International Baccalaureate
Baccalauréat International
Bachillerato Internacional

IB position paper

Concurrency of learning in the IB Diploma Programme and Middle Years Programme

Roger Marshman

© International Baccalaureate Organization 2010

Introduction to IB position papers

This paper is part of a series of papers commissioned by the IB and written by IB practitioners. Each paper addresses a topic or issue related to the IB's philosophy or its educational practices.

Other papers in the series

Hare, J. July 2010. *Holistic education: An interpretation for teachers in the IB programmes*.

Introduction

A definition of the concurrency of learning is a principle under which students deal each year with a balanced curriculum in which the required subjects are studied simultaneously.

The International Baccalaureate (IB) Diploma Programme and Middle Years Programme, each in its individual way, reflecting different origins and histories, embrace the principle of concurrency of learning, in broad terms sharing a belief that out of concurrent learning across disparate disciplines will come a richer, more interdisciplinary learning, whereby insights from different disciplines inform learning in a mutually enhancing way.

This paper explores the concept of concurrency in the IB Middle Years Programme (MYP) where it has been always part of the fundamental concept of holistic learning, though with increasing practical explicitness, and in the IB Diploma Programme (DP) where it has been an essential element in the philosophical conception of the programme from the earliest days. In the IB Primary Years Programme (PYP) the concept is not specifically articulated, but is present by default in the expectation of transdisciplinary units of inquiry.

In terms of the IB mission statement, the focus here is on the aim "to develop inquiring, knowledgeable and caring young people" and on the encouragement of "students across the world to become active, compassionate and lifelong learners". The multidisciplinary, holistic nature of many of the world's problems, and of many future jobs, is well known and is therefore not specifically addressed in this paper, although it is assumed to be vital.

A brief historical survey showing the concept of concurrency in the philosophy and documentation of the programmes is followed by more theoretical considerations of constructivism, the learner as a whole person, and the nature and value of interdisciplinary learning. A further section addresses practical requirements. Finally, a brief comparison is made between IB programmes and other "international" programmes.

A little history: The IB Diploma Programme

The DP arose partly from a conviction that traditional "sixth form" (the final two years of secondary school/pre-university education) programmes in the UK—A-levels—allowed too narrow a focus on too small a set of subjects. Within the DP, the expectation of learning in six disciplines (the number eventually adopted in 1965) did not in itself guarantee interdisciplinary cross-fertilization of understanding. However, following discussions in 1967, the adoption of theory of knowledge (TOK) as a formal requirement of the DP did formally codify the expectation of interdisciplinary epistemological understanding to address the issues of knowledge claims in different disciplines.

In summarizing the historical development of the DP, Hill (2002) indicates developments that took place over several decades, culminating in 1962, driven by three types of conviction among parents and educators: ideological, utilitarian and pedagogical. It is with the pedagogical aspects that this paper is concerned. Hill summarizes the pedagogical position as follows:

> [It required] critical inquiry coupled with an open mind willing to question established beliefs, willing to withdraw from conventional positions in the light of new evidence and experiences, willing to accept that being different does not mean being wrong. This was quite a change from the emphasis at the time on accumulating knowledge as fact by memorization. (Hill 2002: 19)
>
> [It was] to promote critical thinking skills ... via a balanced programme in the humanities, the experimental sciences and experiential learning. (Hill 2002: 20)

Prior to being the first director general of the International Baccalaureate Organization from 1966, Alec Peterson was head of educational studies at Oxford and had a strong wish for "reforms of the

excessively specialized and polarized English curriculum" (Peterson 1987) at pre-university level. In 1960, he advocated an increase in the number of specialisms from three to four, time for religious and physical education and creative arts, and a 60-hour course enabling students to make a unity of their whole learning experience by understanding the "methodology of the subjects". Hill points out that this was an independent precursor to theory of knowledge, a name first suggested in 1965.

In *Schools Across Frontiers*, Peterson (1987) reports a desire for "the teaching of minds well informed rather than minds well stuffed" with an understanding of the "interconnectedness" of learning (Peterson 1987). Creative, aesthetic or social service activities (CASS), later to become the familiar creativity, action, service (CAS), was to connect experiential learning with intellectual learning. Theory of knowledge (TOK) was to make connections of knowledge issues with subjects throughout the course.

Peterson gives an account of the long gestation of the "six discipline plus core" DP model, involving the wish to avoid three negative influences: the overspecialization and lack of breadth in the English A-levels; too great a breadth of "learning" in up to 13 subjects in the "encyclopaedic" German *Abitur*; and an anti-intellectual trend towards "smorgasbord" choice in some North American schools.

Peterson also wished to avoid the tendency in national systems for subjects to be studied in "watertight compartments" and the "failure to make explicit the differing forms which academic learning and knowledge take":

> What matters is not the regurgitation either of facts or of pre-digested interpretations of facts but the development of powers of the mind or ways of thinking that can be applied to new situations. (Peterson 1987: 47)

In what we now see as a desire for metacognition, Peterson quotes the influence of Bruner (1960) in understanding that:

> Teaching specific subjects without making clear their context in the broad fundamental structure of a field of knowledge is uneconomical in several deep senses ... knowledge one has acquired without sufficient understanding to tie it together is likely to be forgotten. (Peterson 1987: 48)

Pedagogically, the significance of this relates to there being an emphasis on both conceptual understanding and on the underlying importance of epistemology and interdisciplinarity, especially as these elements are embedded within subjects and within the core significance of TOK and CAS, which is further examined later in this paper.

In proposing a summary definition of international education, Hill (2002) reminds readers that a formal curriculum comprises content (knowledge and concepts), skills and attitudes, and his comments about skills resonate strongly in the context of concurrency of learning. The central skill of critical analysis of material requires a pedagogical approach, which includes "working cooperatively, independent research, **interdisciplinarity**, developing the 'whole person', and learning how to learn" (Hill 2002: 27, my emphasis). Hill gives several useful examples.

The implication here is that interdisciplinarity is most readily achieved when organized concurrently. And while affective outcomes can never be guaranteed or legislated for, concurrency of exposure to knowledge and attitudes across a range of disciplines at least raises the likelihood of affective engagement in topics and issues of affective importance, such as intercultural understanding.

The expectation of concurrency was certainly made explicit with the publication of *Programme standards and practices* (IB 2005: 2)—"Standard A1, Practices, DP, 11" reads: "The school promotes concurrency of learning for each student."

It is interesting that the word "promotes" was used here rather that the seemingly stronger "ensures", found in the equivalent "MYP practice". On reflection, however, one could argue that **ensures** implies a guarantee of outcomes—a logical impossibility—while **promotes** retains a sense of active engagement in pursuit of an objective, an idea in keeping with IB curriculum philosophy generally. The relevant wording to be published in the 2010 version of *Programme standards and practices* (IB 2010a) is:

> B2 10 The student schedule or timetable allows for the requirements of the programme(s) to be met.

Diploma Programme requirements

- The schedule provides for the recommended hours for each standard and higher level subject.
- The schedule provides for the development of the theory of knowledge course over two years.
- The schedule respects concurrency of learning in the Diploma Programme.

In terms of earlier comments about terminology, the replacement with *respects* of the seemingly stronger *promotes* is perhaps regrettable, especially as the new MYP wording has adopted *promotes*. Nevertheless, the principle is also clearly espoused in "Standard C2, Part 1b" for the DP: "The curriculum facilitates concurrency of learning."

A little history: The IB Middle Years Programme

The development of the forerunner to the MYP, the International Schools Association Curriculum, was undertaken in the 1980s by a group of teachers and administrators from international and internationally minded national schools (International Schools Association 1991). The aim was to develop a curriculum encouraging international awareness in young people with emphasis on the skills, attitudes and knowledge needed to participate in an increasingly global society. With its structure encompassing eight subject areas and the contextualizing perspectives of the areas of interaction, such a curriculum was fundamentally holistic in conception.

Therefore, from the beginning, one of the fundamental concepts underpinning the MYP is holistic learning, which represents:

> the notion that all knowledge is interrelated and that the curriculum should cater to the development of the whole person, the attributes of which are described by the IB learner profile. (IB 2008a)

It should be noted that the concept of holistic learning has two aspects: the curriculum and the learner, and each is important in the consideration of concurrency of learning. While the learner profile was only specifically codified by the IB as relevant to the learners in the MYP and DP from 2006, the MYP has, since its inception, been committed to the holistic principle of concurrency of learning across eight curriculum areas in all years of the programme. The minor exception to this across the final two years is the **curriculum flexibility** provisions introduced after programme committee deliberations in October 2002.

It was also in 2002 that the *Middle Years Programme monograph* was published (IB 2002). On the related concepts of concurrency and metacognition, it had this to say:

> Holistic learning in the context of the MYP
>
> Like the Primary Years Programme, the development of the MYP has been substantially influenced by a constructivist, process-led view of learning in which the student develops an understanding by consciously learning how to learn and linking new knowledge to existing knowledge. Theorists such as Gardner (1999), Perkins (1992), and Wiggins and

> McTighe (1998) stress the vital importance of thoughtful learning and connections within a pedagogy of understanding.
>
> The focus of holistic learning is the discovery of relationships between areas of knowledge, [and] between the individual, communities and the world. The programme emphasizes the study of traditional subject groups ... However, the MYP requires schools to organize learning so that students will become increasingly aware of the connections between subjects, and between subject content and the real world. (IB 2002)

Teachers are expected to understand the student's total experience at school, hence the insistence on collaborative planning across subjects and through the unifying contexts of the areas of interaction. Students should understand that knowledge is interrelated and that real-world issues require insights across disciplines. Jacobs (1997) explores the related benefits of increased intrinsic motivation, deeper understanding, and more probable transfer of learning.

While prior to 2005 the phrase "concurrency of learning" was not to be found in the MYP evaluation documents, the principle was highly visible. The 1999 MYP evaluation self-study questionnaire (IB 1999/2002) required evaluation of whether school practices were:

- ensuring that teachers consider the curriculum as a coherent experience, with attention paid to approaches to learning and natural links and overlap within the curriculum
- facilitating interdisciplinary projects to strengthen cross-curricular skills and deepen the understanding of wider concepts
- ensuring that teachers coordinate learning activities within and across academic disciplines, through common planning and curriculum mapping.

School leaders were to ensure that timetabling provided adequate time for each subject group according to MYP requirements and the needs of the students. Under Standards C1 and C2, they were also to assist teachers to:

- [identify] areas or topics that have links with other subject groups
- use opportunities to connect to other disciplines for the understanding of wider concepts, and link with other subject groups in meaningful activities/projects
- have an overview of the students' whole experience of the curriculum through a form of curriculum mapping and grade-level/year meetings.

The expectation of concurrency was made explicit in *Programme standards and practices* (IB 2005: 2) "Standard A1, Practices, MYP, 10" reads: "The school ensures concurrency of learning for each student across all subject groups." This has consistently been taken to mean in all years, except where the curriculum flexibility provision is applied to one or two subject group(s) in the final years. The latest wording for the MYP is (IB 2010a):

> B2 10 The student schedule or timetable allows for the requirements of the programme(s) to be met.

Middle Years Programme requirements

- The schedule or timetable provides a minimum requirement of 50 teaching hours per subject group per year.
- The schedule or timetable provides a broad and balanced choice of subjects, including at least one subject from each of the eight subject groups, and promotes concurrency of learning.

As indicated earlier, the MYP has entailed a commitment to interdisciplinary learning from the beginning, beyond mere concurrency of discipline-based (or "disciplined") learning. This has been both through the concept of interdisciplinary "projects" or the much preferable term "units of work", and through the unifying and contextualizing function of the areas of interaction. Nevertheless, the expectation became clearer and more codified in the early years of the new century. At the same time, a body of shared understanding about the nature of worthwhile, high-quality interdisciplinary learning, and the planning required for it, began to emerge, as codified in "Standard C2, Practices, MYP, 14":

> Planning at the school facilitates interdisciplinary learning to strengthen cross-curricular skills and deepen understanding of wider concepts.
> (IB 2005: 11)

The theoretical underpinnings of the importance of interdisciplinarity in the MYP have been helpfully clarified since 2005, largely through the work of researchers at the Harvard Graduate School of Education. The work, outlined later in this paper, informs a new support document, *MYP guide to interdisciplinary teaching and learning* (IB 2010b). Furthermore, the introduction of the MYP unit planner in 2008 (see IB 2008a) has assisted schools in making interdisciplinary units of work both more authentically meaningful, in terms of real-world contexts, and more manageable.

There is another central element of the MYP model which exemplifies a commitment to holistic and concurrent learning: the areas of interaction as organizing or focusing contexts for the planning of both disciplined and interdisciplinary teaching and learning. Their use as a contextualizing tool promotes the authenticity of engaging with real-world issues in an intellectually rigorous way, to be clearly distinguished from facile thematic studies or "projects". The areas of interaction are deeply values-laden and, when applied in the most exemplary manner, require students to understand the origin and manifestation of their own value structures and how they might be defended or challenged. A major tool in the process is the formulation of engaging and multifaceted unit questions. The link between the areas of interaction and aspects of TOK in the DP can be readily discerned (Marshman 2006).

The perspective of the Primary Years Programme

Concurrency of learning has not been an explicit principle underlying the development of the PYP, nor has that concept contributed to the structure of the PYP curriculum framework. However, looking at concurrency of learning in the context of the practices and requirements of the programme, there are several indicators showing that it does exist, although perhaps not strictly in accordance with the definition of concurrency of learning given at the beginning of this document: studying "different subjects ... simultaneously".

Concurrency of learning in the PYP is illustrated within its written curriculum. The five essential elements of the written curriculum—knowledge (disciplinary and transdisciplinary), key concepts, transdisciplinary skills, attitudes and action—together with the IB learner profile, ensure a coherent learning experience for each student throughout each year or grade level, and from one year or grade level to another (IB 2009a, IB 2010c).

This coherence is enhanced at each year or grade level by the requirement that: "mathematics, language(s) of instruction, social studies and science need to be the responsibility of the classroom teacher: the teacher with whom the students spend most of their time." (IB 2010c)

Theoretical considerations 1: Constructivism

A commitment to constructivist belief about how children learn has explicitly underpinned the PYP from its beginning in 1997. Until the publication in 2008 of *Towards a continuum of international education* (IB 2008b), and specifically its statement on teaching and learning, the term "constructivism" was not formally associated with the two older programmes, although the concept had been embraced philosophically and practically to varying extents in DP and MYP schools for many years previously (Marshman 2006). A long dissertation on constructivist theory is not possible here, but a few aspects are especially relevant to the discussion of concurrency.

The theory asserts that cognition and learning is a psychological construct, or development of a mental model, in a process that is idiosyncratic to each individual learner because of prior experience and individual propensities. Importantly, the process is only sometimes, and perhaps rarely, predictable in a linear way, and is different for different individuals. Gardner (1999) explores differences in learners' intelligences in a practical way. Learners are not blank slates or empty vessels and have different propensities and learning styles (Gardner advises against the conflation of these two ideas)—they are engaged in different ways and make cognitive connections in different ways. It follows, therefore, that different disciplines may enrich the learning through specific insights; this is primarily an argument for interdisciplinary learning, but of course such learning presupposes concurrency or a carefully planned serial experience—a kind of virtual concurrency.

Gardner, embracing a "less is more" perspective, proposes that the vital decisions about what is to be taught and why can usefully be made in terms of important questions and topics of the world and of the day. This approach to content, essentially an interdisciplinary one, leads to the sense that "literacies, skills and disciplines ought to be pursued as tools which allow one to enhance one's understanding of important questions, topics and themes" (Gardner 1999: 74)—fewer topics in greater depth. He argues that the application of learning in a performance view of understanding is critical. This authentic view of assessment of learning may be challenging, but

> the actual decision to focus on performances immediately shifts the emphasis from mastering content to thinking about the reasons why a particular content is being taught and how best to display one's comprehension in a publicly justified manner. (Gardner 1999: 74)

There is a consistency here with PYP and MYP unit planning processes, built around questions for significant and transdisciplinary or interdisciplinary inquiry. A relevant, contemporary MYP unit question such as "How can we eat fish?" would satisfy Gardner's requirements of significance in the real world and opportunities to challenge the misconceptions which work against understanding in any discipline; for example, the learned formalism of the application of algorithms in mathematics, teleological views of evolutionary theory, or superficial understandings of historical events such as the Holocaust. The question "How can we eat fish?" would also accord with the characteristics of a good guiding question (Traver 1998). Moreover, addressing such interdisciplinary topics demands central, discipline-based conceptualization and understanding.

Gardner summarizes his theory of eight or nine relatively discrete information processing mechanisms or intelligences. Very importantly, in the concurrency context, he counsels against viewing the recognition or development of "multiple intelligences" as an educational goal in itself. Rather, "[it] is better thought of as a handmaiden to good education, once educational goals have been established on independent grounds" (Gardner 1999: 79)—such goals are essentially a breadth of disciplined exposure to worthwhile topics leading towards two ends. The first of these is "valued adult roles or end states" for some or all individuals in which the linguistic, logical–mathematical, musical, spatial, bodily kinaesthetic, naturalist, interpersonal or intrapersonal propensities are developed for application in life. The second is the mastery of valued curricular or disciplinary material, say in biology or history. That could still be consistent with a standard unitary idea of intelligence; however,

> [I]f individuals indeed harbor different kinds of minds, with different strengths, interests and strategies—then it is worth considering whether pivotal materials could be taught and assessed in different ways. (Gardner 1999: 79)

Gardner explores different entry points, or ways of engaging students: narrational, quantitative/numerical, foundational/existential, aesthetic, hands-on and social. He explores the value and dangers (known to all students of TOK!) of informative analogies. Finally, he asserts that, in considering what is worthwhile as a core educational experience or topic:

> The key step … is the recognition that a concept can only be well understood—and can only give rise to convincing performances of understanding—if an individual is capable of representing that core in more than one way, indeed, in several ways. Moreover it is desirable if

> the multiple modes of representing draw on a number of symbol systems, intelligences, schemas and frames. (Gardner 1999: 85)

The implications are for significant time to be spent on a topic, for depth rather than breadth (the "less is more" principle), and for topics of worth to be portrayed in several ways; these form a strong argument for interdisciplinarity and concurrency. None of this is to be taken to imply that disciplinary expertise is not of vital importance, nor is it "just another call for projects, one of the sins of the Progressive movement" (Gardner 1999: 87).

Recognizing that learning is a "developmental path of constructing, testing and revising mental models of how the world works" (IB 2008b: 12), it will be readily understood that constructivist approaches sit comfortably with inquiry-based methodologies, especially perhaps teaching the skills of question formulation. This is an important aspect of metacognitive awareness that must be valued in constructivist pedagogy, as must the desire for students to become autonomous and independent learners, able to address real-life issues which inevitably cross discipline boundaries.

For example, in the context of teaching science for conceptual understanding, Zimmerman and Stage (2008) summarize several studies that focus the importance of metacognitive processes, "thinking about one's thinking", in conceptual development and inquiry-based learning. These studies support both the essence of sustained concurrency and the intuition of many teachers that conceptual understanding requires regular, planned exposure to ideas and their analysis, revision and connection over an extended period of time. Indeed, effective processes take time, an importance "we are just beginning to recognize" (Zimmerman and Stage 2008: 169). Several factors have been identified as significant, including:

- understanding that prior learning must be activated, and, very importantly, prior misconceptions dealt with
- cyclic opportunities for iterative/incremental or sudden restructuring of knowledge; "simply presenting a learner with a correct concept does not promote conceptual change"
- teaching which recognizes that conceptual knowledge must be organized in connecting schemata
- understanding "that knowledge is contextual, and inquiry that allows investigation and application of knowledge helps learners understand more deeply"; contexts cross discipline boundaries
- incorporation of metacognitive tools, individual and group, and recognition of personal, social and cultural contexts.

A perspective from brain research

Sousa (2005) also focuses on issues of time in explaining that the acquisition of knowledge and its subsequent retention in long-term memory involve physical and chemical changes in the brain. Through repeated stimulus, patterns of neural firing bind cells in groups, called engrams, and lead to storage in diverse structures of the brain. Importantly, in the context of concurrency, the greater the number of associations in the learning and storage activities, the greater is the potential for connections to form engrams that are unique to each learner.

Sousa distinguishes between immediate, working and long-term memories; the first two are associated with initial or repeated learning processes, the latter with retention of both procedural and especially declarative knowledge. While initial "learning may be retained just long enough for the test", achieving retention—"the capacity to locate, identify and retrieve accurately in future"—requires rehearsal rather than, for example, "cramming" (Sousa 2005: 86). Time is required for both rote rehearsal and, more relevant to this paper, elaborative rehearsal, when it is "more important to associate new learnings with prior learnings to detect relationships" (Sousa 2005: 86).

> When students get little time for, or training in, elaborative rehearsal, they resort more frequently to rote rehearsal for nearly all processing.

> Consequently, they fail to make the associations that only elaborative rehearsal can provide ... and continue to believe that learning is for recall rather than for the generation of new ideas, concepts and solutions. (Sousa 2005: 88)

In considering both concurrency and the sustained development of conceptual understanding, it is significant that Sousa (2005, after Hunter 1982) asserts that effective rehearsal involves both massed (intensive) and distributed (spread over time) practice; the former supports initial learning and the latter is needed for deep retention of knowledge and its subsequent retrieval into the working memory to assist new learning. This is the rationale for both spiral curricula and sustained learning over time. Regular exposure keeps neural pathways open.

A brief mention of the IB learner profile

The IB learner profile (IB 2006) started its life in the PYP and, despite some opposition during discussions held between 2002 and 2005, was eventually adopted with minor modifications as describing attributes desirable in learners in all three programmes. Consequently, by the publication of *Towards a continuum of international education* (IB 2008b), there is a clear injunction: "Teaching and learning in IB programmes must be viewed in the context of the IB learner profile" (IB 2008b: 12). There follows a division of the learner profile attributes into two subgroups. Some: "inquirers, knowledgeable, thinkers, communicators and reflective, imply the development of cognitive competencies ... [T]he other attributes—principled, open-minded, caring, balanced and risk takers—emphasize dispositions and attitudes", or what may be considered the more obviously values-laden aspects. While this is a useful division for easy access, it nonetheless seems highly permeable, especially when one accepts, as the IB does, the values-laden nature of all educational experience. The particular point asserted here is that values are constructed in ways analogous to the construction of other knowledge (Kohn 1997, Marshman 2006). The real-world contexts in which learning should or does occur are multifaceted and require insights from a range of disciplined understandings for a rich capacity to understand and engage intelligently with complex issues. This notion is explored further in the next section.

Theoretical considerations 2: Interdisciplinary learning in the MYP and DP

Interdisciplinary learning, and therefore concurrency of learning, has been a concept associated with the MYP since its inception but has been variously understood and implemented until quite recently. A new support document, *MYP guide to interdisciplinary teaching and learning*, was published in May 2010 (IB 2010b). Substantial elements of that document were first drafted in *"Playing sound waves": Quality interdisciplinary teaching in middle school classrooms and beyond* (Boix-Mansilla 2007).

Interdisciplinary learning may be defined as the ability to integrate knowledge and modes of thinking from two or more disciplines to generate a new insight; thus:

> Students demonstrate interdisciplinary understanding of a particular topic when they can bring together concepts, methods, or forms of communication from two or more disciplines or established areas of expertise to explain a phenomenon, solve a problem, create a product, or raise a new question in ways that would have been unlikely through a single disciplinary means. (IB 2010b)

To achieve such rich learning, interdisciplinary study must be purposeful, disciplined (that is grounded in the contributing disciplines) and integrative.

Purposeful implies a significant, multifaceted topic or issue, about which better understanding or competence is valuable for the student; the aims of the teaching and learning must be clear. Ideally, "the potential limitations of a single-disciplinary approach to a topic are overcome by drawing on the resources of other disciplines" (Boix-Mansilla 2007: 3).

Disciplined implies the identification, support, development and use of key discipline-based understandings, grounded in the established epistemology and methods of the disciplines. In order to enrich inquiry, the work will:

- build on the disciplines, selecting and reorganizing disciplinary goals in meaningful ways
- mirror the work and thinking of experts, being robust and seeking to ensure no disciplinary misunderstanding or oversimplification.

The pertinence of this approach to the areas of interaction in the MYP—particularly approaches to learning—and to TOK in the DP are obvious.

Integrative implies a level of understanding and insight that deeply connects elements from different disciplines; a student has an integrative understanding when he or she can act upon, generate or describe a productive relationship of ideas across disciplines (Boix-Mansilla 2007). This concept is tied closely to a performance view of understanding (see also Gardner 1999) based on a development of constructivist thinking, which holds that understanding is something the individual does, rather than merely has. Performances of integrative understanding are therefore appropriate for formative processes as well as summative assessment, providing "opportunities for flexible **thinking with knowledge in novel situations**. Such experiences allow students both to build **and** demonstrate their understanding" (Boix-Mansilla 2007: 12, author's emphasis). This is an intellectually rigorous view of knowledge, learning and ultimately of assessment and is well summarized in the following diagram.

INTERDISCIPLINARY TEACHING FRAMEWORK

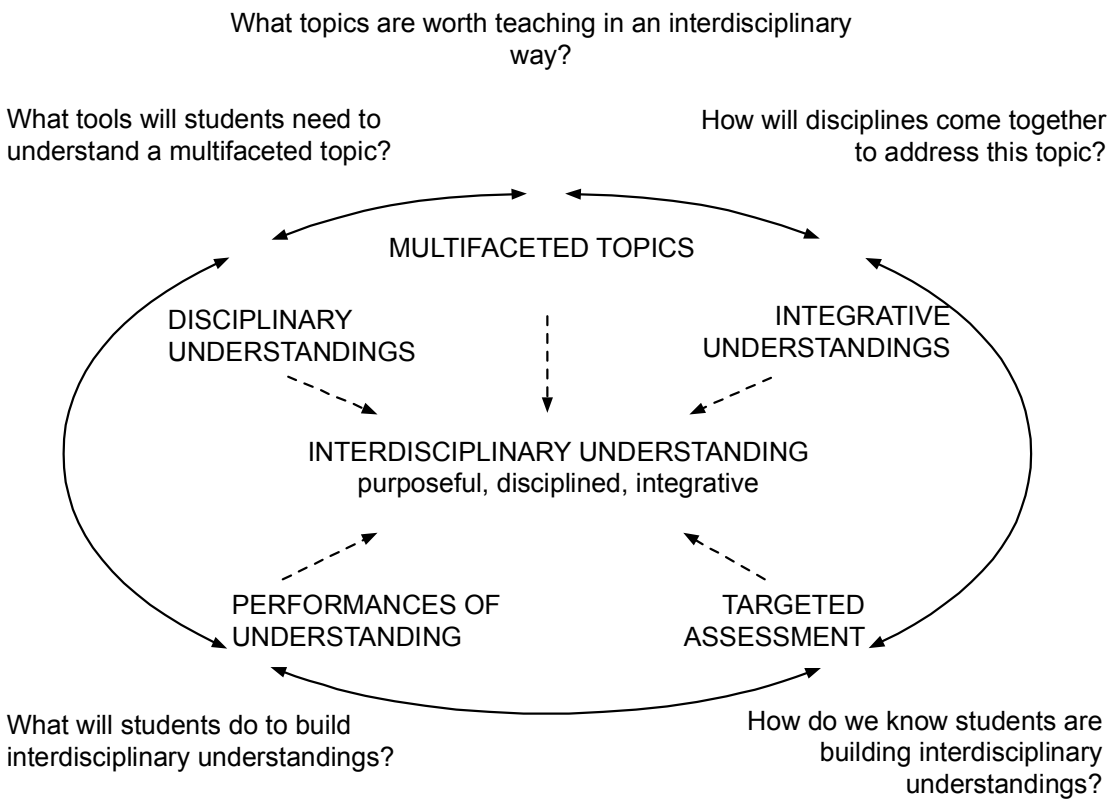

Figure 1: From Boix-Mansilla (2007)

Theory of knowledge and interdisciplinary learning in the IB Diploma Programme

As indicated earlier in the overview of the DP's history, TOK has long had the concept of interdisciplinary understanding at its heart. As a study in epistemology, TOK involves examining different "ways of knowing" and establishing or challenging truth claims in the different disciplines or "areas of knowledge". In exploring values-laden, emotional and aesthetic ways of knowing as well as those often considered "harder"—the logical, empirical, inductive and deductive—students confront vital issues such as the problems of history and paradigm shifts in all areas of human understanding, even in the supposedly hard sciences. Here, the links between TOK and the areas of interaction in the MYP are to be found (Marshman 2006). The richness of understanding to be had from the considerations of TOK will clearly benefit from a concurrent growth of understanding of the problems of knowledge and truth claims in the various disciplines. A short reflection on some current problematical issues will illustrate the point: climate change and international/intercultural perspectives, global banking and currency trading, species extinction, the supposed clash of civilizations, problems with Facebook and the internet, fundamentalisms—none of these is a uni-disciplinary issue. The DP is predicated on the belief that the richest understanding is engendered by simultaneous learning in the disciplines and in TOK, the latter providing the essential epistemological framework for potentially very challenging work.

In its section on "Disciplinary and interdisciplinary understanding", *Diploma Programme: From principles into practice* (IB 2009b) addresses the principle of concurrency as follows:

> Teachers and schools have a responsibility to help students make meaningful connections between different disciplines through providing instruction, teaching schedules (often also referred to as timetables) and learning environments that support this process. **Concurrency of learning is expected in the Diploma Programme as it provides one important means of supporting interdisciplinary learning.**
>
> **Concurrency means teaching the curriculum in a schedule that consistently exposes the student to all of their subjects and the core, over the two years of the programme.** This allows students and teachers to make links between experiences in the core and the academic subjects that are being studied, and it is based on the belief that the total educational experience is more than the sum of its parts.
>
> The theory of knowledge experience provides a forum for discussion and instruction that supports the development of interdisciplinary understanding. **It is essential that the theory of knowledge course relates directly to students' experiences in the academic disciplines** and that the academic disciplines, at appropriate times, refer to theory of knowledge issues. (IB 2009b: 6, my emphasis)

Similarly, the same document, under "Learning how to learn", asserts:

> Each academic discipline presents students with different challenges and it cannot be assumed that understanding gained in one discipline or context will be easily transferred to another. **The structure of the Diploma Programme, with the expectation of concurrency of learning and the theory of knowledge experience, is designed to help students (with the support of teachers) make meaningful connections between the experiences of the core and the different academic disciplines.** In the process it is expected that students will develop a better appreciation of themselves as learners and the nature of human knowledge. (IB 2009a: 7)

In this context, the importance of the complementary learning that students gain from another element of the DP core—creativity, action, service (CAS)—should also be mentioned, with a reminder that it too should be sustained over most of the two years of the programme.

An interdisciplinary development in the DP

It is often said that the DP differs from the other programmes by being discipline based (as indeed are the others) without the transdisciplinary and interdisciplinary expectations of the PYP and MYP, with the exception of the desired interdisciplinary perspectives to be gained from TOK. It is therefore very pleasing to note the development of the interdisciplinary world studies extended essay option, currently in pilot implementation under a partnership with Harvard University's Project Zero. Students will focus on significant global issues requiring interdisciplinary understanding and solutions. The option will be available to all schools from 2011, for first examinations in the May and November 2013 examination sessions.

The partnership, started in 2008, arose from a mutual interest in developing greater understanding of interdisciplinary teaching and learning in schools and in providing support to teachers and students. Harvard provides research and analysis, while the IB provides the context: a network of schools and a capacity to publish for a sizable community of schools.

With a twofold importance in the context of concurrency of learning, the project aims to:

- nurture DP students' ability to design and conduct independent interdisciplinary inquiry, which integrates knowledge and modes of thinking from two or more disciplines, to examine a world issue in depth

- advance students' global consciousness—their ability to view themselves as informed local and global actors in an increasingly interrelated world.

For a full treatment of this important point, see Boix-Mansilla, Miller and Gardner (2000).

It is hoped that this pilot and associated research will extend understanding of the nature of interdisciplinary learning and inform the next extended essay curriculum review.

The DP—some practical considerations

DP courses are designed as two-year courses

Reflecting a structure designed to maximize the capacity of students to achieve optimal growth and performance in all their subjects, the relevant DP general regulations (IB 2007) read:

> 7.1 Candidates for the IB diploma must satisfy assessment requirements in six subjects, each studied over a period of two years, **except that not more than two standard level courses may be completed in the first year of the programme. Languages *ab initio* and pilot subjects can never be completed in the first year of the programme**.
>
> 7.2 In addition to the six subjects, candidates for the IB diploma must:
>
> a. take a course in, and complete the required assessment in, theory of knowledge, for which the IB Organization recommends at least 100 hours of teaching **over the two-year period** of the Diploma Programme.

It is perhaps regrettable that regulation 7.2 has been given the following "soft" and somewhat inconsistent interpretation to meet requests in some parts of the world.

> All HL courses and at least one SL course must be taught over the two years of the programme. It is permissible to teach up to two SL subjects over one year. It should be noted that this exception is designed to offer flexibility to schools where genuine need for this arrangement exists due to **unavoidable** scheduling constraints. **This is not intended to be**

> **a routine aspect of Diploma Programme design;** all courses are designed as two-year learning experiences.
>
> The core must be taught/experienced over two years. TOK is a course that encourages reflection on the nature of human knowledge and should be taught with reference to student experience in the classroom, which requires concurrency of learning. Some schools choose to finish the TOK courses slightly before the final examinations so that students can start to prepare for final assessments. Similarly, CAS needs to involve students over the two years, but it is reasonable to allow students to finish the programme a couple of months before final assessments to allow them to concentrate on examination preparation. (IB 2008b: 25, my emphasis)

In contrast to the desire in some schools to truncate the learning time available to students to meet scheduling requirements, schools elsewhere have adopted a different stance involving two main perspectives. The first is that taking a subject by anticipation (in the first year) is in the student's interest only if that student can be almost certainly guaranteed a score of 7 or at least 6. The second viewpoint is typically found in schools with a DP cohort of wide-ranging ability. It essentially reflects the belief that a student's capacity to score optimally is enhanced by longer exposure and that the chances for many students to perform optimally are reduced by cramming a two-year course into less time.

The principle is surely that scheduling should be designed to meet the learning needs of students and the learning expectations of the programme.

Scheduling DP courses

Concurrency of learning in the DP, and to a lesser extent in the MYP, has been seen as a difficulty in scheduling terms in some schools in Canada and the USA, where there seems to be less of a tradition of holistic curricular delivery than may be found elsewhere. However, as outlined earlier in the historical overview, the philosophical expectation has been embedded in IB thinking from the earliest days. It is therefore reasonable to assert that, in demonstrating an understanding of the programme and a commitment to it, schools have long been expected to strive to meet the relevant standards and practices, codified thus (IB 2005: 7–9, points 33 and 35):

> Standard C1: A comprehensive, coherent, written curriculum, based on the requirements of the programme and developed by the school, is available to all sections of the school community.
>
> - There is a balance of subjects on offer in the school as well as an appropriate student schedule that provides for student access to the full diploma.
>
> - The school supports the central role of theory of knowledge by assigning adequate staffing and time for student learning and assessment, and establishing links to other subjects. Planning at the school takes place collaboratively.

Standard C2 (IB 2005: 10, points 3 and 5) further stresses collaborative, holistic processes:

> - Planning at the school enables all teachers to gain an overview of the students' whole learning experience.
>
> - Planning at the school accommodates a range of learning needs and styles, as well as varying levels of competencies.

In acknowledging that scheduling can be a complex issue, particularly when other state, provincial or national courses have to be incorporated, *Diploma Programme: From principles into practice* (IB 2009b) nonetheless is very clear that:

> The coordinator will have a role to play in creating, or working closely with the creator of the school schedule and calendar to ensure that all courses meet Diploma Programme requirements and that students gain the maximum benefit of concurrency of learning whenever possible.

Furthermore, although some flexibility is allowed with respect to TOK and CAS:

> The core must be taught/experienced over two years. Theory of knowledge is a course that encourages reflection on the nature of human knowledge and should be taught with reference to student experience in the classroom, which requires concurrency of learning.

Arguments from maturity

Teachers frequently report their belief that students develop complex conceptual understanding and skills over extended time. Such a belief is, of course, consistent with constructivist theory and brain research. Language teachers, for example, report that growth is discernible between the first and the second year; they begin to write in a more sophisticated, critically reflective way.

Other instances where time and/or maturity matter come readily to mind:

- mastering challenging concepts in many disciplines
- the time and skills of investigation, analysis and evaluation required for the information technology in a global society project
- the collaborative skills and conceptual understanding for the group 4 project
- the importance of sustained process and practice in the arts.

Furthermore, assessment tools are designed to be used with students who have completed two years of study and have the maturity as well as the subject knowledge needed to be successful. Concepts raised in many courses take time to be assimilated and applied or performed by students in order to demonstrate understanding of the subject.

Regarding TOK and its central role in the DP, many students' intellectual development is such that they cannot fully grasp the ideas without prolonged exposure. TOK should both draw on the students' experience in regular lessons and also provide a means for students to deepen their understanding in these lessons. Concurrency is therefore crucial for this.

In addition, MYP teachers, for example, invoke the maturity argument in a slightly different form: in opposition to timetabling and choice structures that lead students into shortened experiences or early choices before the benefits of as many months of age and academic maturity have been gained as is possible.

The MYP—some practical considerations

As noted earlier, the 2005 *IB programme standards and practices* (IB 2005) were clear in the expectation of concurrency of learning for each student across all subject groups. When *MYP: From principles into practice* was published in 2008, some explanatory detail was added:

> The MYP promotes the principle of concurrency of learning, whereby students deal with a balanced curriculum each year in which different subjects are studied simultaneously. (IB 2008a)

In due course, this was supported with advice to schools in the MYP *Coordinator's handbook* (IB 2009c). To achieve balance:

> D1.6 The IB mandates 50 hours per year for each subject group as the minimum to allow students to continue to mature and further their experience of all subject groups each year. In order to ensure concurrency of learning, these teaching hours should be sustained over the course of a year. (IB 2009c)

In order to assist schools that experienced scheduling difficulties, a flexibility option was introduced in 2003. The current wording includes:

> D1.5 The MYP is designed as a programme that requires schools to teach eight subject groups every year for a minimum of 50 hours of instruction per subject group each year. However, **subject to approval** by the regional office, the following flexibility is available in the last two years of the programme for schools that offer a four- or five-year programme. In the penultimate and final years, schools may offer a course of study that does not include all eight subject groups provided that:
>
> - the students meet the final objectives in all eight subject groups
> - all eight subject groups are offered during the course of the final two years
> - a minimum of six subject groups are offered in each of years 4 and 5
> - the subject groups chosen are each offered for a minimum of 50 hours of instruction each year
> - schools have considered how concurrency of learning (Programme standards and practices) will be affected and have planned to compensate for this. (IB 2009c)

Brief points of comparison

In considering the programmes of other authorities—Cambridge International Examinations (CIE) and the American College Entrance Examination Board (CEEB) advanced placement courses—contextual points raised by Peterson (1987: Chapter 3) are interesting. During the formative IB years, there was pressure from continental perspectives, especially French, for a whole programme "package" such as a diploma, contrasting with a common English perspective favouring a subject-by-subject examination. The model chosen was to be neither encyclopedic nor too limited in scope, but should adopt an approach to general education that went beyond a mere body of knowledge ("minds well stuffed") to teach a student to learn, to think and to imagine. It would require a level of specialization and depth, focusing on paradigmatic examples, to help form critical conceptual understanding within a wider context—a context both subject-specific and interdisciplinary—cemented by the understanding of underlying epistemologies. Through holistic curriculums and the agency of TOK (DP), the areas of interaction (MYP) and transdisciplinary inquiry reflecting the key concepts (PYP), all IB programmes follow these criteria, in age-appropriate ways.

The subject-by-subject approach remains the basis of CIE and advanced placement courses, in which commitment to concurrency is little discernible.

Advanced placement

Peterson asserts that the advanced placement course was introduced to balance the intellectual dilution and cafeteria style of American high school diplomas in the 1960s with greater academic challenge. Most students continue to choose advanced placement courses on a subject-by-subject basis, although a somewhat more holistic approach is evident in the development of the Advanced Placement International Diploma (APID), but it has restricted availability. Kennedy (2010)

describes the APID as “the College Board’s answer to the IB’s international cachet and acceptance. It is aimed at students studying abroad and American students who wish to attend university in a foreign country” (Kennedy 2010: paragraph 9).

Cambridge International General Certificate of Secondary Education (IGCSE) and International A- and AS-levels

The emphasis in the IGCSE is on a subject-by-subject approach, exemplified by separate certification for individual subjects, any combination of subjects, and especially the notion of core (subject) curriculum. Nevertheless, there is a mention of cross-curricular perspectives in the recent introduction of IGCSE global perspectives.

CIE A- and AS-level subjects—two year and one year courses respectively—are certificated separately and schools can offer almost any combination of the subjects available. The Cambridge Advanced International Certificate of Education (AICE) diploma requires students to study at least three subjects drawn from mathematics and sciences, languages, and arts and humanities. It requires passes in six credits; AS-level counts as one credit, A-level counts as a double credit (CIE 2010).

Conclusion

In any future IB programme developments, it will be important to retain a consistent, basic expectation of concurrency of learning involving holistic breadth with sustained learning over time.

In summary, the principle of concurrency of learning:

- reflects constructivist cognitive philosophy, particularly through recognition of individual propensities for learning, taking account of the idea of multiple intelligences
- represents the personal aspect of holistic learning as a fundamental concept, addressing the potential needs of the whole person as a lifelong learner
- helps build a capacity to deal with authentic, real-life issues and the need for multi-skilled people
- recognizes the importance of the “less is more” principle
- promotes interdisciplinary learning to build the capacity to understand and address complex concepts and big issues.

For all these reasons, the IB expects that IB World Schools, in their journey towards fully meeting programme evaluation standards, will demonstrate a clear commitment to the support and promotion of concurrency of learning.

References

Boix-Mansilla, V. 2007. *"Playing sound waves": Quality interdisciplinary teaching in middle school classrooms and beyond (draft one, 10.24.2007)*. Accessed 14 April 2010. http://www.pz.harvard.edu/interdisciplinary/pdf/VBM_Sound-waves_2007.pdf.

Boix-Mansilla, V, Miller, WC and Gardner, H. 2000. "On disciplinary lenses and interdisciplinary work". In S Wineberg and P Grossman's *Interdisciplinary curriculum: Challenges to implementation*. New York. Teachers College Press.

CIE. 2010. *University of Cambridge International Examinations*. University of Cambridge Local Examinations Syndicate. Accessed 14 April 2010. http://www.cie.org.uk.

Gardner, H. 1999. "Multiple approaches to understanding". In Charles M Reigeluth's *Instructional-design theories and models: A new paradigm of instructional theory*. Mahwah, New Jersey. Lawrence Erlbaum Associates.

Hill, I. 2002. "The history of international education: An International Baccalaureate perspective". In M Hayden, J Thompson and G Walker's *International education in practice*. London. Kogan Page. Pp 18–29.

IB. 1999/2002. *Middle Years Programme: Programme evaluation self-study questionnaire*. Geneva. International Baccalaureate.

IB. 2002. *Middle Years Programme monograph*. Cardiff. International Baccalaureate.

IB. 2005. *Programme standards and practices*. Cardiff. International Baccalaureate.

IB. 2006. *IB learner profile booklet*. Cardiff. International Baccalaureate.

IB. 2007. *IB Diploma Programme: General regulations*. Geneva. International Baccalaureate.

IB. 2008a. *MYP: From principles into practice*. Cardiff. International Baccalaureate.

IB. 2008b. *Towards a continuum of international education*. Cardiff. International Baccalaureate.

IB. 2009a. *Making the PYP happen: A curriculum framework for international primary education*. Cardiff. International Baccalaureate.

IB. 2009b. *Diploma Programme: From principles into practice*. Cardiff. International Baccalaureate.

IB. 2009c. MYP *Coordinator's handbook*. Cardiff. International Baccalaureate.

IB. 2010a. *Programme standards and practices*. Cardiff. International Baccalaureate.

IB. 2010b. *MYP guide to interdisciplinary teaching and learning*. Cardiff. International Baccalaureate.

IB. 2010c. *The Primary Years Programme as a model of transdisciplinary learning*. Cardiff. International Baccalaureate.

International Schools Association. 1991. *ISAC: Programme of international secondary education 11–16 years*. Geneva. International Schools Association.

Jacobs, HH. 1997. *Mapping the big picture: Integrating curriculum and assessment K–12*. Alexandria, Virginia. Association for Supervision and Curriculum Development.

Kennedy, R. 2010. *AP and IB: A matter of excellence*. Accessed 14 April 2010. http://privateschool.about.com/od/apib/p/APIB.htm.

Kohn, A. 1997. "How not to teach values". *Phi Delta Kappan*. February. Pp 429–439.

Marshman, R. 2006. Values, *Constructivism and the IB Continuum*. Paper delivered at IBAEM Regional Conference, Athens, October, 2006. Accessed 14 April 2010. http://www.ibo.org/ibaem/conferences/documents/ValuespaperRMarshman.pdf.

Peterson, ADC. 1987. *Schools Across Frontiers: The Story of the International Baccalaureate and the United World Colleges*. Second edition. Peru, Illinois. Open Court.

Sousa, David A. 2005. *How the brain learns: A classroom teacher's guide*. Thousand Oaks, California. Corwin Press.

Traver, R. 1998. "What is a good guiding question?" *Educational Leadership*. March. Pp 70–73.

Zimmerman, TD and Stage, EK. 2008. "Teaching science for understanding". In L Darling-Hammond's *Powerful learning: What we know about teaching for understanding*. San Francisco, California. Jossey-Bass. Pp 151–192.

Roger Marshman
July 2010