student learning preferences and interests. Identify and teach through student strengths.
Value prior knowledge	Identify prior knowledge and activate prior learning, including that learned in other languages. Map language and learning profiles. Build new knowledge onto existing knowledge.
Scaffold learning	Support new learning through the use of graphic organizers (writing frames, Mind Maps®), which are pictorial forms of promoting, organizing and constructing knowledge; visual aids, drama, demonstrations, etc. Encourage collaborative learning groups/peer support. Scaffold tasks through use of strongest language where appropriate.
Extend learning	Combine high expectations with opportunities for learner-centred, experiential practice and interaction with cognitively rich materials, experiences and environments. Use technology and assistive technologies to enrich learning and to ensure that all learners have the same opportunities.

Student learning is enhanced when these four principles of good practice are considered in conjunction with the approaches to teaching and learning. For detailed information, see the IB publication *Learning diversity in the International Baccalaureate programmes: Special educational needs within the International Baccalaureate programmes* (2010).

Differentiated teaching may involve using collaborative and cooperative learning, a variety of learning practices, creative approaches to teaching and learning, differing formats and modes of exploring and presenting knowledge and understanding being made available to the students. By providing students with multiple means of representation, action and expression, and engagement as in Universal Design for Learning (UDL), students are given equal opportunities to learn (www.cast.org).

Powell and Kusuma-Powell (2008) suggest that in order for teachers to differentiate teaching effectively, they need to engage in five on-going professional inquiries. These inquiries focus on knowing your students, knowing yourself as a teacher, knowing your curriculum, knowing how to use formative assessment data effectively, and knowing your collegial relationships.

Knowing your students as learners	This entails systematically and deliberately exploring your students' cultural and linguistic backgrounds, family circumstances, learning styles, intelligence preferences, readiness levels, interests, and other individual learning traits and then using this information to address specific learning needs by providing meaningful, respectful and challenging work.
Knowing yourselves as teachers	Developing professional self-knowledge includes probing your own cultural biases and assumptions, discovering your own preferences about learning that may have translated into your preferred and dominant teaching style, and recognizing underlying beliefs and expectations that you have about students in general or about certain students specifically.
Knowing your curriculum	Knowing your curriculum includes being able to discriminate between content and transferable concepts, identifying the truly big ideas and enduring understandings, and recognizing that there are many possible paths to conceptual understanding.
Knowing your formative assessments	This encompasses selecting and designing tools to match specific learning objectives, offering students some choice in formative assessment so as to enhance engagement and motivation, and bringing students inside the formative assessment process so that they become the end-users of formative assessment data.
Knowing your collegial relationships	Effective differentiation is challenging and frequently involves enlisting the help of other professionals with different experiences, backgrounds, and expertise to support us in planning how to best serve student learning. Education is a complex profession – it is counterproductive for teachers to "go it alone".

Differentiation, as many other aspects of approaches to teaching and learning, is most effective when it becomes an embedded part of the culture of a school and of classrooms. Schools should aim to foster a school-wide culture of collaboration, inquiry and inclusion.

Teaching informed by assessment （formative and summative）

> Evaluation which is directly related to the teaching–learning process as it unfolds can have highly beneficial effects on the learning of students, the instructional process of teachers, and the use of instructional materials by teachers and learners.
>
> (Bloom 1969: 50)

Assessment plays a crucial role in supporting learning as well as in measuring learning. In the DP, assessment is intended to support curricular goals and to encourage appropriate student learning. DP assessments are based on the course aims and objectives and, therefore, effective teaching to the course requirements also ensures effective teaching to the formal assessment requirements. The DP places an emphasis on criterion-related (as opposed to norm-referenced) assessment. This method of assessment judges students' work in relation to identified levels of attainment, rather than in relation to the work of other students. (See *Guidelines for developing a school assessment policy in the Diploma Programme* 2010.)

Although the two are inherently linked, an important distinction must be made between formal IB assessment and the supporting formative assessment processes that schools develop for themselves. Formative assessment encompasses "all those activities undertaken by teachers, and/or by their students, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged" (Black and Wiliam 1998: 7) Formative assessment is, therefore, a tool or process that teachers can use to improve student learning; it is about assessment for learning, rather than simply assessment of learning.

One of the most comprehensive analyses of factors affecting student learning was undertaken by John Hattie of Auckland University in New Zealand, and published as *Visible Learning* (2009). This study was a synthesis of 800 meta-studies of 52,637 papers, including results from more than 200 million students worldwide, from early childhood through to adult education. Two of the top ten teaching-related factors that Hattie identified as having the most effect in positively influencing student learning were providing formative evaluation, and feedback. Effective assessment, therefore, has a crucial role to play in student learning. In particular, a key function of assessment in the DP should be that of providing feedback: feedback to students, and also feedback to teachers on students' particular strengths and limitations. This feedback to teachers plays a crucial role in guiding future planning.

Providing formative evaluation	**Feedback**
"Feedback to teachers on what is happening in their classroom so that they can ascertain 'How am I going?' in achieving the learning intentions they have set for their students, such that they can then decide 'Where to next?' for the students." (Hattie 2009: 181)	"Feedback is most powerful when it is from the student to the teacher … when teachers seek, or are at least open to, feedback from students as to what students know, what they understand, where they make errors, when they have misconceptions, when they are not engaged—then teaching and learning can be synchronized and powerful." (Hattie 2009: 183)

Teaching idea:

Wiliam (2011) described assessment as "the bridge between teaching and learning".

With another DP teacher, review the assessment tasks and assessment processes you have identified for an upcoming unit. Do you think these tasks will successfully provide this "bridge" between teaching and learning?

If yes, what specifically about them is it that you think will make them successful in this regard? If no, what amendments could you make to improve them? Ideas to consider could include using strategies such as peer feedback, ensuring students will receive evidence-based feedback that focuses on helping them understand how to improve, ensuring that the objectives and criteria for the task are clear to the students, and ensuring that the assessment tasks themselves are rich enough to give teachers an insight into student learning.

Teaching the DP with ATL in mind

Teaching with ATL in mind needs to begin with a clear and explicit identification of what types of skills and dispositions are trying to be developed.

In general terms, the development of every ATL skill can follow the same seven basic steps.

1. Decide which particular and specific skills are going to be focused on in your classroom/subject/department/school.

2. Make the skills to be focused on explicit by clear description of each skill and by using examples of high and low skills proficiency.

3. Allow the students to self-assess their perceived competence in the skills in question.

4. Analyse the class results obtained, looking in particular for any general skills deficiencies across the class.

5. Develop mini-lessons or tutorials, or find online exercises for students to complete to bring all students up to the same skill level.

6. Build into subject lessons exercises that enable students to practise and improve the skills in focus.

7. Ask the students to continue to self-assess their proficiency.

Teaching with the development of ATL skills in mind impacts significantly on the wider pedagogical approach adopted by teachers, and in particular on how teachers view their role in the classroom. Teacher regulation of student learning is sometimes described in a continuum from strong, through shared, to loose regulation.

Strong teacher regulation	Shared teacher regulation	Loose teacher regulation
• Teacher controls all information, regulates student processing, answers all questions, clarifies, explains, summarizes. • Student thinking at a minimum, teacher as maximum support.	• Teacher provides access to resources, skills training, questions, problem statements, concepts, ideas, learning outcomes. • Students actively engage with information in order to answer questions, follow leads, solve problems. • Student thinking engaged, teacher as guide and support.	• Teacher's only functions are supplying the learning objectives and assessing the students' level of achievement against them. • Student thinking at a maximum, teacher not involved in student thinking or learning at all.

A drawback of the strong teacher regulation model is that it can reduce the potential for the development of students' skills of self-regulation. The loose teacher regulation model also has limitations, as although it does allow for growth in students' self-regulation skills, this growth only occurs if it is instigated by the student. In contrast, adopting a shared regulation style in the classroom can be an excellent means to achieve growth in students' self-regulated learning skills.

An example of a teaching approach that can support the development of ATL skills and, in particular, students' self-regulation skills, is that of "process-oriented instruction". "Process-oriented teaching is teaching that facilitates independent learning, supporting students to become proficient learners in the field concerned and preparing them for lifelong learning" (Bolhuis and Voeten 2001). Process-oriented instruction is often contrasted with more traditional methods where the emphasis is on the transmission of information, where the teacher spends most of the time explaining the subject matter, and the main activities expected from the student are listening and writing notes. The teacher does not engage much with the students except to answer questions, assign tasks or give instruction concerning the learning process. In process-oriented instruction, the focus of the teaching is placed on the strategies and techniques the students are using to process the subject

information. The teacher “teaches” learning skills by modelling, demonstration, creating skills-based tasks, monitoring performance, asking for feedback and helping build the students’ metacognitive awareness (Bolhuis 2003).

In many schools, transmission is still a dominant teaching style. In 2001, a study of Dutch secondary schools observed 130 lessons—in foreign languages, Dutch, mathematics, science, social studies and the arts. The time spent by teachers using each of these teaching styles was found to be as follows (Bolhuis and Voeten 2001).

- 30% transmission— the teacher explains, the students listen, the teacher questions the students
- 40% activating—the teacher gets students to process information through directed tasks, using student feedback to guide the lesson
- 25% procedural and behavioural instruction
- 5% process-focused teaching—teaching the students to set learning goals, choose and execute learning strategies, diagnose and monitor the learning process.

Moving from a traditional subject-focused style of teaching to a skills-based, process-oriented style aimed at promoting self-regulation of learning by students can be challenging for both students and teachers, but it has the potential to yield excellent results in terms of student engagement and development of learning skills.

Whether ATL skills are taught entirely through being infused into subject lessons, or by being supplemented with standalone skills lessons, a key concern is ensuring that students transfer the skills learned in one context to other contexts. Because students often find it challenging to transfer these skills, it is important that the teaching of ATL skills also includes a focus on the importance of transfer. This “bridging” work is a vital aspect of the effective teaching of skills.

The DP encourages transfer through its emphasis on concurrency of learning. By studying different subjects and the core concurrently, it is intended that students will have more opportunities to make links and connections than they would otherwise. However, solely studying different subjects at the same time is not enough to guarantee that students are effectively transferring their learning. Instead, there needs to be explicit teaching for transfer; for example, explicitly encouraging transfer by exploring concepts across multiple subject areas, or by encouraging students to make connections between their learning in the different subjects.

Pedagogy or andragogy?

Pedagogy is defined as "the art and science of teaching children" (Ozuah 2005: 83), in contrast to *andragogy* which is the art and science of helping adults learn (Knowles 1980: 43). When considering teaching strategies suitable for 16–19-year-old DP students, it may be useful to move away from some pedagogical approaches towards more andragogical approaches in order to design teaching more appropriately matched to the developmental stage of the students.

According to Knowles (1980), pedagogical approaches tend to assume that child learners:

- are dependent on teachers
- prefer learning that is subject centred
- respond well to extrinsic motivators
- do not have enough life experience for it to be relevant to learning in the classroom.

In contrast, andragogical approaches tend to assume that adult learners:

- prefer to be responsible for their own learning and involved in the planning and evaluation of their instruction
- can use their own life experience as a rich resource for learning
- prefer learning that is problem centred rather than content oriented
- respond better to internal, rather than external, motivators
- need to understand the reason for, and importance of, all their learning

It is interesting to consider whether DP students, and their attributes as learners, fit a more andragogical or pedagogical teaching structure. If the DP is a preparation for further learning as an adult, then getting students used to more adult ways of learning while still at school could potentially be advantageous. It can also be argued that inquiry-based learning, as it is described in most IB documents, is in many ways, a more andragogical teaching strategy than a pedagogical one.

Utilizing technology effectively

Throughout this document and the accompanying resources, many of the activities draw heavily on technology. Technology can play a key role in supporting and enabling innovative approaches to teaching, such as the “flipped classroom” (see, for example, Bergmann and Sams 2012). In a flipped classroom, students acquire new knowledge and information at home before the lesson, for example, by watching lectures or reading materials, which then frees up the lesson itself for activities focused on the application of that knowledge, and on discussion. Flipping the classroom has close links to other approaches to teaching, such as differentiation, as “flipping the classroom establishes a framework that ensures students receive a personalized education tailored to their individual needs” (Bergmann and Sams 2012).

There are many technology integration frameworks, or ways of thinking about how technology should be integrated into classrooms, that can help teachers think about how to use technology effectively to enhance their students' educational experiences. Examples of such frameworks include “TPACK” (the Technological Pedagogical Content Knowledge framework, see http://www.tpack.org) or “TIM” (the Technology Integration Matrix, see http://fcit.usf.edu/matrix/faq.php). These frameworks help teachers to think more systematically about technology use; encouraging them to reflect not only on how, but also why, they are using technology in the classroom.

Another well known technology integration framework is the SAMR model proposed by Puentedura (2013).This framework highlights that technology is often not used to its full potential as it is often used only as a substitute for an existing tool, rather than utilising its potential to transform a task.

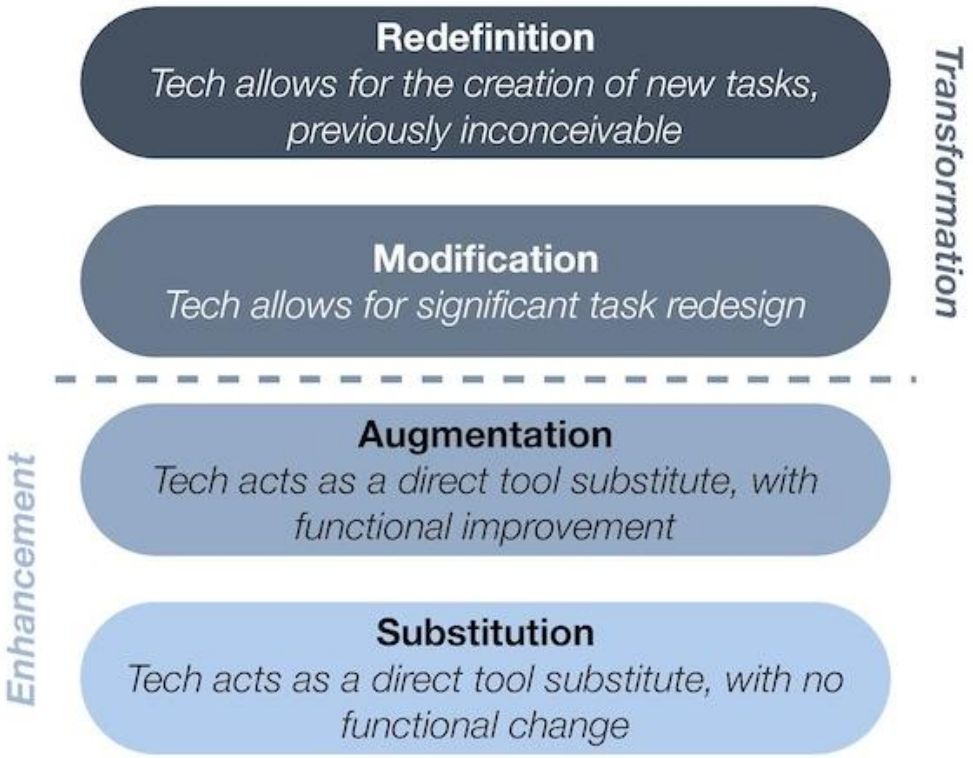

Figure 5

Puentedura’s “substitution, augmentation, modification, redefinition” (SAMR) model (2013)
Image reproduced with permission of the author.

In this way, effective use of technology has the potential to enable teachers and students to engage in tasks and opportunities that would otherwise be impossible or inconceivable, such as tasks requiring communication and collaboration between students on different sides of the world. One project that highlights how technology, and specifically social media, can be used effectively in education comes from the “Flat Classroom Project” run

by Julie Lindsay and Vicki Davis (see http://www.flatclassroomproject.org). This project consists of a wide range of collaborative initiatives where students from schools around the world collaborate using synchronous documents, collaborative workspaces and social networks.

Digital citizenship

Underlying the effective and responsible use of technology in its myriad forms is the concept of “digital citizenship”. Digital citizenship is a set of values that provides a framework for online action and behaviour. It is about encouraging and expecting students to act in an ethical manner, to be respectful of themselves, other people and intellectual property. Many students have grown up surrounded by, and immersed in, technology, and are “digital natives” (Prensky 2001). However, “even when students are comfortable using technology, they may not be using it appropriately. Likewise, educators of all skill levels may not understand how to use digital technology effectively. Both students and teachers need to find a common ground. They all need to become members of a digital citizenry” (Ribble 2011).

Every DP teacher is a language teacher

> Language wraps itself around, in, through and between everything that we teachers and learners do in the classroom.
>
> (Ron Ritchhart 2002)

The development of international-mindedness is central to an IB education, and this term explicitly encompasses the three aspects of multilingualism, intercultural understanding and global engagement. Language is, therefore, highly valued by the IB, not least for the crucial role it plays in the cultivation of intercultural understanding. Every DP teacher plays an important role, and has an important responsibility, in supporting and reinforcing students' language development.

Multilingual classrooms are fast becoming the norm, with students having increasingly diverse language profiles. All DP teachers need to be able to build on these profiles, understand how their diversity is a potential resource for learning, and develop every student's academic language. DP teachers should, therefore, use teaching approaches that ensure all multilingual students, including those learning in a language other than their mother tongue, are able to have access to the curriculum. The document *Language and learning in IB programmes* (September 2011, updated August 2012) proposes a pedagogy that emphasizes four dimensions of teaching that are particularly important in ensuring learner participation, promoting engagement and successfully constructing understanding.

Activating prior understanding and building background knowledge	There are a number of strategies that teachers can use to activate prior understanding and build **background knowledge**. These might include using the mother tongue and other languages when appropriate; using their knowledge of students' prior understanding in all languages to differentiate tasks and activities that will build up the further background knowledge necessary for new learning to occur; or recording information in student language profiles and maps that will support planning for future differentiation.
Scaffolding learning	Examples of **scaffolding strategies** teachers can employ include the use of visual and practical aids, graphic organizers, demonstrations, or small, structured collaborative groups.
Extending language	Teachers can help students **extend their language** by combining high expectations with numerous opportunities for learner-centred practice and interaction with cognitively rich materials and experiences. In practice, this could mean encouraging students to read extensively both inside and outside the DP curriculum and to write in a wide range of genres.
Affirming identity	Teachers should aim to create the social and emotional conditions for learning that value all languages and cultures, affirm the identity of each learner, promote self-esteem and develop intercultural awareness. Some learning conditions that schools and individual teachers may wish to create in order to **affirm students' identity** include promoting a class and school environment that welcomes and embraces the diversity of languages, cultures and perspectives; valuing and using the diversity of languages, cultures and perspectives to enhance learning; and liaising with parents to establish understanding of how best to collaborate to achieve shared goals.

For more detailed information and guidance on this area, please refer to these additional IB resources, all of which are available on the OCC.

- *Thought, word and deed: The roles of cognition, language and culture in teaching and learning in IB World Schools (2011)*
- *Learning in a language other than mother tongue in IB programmes* (2008)
- *Guidelines for developing a school language policy* (2008)
- *Guidelines for school self-reflection on its language policy* (2012)

Planning

All DP teachers should engage in explicit planning. The IB does not prescribe a particular format for how this planning should be undertaken. However, the process of planning may be supported by using one of the three template DP unit planners developed for DP teachers. These DP unit planners are not intended to mandate or restrict what DP teachers can or cannot do. Rather, they are intended to inspire and support teachers to think more about not only what they are teaching, but also how they are teaching.

A unit plan is part of the written curriculum and can be defined as a planned study, of various lengths, concluding with summative assessment. Each subject-specific unit plan should:

- stand alone as a significant, engaging, relevant and challenging learning experience
- enable students to demonstrate development against objectives
- contribute to a coherent, school-wide commitment to inquiry that is framed by contexts of personal, local or global significance
- be driven by inquiry that is conceptually based and contextually framed
- involve students in a range of learning experiences planned in response to inquiry-based questions
- build on the prior knowledge of the students
- be planned and taught to promote positive attitudes and development of the attributes of an IB learner
- have a summative assessment that gives the students the opportunity to demonstrate achievement of the DP objectives set for the unit
- require students to reflect on their learning and encourage them to engage in principled action or service.

Template DP unit planners

The three template DP unit planners are all divided into the same three sections: inquiry, action and reflection. However, they have been designed to offer teachers a chance to reflect on how they are teaching at three different levels of detail.

Planner 1 provides a low level of detail, asking teachers to:

- think concretely about transfer goals and essential understandings as they relate to content, skills and concepts
- list formative and summative assessments
- check boxes with regard to ATL skills, pedagogical approaches, connections to TOK, and so on
- reflect on the learning and design process at the end of the unit.

Planner 2 provides a medium level of detail, asking teachers to:

- think concretely about transfer goals and essential understandings as they relate to content, skills and concepts
- create inquiry questions to aid in the teaching and learning of essential understandings
- list formative and summative assessments
- check boxes with regard to ATL skills, pedagogical approaches, connections to TOK, and so on

- reflect on the learning and design process at the end of the unit
- reflect on the level of success with transfer.

Planner 3 provides a high level of detail, asking teachers to:

- think concretely about transfer goals and essential understandings as they relate to content, skills and concepts
- identify and list likely misunderstandings students may have before/while learning the content, skills and concepts of that unit
- create inquiry questions to aid in the teaching and learning of essential understandings
- match assessments with essential understandings
- check boxes with regard to ATL skills, pedagogical approaches, connections to TOK, and so on, and an additional box on metacognition
- reflect on the learning and design process at the end of the unit
- reflect on the level of success with transfer.

Features of the planners

The first section of the planner provides a space for practical information, such as subject group and course, year and level, dates the unit is being taught at the school, a basic description of the unit, any selected texts used, and any DP assessments linked to that unit or performed during the unit. The three template DP unit planners are then all divided into the same three sections: inquiry, action and reflection, following the three elements of the inquiry learning cycle (see *What is an IB Education?* 2013) and mirroring the format of the MYP planning template. Below is a brief explanation of some of the key elements of the planner templates.

Transfer goals

In the inquiry section (in all three versions of the planner), the first item is "transfer goals". *Transfer* is taking what has been learned in one context and being able to apply it effectively in a new, unfamiliar or independent context. Transfer is at the core of student understanding, as "you truly understand and excel when you can take what you have learned in one way or context and use it in another, on your own. The successful driver, soccer player, historian, or mathematician can size up a new challenge and transfer learning efficiently and effectively. Someone who learned only by rote cannot" (Wiggins and McTighe 2011). Identifying transfer goals early in the unit planning process helps teachers to direct their attention at the key goals for the unit, focusing on the question of what students should be able to know, do and understand independently with a new set of data or an unseen text when the unit is finished.

Essential understandings

In planners 2 and 3, after the transfer goals have been identified there is space for identification of essential understandings. In planner 1, this section comes at the beginning of the action section. The "essential understandings" space is the opportunity for teachers to break down the unit's individual goals relating to content, skills and concepts. Here, teachers can identify the core content that must be covered (for example, a key historical event), the skills students will learn as they make sense of that content (for example, writing a cogent essay on the event) and the concepts that are vital for students to be able to fully understand the importance and context of the material (for example, there are multiple perspectives on why the event took place and it is not always possible to know which one is "right"). Identifying enduring understandings helps to move the focus of the unit beyond facts to "the big ideas, the important understandings, that we want students to 'get inside of' and retain after they've forgotten many of the details … enduring understandings go beyond discrete facts or skills to focus on larger concepts, principles, or processes" (Wiggins and McTighe 1998: 10).

Inquiry questions

In planners 2 and 3 there is also a space for teachers to turn the essential understandings into inquiry questions. These are probing, student-friendly questions that can lead to essay topics, interesting discussions and debates. Teachers should feel free to add to the list of inquiry questions, beyond the ones that are derived from the essential understandings, as there may be further questioning that helps to support understanding and transfer in the unit. A good strategy for developing inquiry questions is to check if the questions inspire

student discussion or debate, and whether they are questions that require further probing, questioning or solving. Examples of inquiry questions include: Why can't you divide by zero? Who is my audience and what am I trying to make them think or feel? Can, or should, natural resources be owned by groups or nations?

Action

The "action" section of the planners asks teachers to think about the ways in which their unit is taught and the many connections in the unit to other IB elements. The "ATL" box asks teachers to think about the students' various approaches to learning in the unit, and the other boxes ask teachers to consider how the students approach, learn or connect to language and learning, TOK, CAS and differentiation in the unit.

The "learning process" box is key to all of the planners as it asks teachers to identify the various pedagogical methods used in teaching the unit. While teachers have their preferred and practised modes of teaching, many find that the check boxes are a helpful reminder to aim for some variety throughout each unit. Finally, at the end of the "action" section, there is a space to identify the resources used for the teaching of the unit.

Reflection

The final stage on all three planners is for reflecting on the unit during and after it is taught. This helps teachers to identify what was successful in the teaching of the unit, what was not, and what improvements the teacher could make for next time. In planners 2 and 3, there is additional reflection on the transfer goals, which asks teachers to reconsider the initial transfer goals from the "inquiry" section and reflect upon whether the students achieved those transfer goals by the end of the unit.

Pedagogical leadership

This section is aimed primarily at DP coordinators. It will first explore the role that the DP coordinator has as part of the pedagogical leadership team within a school. It will then explore three examples of ways to raise the profile of ATL within schools by:

- developing and implementing teaching and learning initiatives in schools: embedding ATL in the school culture
- implementing a system of student self-assessment of ATL skills: developing students' self-confidence and motivation
- enlisting allies: involving the wider school community.

The DP coordinator as part of the pedagogical leadership team

The processes involved in the management of the DP are comprehensively explained in the annual *Handbook of procedures for the Diploma Programme*, which details the specific regulations and practical requirements for delivering the programme. However, in addition to the crucial "procedural"/organizational responsibilities of DP coordinators, another important aspect of the DP coordinator role is that of being part of the school's pedagogical leadership team.

This does not mean that the sole responsibility for pedagogical leadership should fall on the shoulders of the DP coordinator. However, it does mean that DP coordinators play a crucial role in helping to ensure, for example, that:

- there is a clear and unified approach to planning, including collaborative planning
- international-mindedness is embedded in curricular and co-curricular activities
- the three elements of the DP core play a central role in the curriculum, and both support, and are supported by, the subject disciplines.

Developing and implementing teaching and learning initiatives in schools: Embedding ATL in the school culture

When designing and implementing teaching and learning initiatives in schools, DP coordinators are often faced with the challenge of how to embed initiatives so that they become an integral part of the culture of the school, rather than simply an add-on. One important way to help with this is to ensure that initiatives have a very specific focus and benefit, rather than their being perceived as doing something new or different just for the sake of it being new or different. Another effective way of embedding ATL in the school culture is to ensure that in-school professional development (PD) activities not only focus on, but also model, the approaches to teaching and learning being discussed. For example, the visible thinking routine "sentence, phrase, word" (Ritchhart et al. 2011) is an excellent way to engage teachers with reading an article or extract from a text.

Teaching idea: Using the visible thinking routine of "sentence, phrase, word" to discuss an article or text as part of an in-school PD activity.

Select an interesting article or text extract to discuss as part of an in-school PD activity. Rather than simply asking teachers to read the extract, use the visible thinking routine to give greater focus to the activity and promote deeper discussion. Ask the teachers to individually read the text, and to highlight one sentence, one phrase and one word which they feel particularly capture a key idea or catch their attention. Then, in small groups, ask the teachers to discuss the choices they made, explaining why they made the selections that they did. Ask the group to reflect on the themes which emerge from their responses.

(Ritchhart et al. *Making Thinking Visible* 2011: 207)

Examples of teaching and learning initiatives that can be instigated/encouraged by DP coordinators:

Initiative	**Notes**
An in-school PD session on TOK across the curriculum	A useful starting point for engaging non-TOK teachers with TOK can be the "knowledge framework" found in the *Theory of knowledge guide (first assessment 2015)*. TOK teachers use this tool to analyse areas of knowledge into five related areas, such as "scope/applications" and "methodology". However for non-TOK teachers, it can also provide a helpful scaffold and the vocabulary to encourage TOK conversations in their subject classrooms.
Encourage a review and coordination of the school's calendar of DP deadlines	DP teachers can help students with their time management and organization skills by coordinating the deadlines for internal assessments and major projects so that these do not all happen at the same time. This can help to avoid unnecessary student stress.
Introduce a "post internal examinations" reflection for students	Reflection by students on their performance in internal examinations can help to embed reflection as part of the assessment process. It can also help to develop a more effective dialogue about assessment between the student and teacher. In this initiative, students are asked to reflect on their performance in internal examinations, identifying areas for development and proposing some action points. Teachers then review the students' responses and make additional suggestions of areas for development.
Set a whole-team target to focus on teaching through inquiry	Setting a single focus of attention for all DP staff for a particular period, such as a focus on teaching through inquiry, can help to give a more coherent student-centred approach to DP teaching within the school. Because all teachers are focusing on the same approach, they are able to share ideas, examples of unit plans, and so on, giving them additional support and ideas for how to embed the approach into their teaching more effectively.

Initiative	Notes
A collaborative planning initiative	Collaborative planning is explicitly specified as one of the programme standards and practices (standard C1). A crucial aspect of the DP coordinator's role is, therefore, ensuring that effective collaborative planning is taking place between DP teachers. Collaborative planning should focus on areas such as exploring connections and relationships between subjects, and finding opportunities to reinforce the concepts, content and skills addressed in different subjects. It also helps to ensure that all teachers have a better overview of students' learning.
An "observation buddy" initiative	One effective way to gain feedback on the teaching and learning happening in their classrooms is for teachers to engage in a peer observation scheme, where they observe a lesson from, and in turn are observed by, a peer. Some teachers can find this idea intimidating, as they feel they are being "judged" on their teaching. Ritchhart (2011) suggests beginning with observations that focus on observing student thinking, or student learning, rather than on the teaching itself, as this change of emphasis can help the observation seem less intimidating.
Encourage DP teachers to engage in action research	Where schools are looking for ways to extend and challenge teachers who are already engaged with, and enthusiastic about, ATL, one effective way can be to encourage teachers to engage in action research. In 2013 the IB launched a new *IB Journal of Teaching Practice*, which is a research journal written by, reviewed by, and published for teachers. Conducting research and then writing an article for this journal could be a powerful form of professional development for teachers, as well as having a positive impact on student learning. It also encourages sharing of good practice relating to ATL across the wider IB community.

Student self-assessment: Developing students' self-confidence and motivation

One possible way to embed ATL into school life is to consider requiring students to regularly self-assess their progress in developing these skills, for example, as part of the school's reporting procedures. Student self-assessment has been shown to improve both self-confidence and self-motivation (Dweck 1999). Using this technique, students are relied upon to accurately judge their own competence or proficiency improvements in specified skills against generalized skills-proficiency measures.

Given a clear proficiency-development framework, DP students are very capable of self-assessing both their initial ATL skills and the progress that they make towards mastery. One example of such a framework is as follows (Dreyfus and Dreyfus 2000, Berliner 2004).

Level 1 **Novice** **Observation**	**Level 2** **Learner** **Emulation**	**Level 3** **Practitioner** **Demonstration**	**Level 4** **Expert** **Self-regulation**
Observes others performing tasks and using the skill High levels of scaffolding from teacher needed	Copies others' performance of the skill Medium level of scaffolding needed	Can demonstrate the skill on demand Minimal teacher scaffolding required	Can teach others the skill No teacher scaffolding required

Teaching students the skills of self-assessment in a staged process gives them training in the vitally important skill of accurately gauging the quality of their own output, generates more self-confidence and intrinsic motivation, and ultimately reduces the burden of marking on the teacher. Once students have demonstrated proficiency in self-assessment, they can be given many opportunities to do so.

If an approach of student self-assessment is adopted, it can be extremely useful to include this element on reports. In addition to the benefits to students, doing so can also help to raise the profile of ATL skills in the school community, and help them to be seen as being embedded into the curriculum rather than being an add-on.

Enlisting allies: Involving the wider school community

IB World Schools are learning communities that encourage school leaders, teachers, students, parents and local community members to value learning as an essential and integral part of their everyday lives. Another strategy that can help to embed ATL in schools is, therefore, to engage the wider school community with the ATL programme.

In addition to subject teachers, there are a number of other individuals/groups who play an integral role in supporting students in their learning. For example, counsellors, in collaboration with year-level leaders and other staff, can be effective in integrating developmentally appropriate and timely pastoral topics into homeroom and advisory schemes in an effort to promote the development of balanced learners (see the IB learner profile). Counsellors can integrate lessons on study skills and assessment preparation into the homeroom and/or advisory schemes, as well as working with parents, who will serve as partners in supporting the process.

Drawing from an overall understanding of the students' needs, the rigour of programmes, and dynamic academic and extra-curricular demands, counsellors can be responsible for coaching individuals towards maintaining a healthy and realistic balance of expectations. In an effort to empower students to meet deadlines while maintaining balance in their lives, counsellors can teach backward-planning models as well as visual timetable-mapping exercises in homeroom/advisory sessions. Counsellors can implement schemes that address the affective and physiological responses to school-related stress and how to manage them. Students should be taught the importance of stress- and anxiety-reducing strategies and, through modelling, be shown how to use them in different scenarios. Counsellors can also be effective in advising parents on how to help their child maintain a realistic schedule.

Another important group within the school community are parents. Parents can sometimes feel excluded from education, and it can be challenging for schools to talk to parents effectively about their children's learning. However, parents can play an important role in the development of ATL skills; for example, parents can support reflective practices by asking students questions about their learning and talking about learning processes and goal-setting. Ron Ritchhart, senior research associate at Harvard's "Project Zero", recommends five "tips" for engaging parents in the learning of their children (2013), suggesting that when teachers talk to parents they should:

- Tip 1: Link to a research base
- Tip 2: Have a clear rationale
- Tip 3: Connect to the familiar
- Tip 4: Use rich examples
- Tip 5: Provide specific action points/takeaways

Ritchhart (2013)

Librarians

School librarians can play a central role in the development of ATL skills. As a natural part of their work, librarians offer expertise in information literacy, critical thinking, and other study and learning skills, to support effective learning through the development of ATL skills. This is best achieved by working with subject teachers, the IB coordinator and others (rather than in a parallel environment), and where the role of the librarian is understood in the school and reflected in school documentation and practices (Tilke 2011).

The role of librarians in DP schools may involve working with students on areas such as academic honesty, researching and extrapolating important information, and citing sources effectively. Librarians in DP schools may also play a role in supporting teachers in their planning; they are often well placed to work with teachers to develop vertical and horizontal planning of ATL skills across subjects and the integration of ATL skills into unit plans. Their expertise in research skills makes librarians a vital asset in planning for the integration of these skills into the curriculum, as well as other inquiry-related skills such as critical thinking, creativity and collaborative skills.

Examples of opportunities to effectively engage the knowledge, skills and expertise of school librarians.

- Management of a collaborative and reflective workspace and learning environment (the school library).
- Developing students' citation and reference skills.
- Working with students on academic honesty, and promoting effective strategies to reduce plagiarism.
- Developing technology-related skills, such as using online resource databases and other technology-based research tools.
- Developing an information infrastructure (for example, liaising with local universities).
- Developing collaborative strategies with teachers, and helping to promote a collaborative learning environment.
- Using the curatorial skills of a librarian to help students develop their own curating practice through tagging and using helpful tagging terms to help them collect and organize data gathered through their own information searching.

Conclusion

This document is intended to provide guidance and suggestions, rather than to be prescriptive or restrictive. It outlines the principles underlying teaching and learning in the DP, but still leaves room for flexibility and creativity of individual teachers and schools. For example, although there is a wide variety of approaches to the teaching of ATL skills, there is general agreement that in order for the teaching of skills to be effective it needs to be both explicit and sustained. Improving skills requires reinforcement over an extended period of time, and in a variety of contexts. Which specific strategies a teacher or school employs to transfer this underlying principle into their practice is left to the professional judgment of teachers and coordinators, as they are the people who have the deepest insight into the specific situation and needs of their students.

Although some of the techniques for developing skills are complex, others are relatively simple. One of the easiest ways for teachers to get students to start to notice learning strategies is to encourage them to reflect on the different ways in which they are taught on a regular school day and to consider which strategies work best for them. The key consideration for students is not which teaching methods they enjoyed most, but which were most effective in helping them understand, remember and learn that particular subject matter. This in itself is a big step forward in metacognitive development for students—to separate pleasure from effectiveness in order to better identify their own best **ways** of learning. If this exercise is performed regularly, then analysis of the information generated will allow any individual student to build up a profile of themselves as a learner and enable them to more finely calibrate their own most effective ways of learning. The results of which can then be used by students to improve their performance.

Establishing this kind of metacognitive awareness creates what Dweck (2008) calls her "growth mindset", characterized by the belief that learning improvement is a function of effort and strategy use, and that both of these things are within the student's control. Students with this type of awareness treat learning as a process requiring many different techniques and strategies depending on the subject and the context. They actively seek out options for every stage of the learning process, they try out different things and they notice what works and what doesn't. They view any learning failure as a failure of process rather than that of the individual, they find better processes and apply them, they reflect on the results and they continually improve the success of their learning efforts (Derry and Murphy 1986, Hattie et al. 1996, Kobayashi 2004, Yaworski, Weber and Ibrahim 2000).

The implementation of process-oriented, skills-based teaching can be challenging for both teachers and students. The teacher's role becomes more facilitative and the student's role more inquiring. Many students, especially those comfortable with, or habituated by, transmission teaching will find it difficult to adjust to a classroom scenario where they are expected to do the learning for themselves rather than simply being told what to learn. These approaches to teaching and learning do, however, have the potential to develop "minds well-formed rather than minds well-stuffed" (Alec Peterson, 2003: 43), an aspiration at the heart of an IB education.

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