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International Baccalaureate learner profile: Literature review

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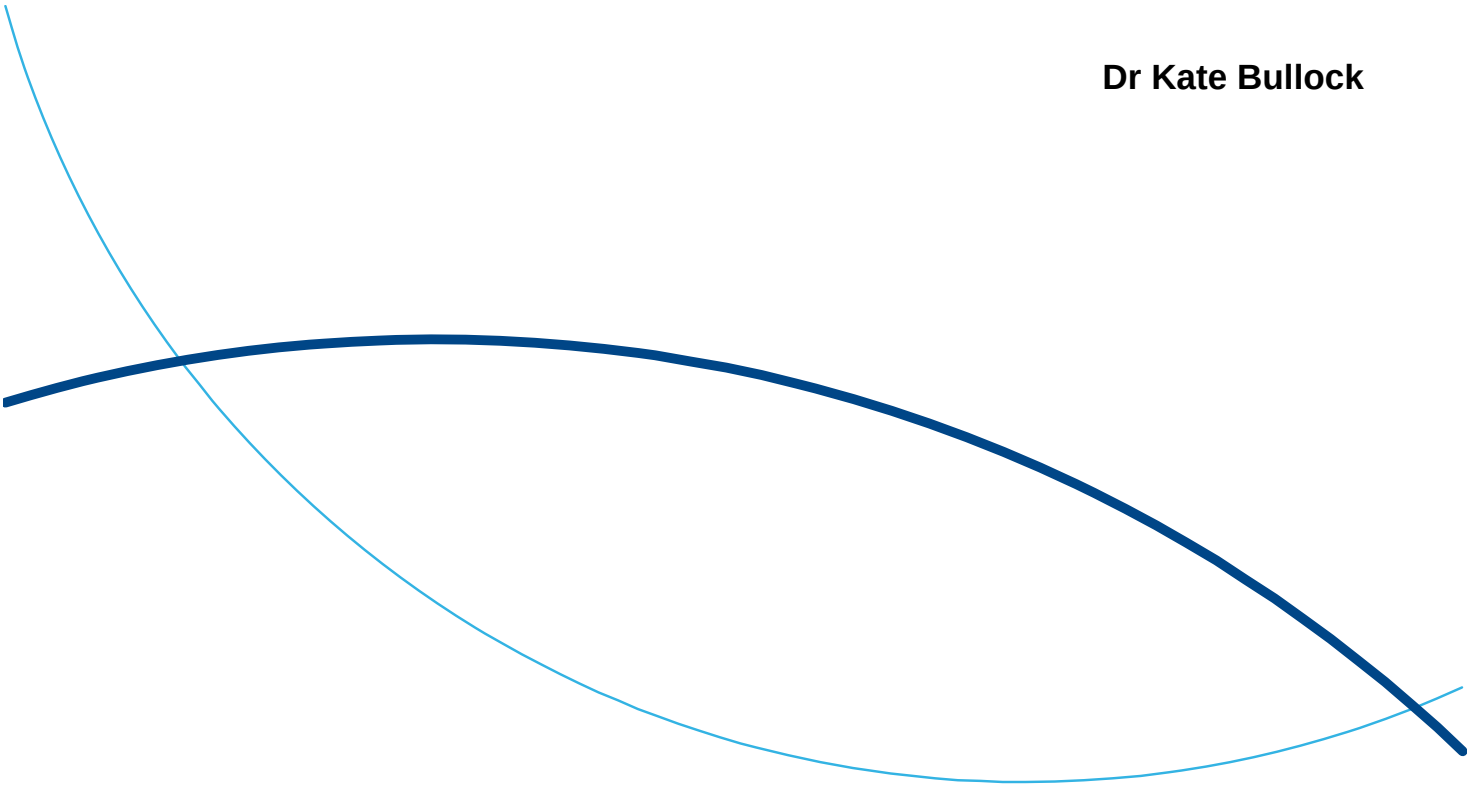


International Baccalaureate learner profile: Literature review

This literature review has been commissioned by the Academic Division of the International Baccalaureate (IB).

Purpose of the review

Learning is a highly complex activity and each learner is unique. The concept of "learning" means different things to different people. The IB perceives education as holistic (Hare 2010). Education is the development of the whole person and learning is a lifelong process. The IB curriculum and ethos emphasize intellectual, personal, emotional and social growth through all domains of knowledge. The IB learner profile sets out the attributes that young people should develop through their experiences of IB World Schools and programmes. The IB learner profile is a public statement of desired student outcomes arising from common values and vision about the nature and purpose of education. These attributes or targets have been identified by key stakeholders and educators. They are descriptors that mould policy and practice and provide a shared ethos for disparate institutions.

The IB learner profile has met with almost universal acceptance among educators in IB World Schools. It is clearly a "good thing" and few would deny its value in nurturing the aims of the IB. For successful realization, however, it is important that the derivation of each attribute of the learner profile can be traced to sound theoretical principles related to the processes of learning.

A theory is an explanation of a set of observations or happenings in terms of a system of interrelated concepts or ideas (Poulson and Wallace 2004). Theories of learning help us to manage ideas about the activities and interactions that are employed when people learn. Such a structure is called a "conceptual framework". Theories also provide us with a shared language to capture and explore that framework.

The aim of this literature review is, first, to identify and analyse learning theories that underpin contemporary thinking on the characteristics and processes of young people's learning. Second, it is to determine how these theories inform the 10 attributes set out in the IB learner profile. Third, the review aims to examine the evidence for a relationship between the 10 attributes and stages of development of psychosocial and learning skills. Finally, it explores the nature of transdisciplinary, interdisciplinary and disciplinary approaches to learning and considers how the key characteristics of these practices are reflected in the IB learner profile.

Strategy for the review

There is a wide literature on learning theory. Theories and models of learning are well documented and are familiar to teachers at all levels and phases of education. This review required a comprehensive and systematic search of relevant literature. Relevant fields were identified as: 1) constructivist and social constructivist perspectives on education and learning; 2) relevant and contemporary theories in relation to learning; and 3) cognition and meta-cognition development in young adults. The social and constructivist model of learning is contemporary and widely accepted. It matches the IB perception of education as the development of the whole person and learning as a lifelong process. The social constructivist model also implies that individual child development results from both cognitive and meta-cognitive activities. These principles have been used to guide and focus the review.

Within the three fields, further emphasis has been determined by the IB learner profile attribute statements. While each of the 10 attributes is distinct and worthy, their broader definitions indicate some overlap between them. This has been acknowledged in the recent writings of Walker (2010) and Marshman (2010). Here the attributes have been grouped into four related themes that address the IB emphasis on intellectual, personal, emotional and social growth through all domains of knowledge, and also mirror key paradigms of learning. While any division may underplay the overlapping aspects of the themes, this grouping provides a useful organizational strategy for a literature review. Theories of learning have, therefore, been examined from four distinct stances to inform the theoretical principles of the 10 attributes set out in the IB learner profile (provided in the appendix). The themes are as follows.

- The cognitive or intellectual theme comprises "knowledgeable", "thinkers" and "reflective". This theme addresses the cognitive processes of acquiring in-depth knowledge and understanding. It considers

the interactions that encourage the development of concepts and mental models. The theme explores issues of critical thinking and of autonomous learning.

- The conative or personal theme comprises “inquirers” and “principled”. This theme looks at personal intention and self-efficacy. It explores the meta-cognitive notions of responsibility for, and awareness of, one’s own learning.

- The affective or emotional theme comprises “caring”, “risk-takers” and “balanced”. Personal qualities and emotional skills are crucial for academic and personal capability. Theories of social development and self-concept are examined to inform social responsibility, well-being and self-belief.

- The culture or social theme comprises “communicators” and “open-minded”. Many recent approaches to learning emphasize the contribution of the community where learning takes place, the importance of collaboration with others and the ability to consider and evaluate different perspectives.

The strategy for this review has been, first, to identify and summarize appropriate texts (see References). Further information has been sought through electronic databases. These have included:

- Books: University of Bath Library—online public access catalogue (OPAC)

- Articles: Electronic Library Information Manager (ELIN); International Education Research Database (IERD)

- Theses and dissertations: EThOS British Library's Electronic Thesis Service

- Google Scholar.

Second, the review has refined the search terms with key words particular to each attribute statement in the IB learner profile. These have been used to interrogate the literature in relation to the four stances of learning set out above. Search terms include: active learning; dialogical process; scaffolding; learner identity; learning communities; learning styles; reflection on learning. As the literature on learning theory is considerable, references have necessarily been limited to the identified paradigms and relevant settings of learning. Inclusion of readings is determined by the focus of the article, the standing of the author, and the quality of the critical argument that is presented.

Third, an overall analysis has examined the findings for evidence of links between the stated outcomes and effective learning at different stages and across disciplinary approaches.

The cognitive aspect of learning

This section addresses the cognitive aspect of learning that is, perhaps, the most generally recognized and widely researched. The cognitive paradigm explores the psychological changes that occur as individuals attain and understand new materials and ideas.

In 1979, Säljö carried out a small study showing that people understand learning as either a product (learning **that**) or a process (learning **how**). The conceptions of learning described by Säljö were not dissimilar to Bloom’s (1956) well-known taxonomy. Both Bloom and Gagné (1975) constructed taxonomies of knowledge and learning behaviours. The taxonomies were predicated on a behaviourist conception of learning that derived from earlier explanations of development as operant conditioning where new responses were learned from repeated stimuli and reinforced by antecedents and consequences (Skinner 1953). Drawing on behaviourist theory, Bloom and Gagné saw knowledge as atomistic chunks that could be built up incrementally. The learning process, they argued, could be conceptualized as a series of small progressive steps leading up to a defined final performance.

Bloom created his taxonomy as a framework for assessment and evaluation, but also as a practical tool for developing higher mental processes and the sequencing of instruction (Eisner 2000). However, as Eisner (2000) pointed out, the distinctiveness of a taxonomy lies in its hierarchical classification. Each level of intellectual activity is dependent on the one(s) below and is a prerequisite for the one(s) above. In order to function at the highest level of Bloom's cognitive taxonomy—evaluation—a learner would need to have necessary knowledge, be able to understand and apply it and be capable of analysis and synthesis in using it.

The idea of specific behavioural statements of objectives for teaching and learning is appealing to those with a developmental conviction. A confounding argument here is that the educational process is not always linear and as observed by Marton and Säljö (1984), not the same for all students. Buxkemper and Hartfiel (2003) point out that in mathematics, analysis and synthesis are frequently carried out simultaneously and, together with evaluation, are often needed for application. Further, Morgan and Saxton (1991: 9) observe that “a structure that dictates process inhibits the natural action of enquiry”.

The accepted behaviourist view of learning was challenged by a number of theorists during the 1970s. A more holistic or constructivist model of learning has roots in Dewey’s classic works at the beginning of the 20th century (reprinted 2008). His ideas of student-centred learning and experiential education influenced many later writers. For example, Bandura’s (1997) social cognitive theory noted the impact of vicarious learning, and his later work considered the influences and self-concepts that determine the extent of learning modelled behaviour.

Piaget (1971) described cognitive development as a symbiosis between a child’s physical and mental interaction with the world and the biological maturation of his or her nervous system. For example, in infants there are some population differences in the development of motor skills, with girls showing earlier gains in small muscle usage, which may explain the earlier articulation of sounds with lips and tongue. Piaget identified four stages of child development (set out in the Meta-analysis) and argued that all children progress through them in the same way. He saw learning as the twin cognitive functions of assimilating new information and accommodating this within pre-existing structures of knowledge. Ausubel and Robinson (1969) amended the Piaget model with their argument that the most important factor influencing meaningful learning was not the child’s stage of development, but the quality, clarity and organization of his or her present knowledge. New knowledge that cannot be adapted into the framework of the individual cognitive structure, they contended, is “rote” and, as the human mind is not designed to store arbitrary information without clear connections, is thus less effective and retainable.

The belief in learning as a constructivist and active process is supported by the work of Bruner (1996). He also defined learning as the formation of concepts and the organization of these concepts into personal mental models that build on prior knowledge. Bruner argued that concepts are neither independent nor discrete, but dynamic changing ideas. He believed that learning should be “participatory, proactive, communal, collaborative and given over to the construction, rather than the reception, of meanings" (1996: 84). As a constructivist, Bruner (1996) advocated a spiral curriculum with concepts being revisited at different levels. This argument supports Vygotsky’s (1978) conceptualization of development. Vygotsky suggested that learning occurs when interactions with others are gradually internalized to become our own processes. He used the term “internal or private speech” to represent our own mental processes. This conceptualization is extended by recent writers who see the process of acquiring scientific knowledge as an accumulation of conceptual insights interspersed with periods of stasis (Kinchin 2010). Working with familiar scientific concepts in a new context is likely to provide learners with a different conceptual lens, resulting in a deeper understanding.

Young people often equate memory with being a good learner, and theories about learning as remembering are compatible with the constructivist approach. Atkinson and Shiffrin’s (1968) Information Processing (IP) model is a familiar representation of how memory may work. Put simply, the human mind takes information, organizes or adapts it in some way, stores the information and retrieves it when necessary. There are three main stages in the formation and retrieval of memory.

1. Encoding or registration (receiving, processing and combining received information)

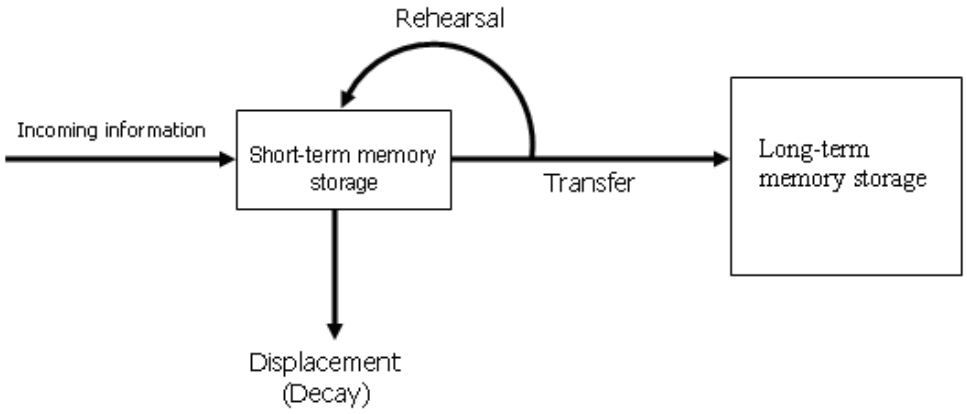
2. Storage (creation of a permanent record of the encoded information)

3. Retrieval, recall or recollection (calling back the stored information in response to some cue for use in a process or activity)

The multi-store model of memory explains memory processes more fully. It explains why only a small number of experiences are remembered (Baddeley and Hitch 1974). The model, illustrated in Figure 1, requires complex interactions between sensory memory, short-term or working memory and long-term memory. Information in the working memory must be kept activated by rehearsal or transferred to the long-term memory by being connected to information already there.

Figure 1

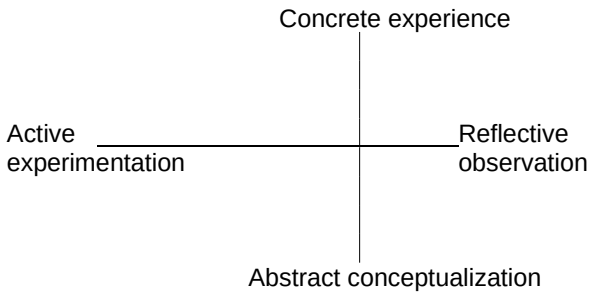
The multi-store model of memory



The ability to remember can be practised and enhanced. Rehearsal and organization are common strategies for memorization (Wood 1998). More recently, the view that learning requires both acquisition of skills or knowledge and internalization of these into individual learner identities has been developed by writers such as Kolb (1984), Riding and Raynor (1998) and Sfaard (1998). These researchers have viewed the two essential steps of learning—acquisition and internalization—as distinct continuums of practice, with a learner's preferred approach to learning distributed between two diametrical ways of gaining and using information or skills. Kolb's model of experiential learning (1984) is one of the most documented and adapted. Kolb suggested that effective learning results from a cycle of experience, reflection, conceptualization, and testing those concepts in new situations. He placed experience and conceptualization at the polar extremes of the acquisition stage of learning. He argued that we gather knowledge either by living the experience or by being told about it. Internalization of knowledge is achieved either through reflection or active testing. Kolb believed that few people have equal skill in all four areas and, hence, individuals develop an orientation towards one of the poles in each dimension. He called this their "preferred learning styles". The Kolb model is set out in Figure 2.

Figure 2

Kolb's learning cycle



Riding and Rayner (1998), on the other hand, identify the dimensions as holist–analytic and verbal–imagery styles. By this they mean that when presented with a piece of information, some learners have a preference for grasping it as a whole concept, while others favour an atomistic, step-by-step approach. At the stage of internalization, some will use words to accommodate the new knowledge into their existing understanding while others prefer images or pictures.

On the one hand, there have been efforts to categorize learners into preferred learning types, and to link these particular styles of learning (such as that which balances experiencing and conceptualizing) with the quality of learning outcomes in different contexts (see Heffler 2001, Mainemelis et al 2002). On the other hand, many educators question the trustworthiness of learning style categorizations (Swailes and Senior 1999, Garner 2000, Duffy and Duffy 2002, Henson and Hwang 2002, Coffield et al 2004) and challenge the belief that learning styles should be matched by curricular or pedagogic modifications (Klein 2003). Klein points out that learning styles including cognitive style, which concerns central processes such as reasoning

and memory, are usually assessed by capturing perceptions and skills and comparing these to a group norm. Most students indicate mixed and inconsistent preferences and he argues that different learning activities require different proportions of a range of skills. Swailes and Senior (1999) observe that analyses of learning style profiles in academic settings reveal a dominance of the reflector/theorist traits. Their findings do not support Kolb's four categories of learning style and they observe a more generic structure of learning, indicative of a three-stage cycle of action, reflection and planning.

Indeed, Schön (1991) and Boud (1993) argue that reflection on changing ideas is the key to effective learning. In order to improve an activity, or to understand something more deeply, it is necessary to consider new experiences of it in the context of past understanding. Schön and Boud suggest that the quality of reflective thought is of greater significance to the eventual learning outcomes than the nature of the experience itself. Reflection allows new thinking to be accommodated into existing learning and beliefs and the whole to be adjusted. Schön and his colleague Argyris (Argyris and Schon 1974) called this "double loop learning" in preference to "single loop learning", which may be realized without plans, values or targets being questioned. Reflection is an ongoing process. Priorities and options change and learners need to continually reflect on and highlight what is important to them.

Summary of the cognitive aspect of learning

Learning is generally understood as either a product (learning **that**) or a process (learning **how**). This conception builds on behaviourist models of learning as an outcome from repeated sensory stimulations. It has been suggested (Bloom 1956; Gagné 1975; Säljö 1979) that learning is both incremental and hierarchical with learning **how** a more complex undertaking than learning **that**. However, many writers (Marton and Säljö 1984; Bullock and Wikeley 2004) have also noted that the educational process is rarely linear and not the same for all students.

Piaget (1971) described learning as the complementary processes of recognizing new information and either assimilating it within pre-existing structures of knowledge or accommodating the pre-existing schemes to fit the new facts. He believed that the ability to learn was related to biological development. He indentified four stages of child development (see Meta-analysis) that all children progress through in the same way. This argument has been modified by, among others, Bruner (1996) who defined learning as a constructivist and active process. Learners must build on and adapt their own prior knowledge to generate new concepts. Bruner's argument has resonance with Atkinson and Shiffrin's (1968) information processing model of memory that indicates the human mind takes information, organizes or adapts it in some way, stores the information and then retrieves it when necessary.

The view that learning requires both acquisition of skills or knowledge and internalization of these into individual learner identities has been further developed by researchers who have seen the two inseparable steps of learning as diametric continuums of practice. Kolb's (1984) model of experiential learning is familiar to many. Kolb (1984) suggested that a learner's preferred approach to learning is distributed between two ways of gaining and using information or skills. This theory has given rise to efforts to categorize learners into preferred learning types, and to link these particular styles of learning with the quality of learning outcomes in different contexts. However, the trustworthiness of learning style categorizations has been questioned. Studies have shown that most students indicate mixed and inconsistent preferences, and that different learning activities require different proportions of a range of skills. A more acceptable model may be the three-stage cycle of action, reflection and planning. Schön (1991) and Boud (1993) argue that reflection on changing ideas is the key to effective learning.

Links to IB learner profile

- **Knowledgeable** They explore concepts, ideas and issues that have local and global significance. In so doing, they acquire in-depth knowledge and develop understanding across a broad and balanced range of disciplines.

- **Thinkers** They exercise initiative in applying thinking skills critically and creatively to recognize and approach complex problems, and make reasoned, ethical decisions.

- **Reflective** They give thoughtful consideration to their own learning and experience. They are able to assess and understand their strengths and limitations in order to support their learning and personal development.

The cognitive literature emphasizes the dynamic and developmental nature of learning. The active tense in the three attribute statements above is appropriate. Learners must explore the focus and purpose of a task

and apply initiative. Learning is not a passive reception of facts; it occurs when experiences are embraced and internalized through thinking and reflection to extend knowledge, ideas and skills. To learn, an individual must first absorb a new piece of evidence, and second actively explore and (re)construct that experience on the basis of his or her existing understanding. Actively thinking about (or exploring) new experiences, or old concepts in a different context, modifies and develops existing skills, knowledge and understanding. This process enables learners to make sense of unfamiliar ideas, concepts and experiences and, hence, to extend and retain in-depth knowledge. Knowledge of facts and manipulating them to acquire and create better understanding leads to confident and rational decision-making.

The ability to learn is dependent on a range of information-gathering and processing skills such as collecting and organizing data and identifying and reforming concepts. Young people need to be aware that these skills are personal—and can be learned. Learning is not merely an innate talent; it demands initiative and active engagement, but the process is not the same for everyone. Learners need to identify their own most effective strategies for thinking and reasoning with issues. Once the skill is recognized as a mechanism for learning, it can be refined and practised (Cooper and McIntyre 1996). The process of reflecting on personal strengths and limitations and assessing whether or not (and how and why) goals have been achieved is crucial in producing effective learners.

The conative aspect of learning

This section explores the impact of conation on learning. An understanding of the processes of acquiring information does not necessarily explain the influences that affect some young people and not others. As all teachers know, effective learning is more than practice and process. It is an intentional pursuit that requires commitment and resilience. Conation is the aspect of learning that is concerned with the ways in which knowledge and feeling are converted into proactive behaviour through intention and personal efficacy.

Conation is the drive that determines the nature and extent of involvement in a task. Drive is a form of motivation. Maslow (1970) and Rogers and Freiberg (1994) describe learning as a deliberate undertaking with the goal of fulfilling personal potential. Maslow arranged life motivating factors in a hierarchy of needs to be satisfied, with basic physiological needs such as food and water first, followed by safety factors such as security and warmth, as these are the fundamental necessities that must be fulfilled before the higher levels can be accessed. The need for esteem and respect in terms of status, achievement and competence within a group is in the upper hierarchy, with only self-actualization or the realization of one's potential above them. Motivation to learn is linked to the higher self-fulfillment needs.

In their theory of self-determination, Ryan and Deci (2000) considered that human beings are naturally curious and self-motivated. They argued that engagement with an issue is fashioned not only by personal preferences, but also by the social conditions in which people find themselves. Motivation, they believed, is not a single construct but a highly complex and multi-faceted thrust or drive. They believed that people strive to fulfill three basic psychological requirements—competence, autonomy and relatedness. Among other things, these thrusts influence the propensity to learn.

The needs that vitalize children result from the early family experiences that shape their developing views of themselves (Cornu and Collins 2004). It has been shown that very young children have definite beliefs about how good they are in different domains (St Clair and Benjamin 2011). As institutions, schools also play a large part in moulding children's views of themselves. From the start of their school lives, children encounter a particular set of expectations related to behaviour, success and failure. How abilities are valued and situations played out has a deep-seated effect on a child's self-image. To be confident and enthusiastic learners, children need to see themselves as capable, as having the right to make choices, and as part of a satisfactory social group. For older students, relatedness or acceptance within the peer group is likely to be a powerful motivating factor. This view is supported by Abbott (1994: 46) who observed that "people are automatically motivated to learn whatever they need to learn in order to become a member of the community to which they want to belong". Abbott's observation includes the motivation that is stimulated by high stakes examinations.

Students must acquire the confidence, skills and values to make rational and well-informed decisions about the paths they select. As they mature in an increasingly complex and interconnected world, young people are required to make many social and life choices. St Clair and Benjamin (2011) suggest that aspirations are a resolution between the desired and the possible. The goals young people see as possible are influenced by their perceptions of themselves and the world. The action of setting goals encourages individuals to behave decisively in order to achieve them. In school, learners hold different orientations to achieving their goals. Researchers (Schunk and Zimmerman 2008) have identified two main patterns of

belief about goal-setting. In a mastery orientation, learners believe that effort will lead to success. Such learners have a desire to improve for the enjoyment of the activity—intrinsic motivation. Performance goals are formed from the wish to be seen as superior, or better than others—extrinsic motivation. These two drivers have been further divided into approach and avoidance orientations. The resulting 2x2 achievement goal framework, shown in Figure 3, distinguishes between mastery-approach and mastery-avoidance, and performance-approach and performance-avoidance goals. Those with an avoidance orientation strive in order to avoid failing or losing.

Figure 3

Achievement goal framework

Goal orientation	Approach	Avoidance
Mastery	Want to know; interest in topic; persist	Fear of being wrong; avoid misunderstanding
Performance (ego)	Want to be better than others	Avoid losing; may not take part

Atkinson (1964) recognized that effective learners attach more value to goals where there is a reasonable chance of success than to those that are overly easy or too difficult and beyond reach. However, those who seek to avoid failure may be attracted to tasks that are easy to achieve or so difficult that success is not expected. Learners who attribute lack of success to lack of ability may exhibit characteristics of learned helplessness; particularly so if they also believe that ability is fixed and beyond their personal control (Dweck 2000).

The usefulness of goals lies in determining the discrepancy between where you are now and where you want to be. Holding a true picture of this discrepancy is fundamental to the processes of learning. Feedback from other people allows the picture to become clearer and more reliable. While Piaget (1971) believed the child was the manipulator of his or her own learning, with the teacher purely acting as a provider of experiences and a guide to the reasoning process, others (Heylings and Tariq 2001) observed that the provision of feedback on performance is essential to extend and consolidate learning. Piaget saw the learner's drive to transform new material into an appropriate form to augment or change pre-existing schemes of knowledge as the crucial step in learning. Lunzer's (1989) early criticism of Piaget rested on the accelerating impact of mediation and feedback from a more informed individual on both learning and motivation.

The influence of a mentor or instructor on a learner was emphasized by Vygotsky (1978). Vygotsky's model defined an optimum learning environment as an interaction between a learner and a "more capable other". The "more capable other" structures and guides appropriate knowledge and development paths for the learner(s). Vygotsky's theory stressed the links between language as a cultural tool in social interactions (intermental activities) and language as a physiological tool for organizing our own thoughts and actions (intramental activities). He suggested that involvement in joint happenings leads to new understandings that we then internalize as personal knowledge and capabilities (Mercer 2002). In this way the existing knowledge and capabilities of learners are enhanced and extended so that in time learners become able to perform at a level at which they would not have been able to function without interaction with another individual or group. Vygotsky called this extending the "Zone of Proximal Development (ZPD)".

In Bruner's view (1996), autonomous learning only results from the effort (or activity) of discovering and adapting concepts. It is practice and confidence in working with heuristics by constantly moving from concrete actions to abstract ideas that enables students, of any age, to develop inquiring minds. Bruner (1996) used the term "scaffolding" to describe the structured guidance that more informed individuals give to learners to encourage them to develop new skills, attitudes or understanding. Bruner identified the importance of the point of "handover" from the teacher to the child. The concept of "handover", however, also highlights the complexity of the concepts of "independence" or "autonomy". The essential activity of working alone is only a small part in a sequence of activities where the responsibility for the learning process moves back and forth between teacher and student. Tharp and Gallimore (1998) show how this sequence can be seen as part of a cycle where handover takes the child from dependency on the teacher

to a stage of self-monitoring within the ZPD. Improvement derives from reasoned judgments of previous performance. Feedback on these will instigate reflection and explanations and allow more demanding goals to be developed.

Yet to be effective, feedback needs to be both accurate and acceptable. The student must be able to assimilate the new knowledge into their current self-portrait and, if necessary, adjust the picture. Studies (Bullock and Wikeley 2004) have shown that learners flourish when feedback is specific, acknowledging strengths and weaknesses but in such a way as to suggest strategies for addressing problems. Feedback must also be timely and challenging, and knowing how to make it so will depend on the educational relationship between the teacher and learner. The discussions that accompany feedback need to be used to engage the learner in the process of making explicit the connections between their own instinctive, intuitive ways of learning and the more formal, outcome-focused learning of the classroom. Feedback also helps personal reflection that, in turn, enables students to make better judgments about the effectiveness of their learning strategies. It helps students to understand the practicalities of learning about learning and, hence, avoid learned helplessness where giving up is seen as a preferred option to unproductive efforts.

Summary of the conative aspect of learning

Conation is the drive that determines the nature and extent of involvement in a task. It connects knowledge and emotion with proactive behaviour. Ryan and Deci (2000) argue that motivation to learn is not a single construct but a highly complex and multi-faceted thrust. They identify competence, autonomy and relatedness as three basic psychological requirements that influence learning. Similarly, Maslow's (1970) theory of motivation suggests that individuals are driven by the need to achieve status and perceived competence within a group. Thus, conation is linked to goals of fulfilling personal potential and higher self-fulfillment needs.

The needs that encourage or discourage children result from their early family experiences and their developing views of themselves and the world. As institutions, schools also play a major role in shaping children's perceptions of themselves. Expectations and values at school may be very different from those at home. In both settings, children encounter particular routines and standards. How these are related to behaviour, success and failure has a major impact on a child's self-image as a learner. As children get older, the influence of the peer group becomes stronger. True inquirers take pleasure in the processes of learning, and grow to understand their preferred strategies and own dispositions for it.

The drive to learn is affected by learners' perceptions of their own abilities and their orientations to achieving goals. Learners with a mastery orientation, or desire to improve for their own enjoyment, believe that effort will lead to success. Those with a performance orientation strive to be seen as better than others. Within these categories, learners can be further divided into either approach or avoidance orientations (Schunk and Zimmerman 2008). Most problems arise with an avoidance focus. Such learners may be attracted to tasks that are overly easy to achieve or so difficult that success is not expected. Worthwhile goals are those that are challenging but offer a realistic chance of success.

Goals are useful in that they can help clarify the gap between where the learner is now and where he or she would like to be. Discussing goals with someone who is more expert helps to develop a realistic understanding of the gap. Vygotsky notes that the "more capable other" structures and guides appropriate knowledge and development paths for the learner(s). This feedback process underpins learning. It encourages personal reflection and evaluation that sheds light on the practicalities of learning about learning and aids judgment on the effectiveness of learning strategies.

Links to IB learner profile

- **Inquirers** They develop their natural curiosity. They acquire the skills necessary to conduct inquiry and research and show independence in learning. They actively enjoy learning and this love of learning will be sustained throughout their lives.

- **Principled** They act with integrity and honesty, with a strong sense of fairness, justice and respect for the dignity of the individual, groups and communities. They take responsibility for their own actions and the consequences that accompany them.

These attribute statements articulate the link between active and autonomous learners and the development of positive dispositions for personal behaviour and collaborative scholarship. The inclination to take part and, most crucially, the drive to persist explain why the same students do better in one class rather than another and why some students become effective inquirers where similar peers struggle or

detach. Evidence from the literature suggests that motivation is complex and dependent on both personality and context. Motivation is not always linked to the desire to achieve; it may be concerned with the need to avoid failure. Those with an avoidance orientation may fail to become sustainable learners and lack a repertoire of strategies to draw upon or the curiosity to persevere.

Young people need to know that dispositions can be acquired. In an increasingly complex and interconnected world, learners need to take responsibility for their own actions. That is, be principled. They must have the confidence, skills and values to make positive, well-informed choices. It is the ability to show resilience in the pursuit of goals that marks the sustainable learner.

The literature emphasizes the vital educational relationship between a learner and a more capable other. An educational relationship is focused on setting and achieving realistic goals. The ability to make a true assessment of one's own development is a key learning attribute and in achieving this, learners oscillate from dependency on the more capable other to personal responsibility and autonomous learning. Learners need to know that the inclination to learn is personally generated and socially driven. Interaction with and feedback from more capable others (and also peers) is a formative and powerful source of learning.

The affective aspect of learning

Closely related to conation, the habits and beliefs that define our personalities are acquired through our experiences from the moment we are born. These attitudes shape predispositions to respond or behave in a particular way. This section considers the affective attitudes that influence the ways in which young people learn.

The importance of the affective domain of learning was recognized by Bloom in 1956 (Krathwohl et al 1973). Since then, interest in personal emotions and beliefs (or the "self") has been a major focus of educational research. Goleman (1997) argues that emotional intelligence is a vital attribute for learning. Goleman describes emotional intelligence as a self-perceived ability to identify, consider and manage your own emotions and those of others. Emotional intelligence means having an understanding of what motivates and pleases you, a capacity for persistence, being able to control your moods and impulses, and keeping distress from swamping the ability to think. Similarly, Salovery and Mayer (in MacGilchrist et al 1997) identified self-awareness, motivating oneself, managing and recognizing emotions and handling relationships as vital to emotional intelligence. These constructs have some overlap with the learning dispositions (resilience, resourcefulness and reflection) suggested by Claxton (2002) as the requisite dispositions for effective learning.

Attitudes, beliefs and habits are built up from a child's earliest experiences. From birth, adults respond to an infant's cries and actions, thus shaping expectations and beliefs. Erikson (1968) identified eight stages of psychosocial development that each person confronts as they grow older and mature. (These are set out in the Meta-analysis.) At each stage, specific challenges are encountered. Successful (or unsuccessful) mastery of the challenges fashions a person's identity. Erikson pointed out that the nature of learning support should be different at each stage, and this too is crucial in shaping young people's perceptions of themselves as learners and individuals. For example, between the ages of 3 and 6 years, attitudes are formed by parental reactions to the child attempting more independent activities, while the ability to learn new skills at school influences concepts of self between 6 and 12 years.

Bronfenbrenner (1979) offered a more complicated explanation of social development. He understood development less as a set of hierarchical steps and more as a function of increased interpersonal relationships. He believed everyone has inborn characteristics that are moulded by the variety of contexts that they experience. Bronfenbrenner conceptualized human development as a nested bioecological system of relationships and influences. His unique observation was that the interconnections between a learner's diverse environments are as important as individual settings in nurturing feelings and attitudes. This perspective is supported by Bowles and Gintis (1976) who point to the major influence of the school and teacher, and the tension that is created for the child in meeting institutional expectations that may be different from those accepted at home.

While the family is the first and foremost influence on a child's development, an individual's experience of school plays a crucial part in shaping his or her identity. One of the ways in which any institution does this is in the application of culturally specific criteria related to success. For older learners, these success criteria tend to be associated with good grades. In school, many of the overriding feelings and attitudes are tempered by perceptions of one's own ability. Young children tend to believe that ability is the same as effort. Older learners attribute success and failure to a range of causes (Dweck 2000), some of which have

been discussed in the “Conative aspect of learning” section in relation to goal-setting. Mastery orientations have been associated with a positive attitude to learning, a preference for challenging work and risk-taking (Dweck 2000). Attribution of success or failure has implications for future expectations and self-esteem (Woolfolk et al 2008).

Self-concept, in various guises, has been explored to determine how an individual’s feelings, values, expectations and attitudes in different situations influence his or her behaviour and learning. Research has indicated a strong link between self-concept and achievement (Pollard and Filer 2001, Reay and Wiliam 2001). Self-esteem (Bandura 1997) is a judgment of self-worth and is influenced by personal values and the social culture.

Pintrich and Schunk (1996) argue that people’s expectation for success, or “expectancy”, is one of the most important predictors of achievement. Among similar theories, Bandura’s (1997) self-efficiency theory suggests that a high self-perception of capability leads to high levels of effort and persistence and ultimately to high levels of achievement. The process is cyclical in that high levels of achievement lead to even greater self-perception of one’s capabilities, which lead to more challenging goals being set, a willingness to expend more effort, greater perseverance, more resilience to failure, and so on. However, in their cross-national study using data from the Third International Mathematics and Science Study (TIMSS), Shen and Pedulla (2000) challenge this simple relationship between perceptions of capability and performance. They observed a cultural element in the link between actual achievement and perceptions of capability to do so. Others (Fouzder and Markwick 2000) suggest that students who see success as being within their control are more likely to adopt appropriate learning strategies.

There are also developmental, gender and ethnic differences to consider in children’s expectancy beliefs. The trends for gender and ethnic differences are not always clear, given the diversity of confounding variables. Compared to their actual performance, girls appear to have somewhat lower or inaccurate perceptions of their own competence, but there is little evidence for the idea that African Americans have lower self-perceptions of competence compared to their actual performance or lower expectations for success (Pintrich and Schunk 1996). It has been suggested that boys tend to externalize failure—blame others—while girls are more likely to internalize it and blame themselves (MacGilchrist et al 1997).

Academic self-concept in relation to specific subject areas has been explored by Byrne and Shavelson (1986) and Bornholt (2000). These writers suggest that the academic self-concept is a subset of the more general self-concept and also has its own subsets in relation to subject areas such as English, mathematics and science. Their work shows that academic self-concept in relation to different subject areas is distinguishable from level of performance in that subject but correlated with it. They also suggest that, while at an early age the subject area self-concepts are interrelated, they become more independent as the student becomes older. How students see themselves in relation to a specific subject area—for example, their perceptions of self competence in mathematics, and their sense of belonging to a community of mathematicians (Wood 1998)—can affect whether or not they see themselves as mathematics learners. If students are to avoid negative self-stereotyping, the role of the teacher becomes one of facilitating the development of positive academic self-concepts in relation to his or her particular subject area.

Bornholt (2000) highlighted the concern that an adolescent should develop a self-concept that provides a sense of individuality and one of belonging. He warned that it is the tension between wanting to be distinctive, but also part of the group, that can lead to misleading self-stereotyping. Students compare themselves with the “prototypical” group member and develop perceptions of themselves that can affect their performance at school and beyond. Bornholt also argued that self-stereotyping in adolescents can affect their academic achievement and career choice. For example, the perception of girls’ subjects and boys’ subjects can lead to choices that have nothing to do with ability.

Perceptions of self are mediated through social engagement. Bandura (1997) observed that young people learn through observation, modelling and vicarious reinforcement. He believed that personal, social and environmental factors influence each other. Students’ perceptions of themselves, and the goals to which they aspire, are continually shaped by the particular culture of the institution, the rules and systems adhered to, and the mechanical or substantive activities that form the learning experiences. The interactions, both implicit and explicit, between learners and those who support their learning set expectations for behaviour and achievement. Interactions are encountered both formally in the classroom and informally in the playground. In the playground, students absorb attitudes, skills and ideas through dialogue, question and discussion, trial and error (Eraut 2007). The philosopher Dewey (reprinted 2008) believed that activity, educational or otherwise, is a transaction between people and environment co-evolving to form a joint history of development. Ideally, experience informs reason and vice versa to create intelligent social reconstruction.

Entwistle and Smith (2002) indicate that students' existing knowledge and personal histories mediate their perceptions of task and engagement with learning. They suggest that discussion between learners and teachers allows a shared understanding of preferred processes and desired outcomes to develop. Such educational relationships are founded on communication (Flutter and Rudduck 2003); they tend to be hierarchical in nature (Edwards 2002) and are fashioned by community and institutional cultures (Osborn et al 2003, Stoll 2003).

Summary of the affective aspect of learning

The importance of the affective domain of learning was recognized by Bloom (1956). Attitudes that support learning have been identified as responsive, resourceful, resilient and reflective. Goleman (1997) argues that emotional intelligence is a vital attribute for learning. The key to emotional intelligence is being able to recognize and understand your own feelings and also those of others.

Erikson (1968) and Bronfenbrenner (1979) point out that attitudes, beliefs and habits are built up from a child's earliest experiences. Erikson identified clear stages of emotional development and suggested that each phase of progress has its own particular goals, issues and concerns. Children's attitudes to themselves as learners and individuals are shaped by their own achievements and by their perceptions of caregivers' reactions to their accomplishments. Exchanges between learners and caregivers can be both implicit and explicit and contain expectations for behaviour and achievement. With age, peer interaction becomes increasingly important in moulding young people's understanding of themselves and their learning.

Theories of affective development indicate that young people learn about themselves through social engagement, that is by observation, modelling and vicarious reinforcement. Self-esteem is a judgment of self-worth and is influenced by personal values and the social culture of any context. Entwistle and Smith (2002) suggest that discussion between learners and teachers develops a shared understanding of preferred processes and desired outcomes, leading to a positive self esteem.

Links to IB learner profile

- **Caring** They show empathy, compassion and respect towards the needs and feelings of others. They have a personal commitment to service, and act to make a positive difference to the lives of others and to the environment.

- **Risk-takers** They approach unfamiliar situations and uncertainty with courage and forethought, and have the independence of spirit to explore new roles, ideas and strategies. They are brave and articulate in defending their beliefs.

- **Balanced** They understand the importance of intellectual, physical and emotional balance to achieve personal well-being for themselves and others.

The attribute statements in this section characterize confident, well-balanced young people with robust emotional aptitudes (Goleman 1997). The choices that are made about learning are largely contingent on feelings. The ability to consider and evaluate emotions as well as ideas and skills is paramount in achieving personal well-being. Social and emotional competencies may be the most important aspects of becoming effective learners. They are the qualities that forecast good international citizens and personal well-being. They are what companies say they are seeking in their new employees. Psychosocial theories show that a positive self-concept enhances learning. How we feel and how we understand these feelings have a bearing on our performance. Self-perception is shaped and moderated by social interaction. Social interaction with adults and peers encourages young people to understand the experiences of others and to value needs that may be different from their own. Learning is expanded by such vicarious encounters.

Respect and understanding for other people leads to more effective participation in an **educational** relationship. Supportive educational relationships are at the hub of personal learning and development. To gain the most from an educational relationship, students also need knowledge about themselves. They need to be able to articulate (both internally and externally) what makes them happy and how they work best. Confident learners can listen, discuss and make sound judgments on the quality of their own work. Thus, learners need to know how to communicate with adults and peers, decide who is a good role model or source of information and develop ideas through collaboration with others.

All learning requires taking risks. For a student, the risk may be as simple as contributing an idea to a discussion with friends or raising a hand in class. To develop the self-esteem and confidence that embraces

challenge, learners need to experience an environment that supports risk-taking, where interchange of values and ideas is more celebrated than right answers.

Culture as an aspect of learning

Over the past 20 years, the influence of the culture in which a child grows and develops has been a focal interest for educators. It has become widely accepted that the environment or situation where an activity takes place has an impact on those who participate. How a group of people interacts with each other, their values, and styles of communication shape their ways of learning. In other words, the cultural expectations of each setting interact with the habits and perspectives of young people. This section examines the relationship between culture and learning.

"Culture" is defined (OED, 1989) as the beliefs, customs, practices and rules that guide a particular group of people. Dimmock and Walker (2000) maintain that culture is learned rather than inherited. In the broadest sense, traditions of religion, language, food and music are shared by cultural or ethnic groups. However, cultural differences are not always so obvious. Deeply-held beliefs and subtle traditions of conduct may be more significant than visible markers such as dress or rituals (Hofstede 1991). Cultural values may support learning of particular traits or skills, producing a population difference.

Social constructivist theory (Lave and Wenger 1991; Dreier 1999) argues that learning is fashioned not only by individual qualities and preferred practices but also by the various contexts of social practice that the learner has experienced. For example, it has been claimed that children in Asian countries are encouraged to respect authority, be obedient and show self-control; while child rearing in the West favours the development of independent thinking, self-direction and assertiveness (Wang et al 2008, Walker 2010). Similarly, the value that Chinese societies place on education and academic success has been identified as the source of children's readiness to learn and their early superiority in literacy and numeracy (Aunio et al 2008, Lau et al 2011).

Vygotsky (1986) argued that the sociocultural systems in which children learn are mutually constructed by teachers and their students. He stressed the responsibility of more capable individuals for sharing culture and consciousness with learners.

These arguments indicate the strong mediating influence of social settings and group cultures in the processes of capturing and transforming knowledge. The culture of social groups determines the patterns of behaviour, symbols of success and communication codes that are valued and sought after. In many contexts, this may be tacit and inherent and, hence, difficult to change or improve if necessary. Setting out clear, unambiguous statements of the values and attributes that are sought by a society could provide a platform for development.

As argued earlier, the beliefs and habits that comprise the self are (in the main) acquired through socialization with others (Resnick and Nelson-LeGall 2004). In all cultures, attitudes, enthusiasm and values are developed through modelling, reinforcement and social exchange. In his theory of social learning, Bandura (1997) emphasized the power of vicarious or observational learning. His research indicated that the way children behave is shaped not just by observation of others but by perceptions of how the actions of others are valued. Bandura went on to suggest that self-esteem is influenced by the extent to which the culture around a child values his or her particular characteristics and skills.

Woolfolk et al (2008) argue that in the 21st century we are all members of many groups and so are influenced by many different cultures. Most schools serve families from a range of cultural and ethnic backgrounds, International Schools especially so. This social mix contributes reciprocally to the microsystem of a child's development (Bronfenbrenner 1979). Learners themselves change with experience or according to the task, and teaching approaches must differ from phase to phase of education, between subject areas and within social contexts. Teachers know that different groups of students will respond differently to the same lesson, while the same group can change its behaviour and reactions from day to day, or even from lesson to lesson. Particular social groups can have an undue influence over classes or year groups. Theories of learning and schemes of teaching alone do not account for the subjective nature of the school and college experience.

The culture of an institution is identified by the significant understandings, values and social practices that combine to an overarching "way of doing things around here". This is accepted, often subconsciously, and shared by the teachers, students and others within the institution (Hofstede 1991). Cultures that are encountered early in life are likely to persist for many years, or until challenged by a different context. Early

home and school experiences of the type of learning that is valued and what it means to study are hard to change. Rutter et al's (1979) seminal work, *Fifteen Thousand Hours*, highlighted the importance of school culture. Rutter and his colleagues used empirical evidence to demonstrate that schools with high expectations of effort, achievement and behaviour make an unmistakable difference to a child's future. This study led to clearer understandings of school culture and the characteristics of an effective school. Factors that affect a school's culture include good communications, collegiality, high expectations and openness to change.

One of the underlying purposes of educational institutions is to orientate students to a preferred cultural perspective. Culture is complex and dynamic, but students become accustomed to the institutional culture that is prevalent at their point in time. In their work in mathematics classrooms, Angier and Povey (1999) point out that the culture of a classroom is:

> not fixed but shifting, contested and problematic: it will vary, perhaps considerably, over time, from day to day and even from moment to moment. Equally, each participant will experience that culture differently, reflecting each individual's identities and positioning.
>
> (Angier and Povey 1999: 147)

Hofstede (1991) set out four dimensions of culture observed in international business companies. In his meta-analysis of seminal texts, Walker (2010) examined educational traditions and also identified four main cultural areas where Eastern attitudes differ markedly from those of the West. These are: group or individual orientation; respect for authority; holistic or atomistic perspectives of the world; and taking risks. In order to reflect an educational context, Dimmock and Walker (2000) adapted and extended Hofstede's four dimensions to six. In place of "masculinity–femininity" Dimmock and Walker used the continuum "consideration–aggression". They added "generative–replicative" as an indicator of predisposition to the generation of new ideas and methods; and also "limited relationship–holistic relationship" as a gauge of the characteristics and importance of interpersonal relationships. Dimmock and Walker, however, cautioned that dimensions may be useful in clarifying a situation but are, nonetheless, constructed concepts and should not be reified. They also stressed that dimensions of culture within a society may not be the same as those within an organization.

Despite such warnings, it is both illuminating and constructive to understand something of one's own culture. If an organizational culture is understood, it can be better managed to support the apposite ethos. As Walker (2010) infers, analysing differences between cultures and integrating their similarities works to form "a sense of shared humanity". Drawing on Hofstede (1991) and Dimmock and Walker (2000), aspects of culture that could be usefully considered by IB World Schools include:

- Power distance. How is power exercised in the organization? Where do the students fit into the power distribution? Are teachers seen as the source of all knowledge or can the students' voice be heard? (Praechter 2001.)
- Attitude to change. Does the institution believe it can embrace change positively in order to improve and move forward, or does it prefer to work in a tried and tested way? (Stoll and Fink 1996.)
- Institutional expectations. In the institution, is there stress on competition and academic achievement or social harmony and wider success? (Hargreaves 1999.)
- Educational relationships. What are the characteristics and importance of interpersonal relationships between tutors, teachers, students and parents? Within the institution are educational relationships systematic and formal or open and responsive? (Fielding 2001.)
- Common practices. For example, is there a common language, or a process for creating a common language or vocabulary, through which educational ideas can be shared and individual progress can be facilitated and celebrated? (Moore 2000.)

Summary of culture as an aspect of learning

Social constructivist theory has placed culture at the heart of learning. In any setting, children absorb the prevalent ideas and ways of doing things through reciprocal processes of social interaction. Theorists ask what kinds of social engagement are necessary for learning. Vygotsky (1986) argued that the sociocultural systems in which young people learn are mutually constructed by teachers and their students, while

Bandura (1997) emphasized the power of vicarious or observational learning. These arguments indicate the strong mediating influence of social settings and group cultures in the processes of capturing and transforming knowledge. The importance of the culture of a school in encouraging learning has been highlighted in Rutter et al's (1979) study *Fifteen Thousand Hours.*

Hofstede (1991) identified four dimensions of culture in international business companies while Dimmock and Walker (2000) adapted and extended Hofstede's four constructs to six to reflect an educational context. Walker (2010) analysed seminal texts to suggest four major differences between Eastern and Western attitudes to education. Walker (2010) went on to suggest that analysing differences between cultures and integrating their similarities works to form "a sense of shared humanity". An synthesis of the literature provides useful dimensions of culture that might be considered by schools. These include: good communications; collegiality; high expectations; educational relationships and openness to change.

Links to IB learner profile

- **Communicators** They understand and express ideas and information confidently and creatively in more than one language and in a variety of modes of communication. They work effectively and willingly in collaboration with others.

- **Open-minded** They understand and appreciate their own cultures and personal histories, and are open to the perspectives, values and traditions of other individuals and communities. They are accustomed to seeking and evaluating a range of points of view, and are willing to grow from the experience.

These attribute statements acknowledge the powerful impact of the situation in which learning and performance take place. Language is fundamental in cooperative working and collaboration (Mercer 2002). Those students who have the ability to listen to different points of view and to express their own ideas clearly and succinctly will be advantaged. Communication may be the key skill in learning as it is through conversation with others that a child learns to manipulate ideas and judge success. Restricted language skills have been blamed for poor learning in school (Wood 1998).

It is important to remember that much of the research cited above (Hofstede 1991) has been carried out in a specific setting. Ways of remembering may be culturally different. Despite its international perspective, the IB is sensitive to criticisms that it is too closely associated with the values of the Western world. Indeed, Walker (2010) argues that the IB learner profile is largely predicated on the Western humanist tradition of learning. Wang et al (2008), however, notes the 'within-culture' variations that occur in both Western and Eastern traditions and suggests that the pressures to function adequately in a swiftly changing world require adjustments in attitudes to child rearing and development. The strengths and drawbacks of both cultural approaches should be acknowledged.

The culture of a school has an important impact on a child's well-being and learning. The elements that contribute to school culture include policies, curriculum and organization. Within these, the customary social and learning interactions, which are frequently set by unwritten rules, give a school its character as "nurturing", "academic", "inclusive" and so on. Culture may be absorbed unconsciously and groups are often unaware of its form or influence. Acknowledging and discussing cultural values and characteristics may widen the perspectives of young people.

Meta-analysis

Theories of learning have been discussed above in relation to the four domains of learning and aspects of the IB learner profile. Theories, of course, are not discrete; this section takes an overview of particular arguments to consider how promotion of the aspirations of the learner profile might nurture ways of inquiry and development of knowledge at different stages of students' learning, and further prepare them for the next stages of their lifelong learning journey. Second, it explores ways in which the learner profile relates to the nature and key characteristics of transdisciplinary, interdisciplinary and disciplinary approaches to learning and teaching.

Stages

A "stage" is a period of time, often associated with a known chronological age range, when physical or behavioural characteristics are notably different from those at other ages. The term implies not only this qualitative difference, but also a predictable sequence of developmental capabilities. Arguments in the 21st

century, however, have challenged the notion of unidimensional stages and emphasized the impact of diverse environments that may nurture particular aptitudes (Meadows 2010).

While most educators today believe that intelligence is not solely a function of genetic make-up, they acknowledge the important contribution of Piaget's (1971) work to understanding a child's development. Piaget stressed the importance of readiness to learn. He argued that all children pass through four main stages in their development of rational thought, and specified the age limits within which the stages would occur. These are as follows.

- Sensorimotor from birth to approximately 2 years. In this stage an infant responds to stimulation of the senses. Thought derives from these sensations and behaviour is shaped by the adult–child interactions that occur around the activities.

- Pre-operational from 2 to 7 years. By now children can retain information, are beginning to use language and to understand concepts. They start to compare and contrast ideas. According to Piaget they begin to make use of symbols although these tend to be limited to the present time and to the child's own viewpoint. At this stage, a child learns from physical observation and touching of objects.

- Concrete operational from 7 to 11 years. Between these ages children develop the ability to manipulate ideas mentally. They can follow a logical sequence of thought and reverse the steps to return to the starting point. Discussion with a more informed other helps learning at this stage.

- Formal operational occurs from 11 years to adulthood. The main achievement in this stage is the acquisition of hypothetical and deductive reasoning. Most adolescents at this stage can consider many possibilities from several perspectives and begin to understand their own best strategies for learning. However, accepted wisdom is that some school children (and indeed some adults) never reach the level of formal operations.

As well as the early motor skills advantage observed in girls and outlined in "The cognitive aspect of learning" section, ethnic differences in reflex movements of newborn infants have been reported, supporting the argument that some biological factor is at work. Most psychologists agree that children pass through stages similar to those outlined by Piaget (1971), although the notion of universal, common stages has been questioned. As a constructivist, Bruner (1996) advocated a spiral curriculum, with ideas being revisited at different levels of learning to match the developmental stage of the learner. He conceptualized the lowest level of concrete actions as "enactive" representations of learning. He then believed students could move to "iconic" representation and finally to "symbolic" representation at the top of the spiral. Bruner's curriculum is essentially congruent with Piaget's developmental stages.

It has been suggested (Goswami 2004) that there are influences other than biological age that determine capability for particular actions and thoughts. Most believe that it is engaging with and thinking about an activity that is the foundation of learning and development. Sociologists have argued that interpersonal and cultural relationships have the power to motivate and channel a learner. In particular, Vygotsky (1978; 1986) suggested that children use language, first intermentally and second intramentally, to develop ideas and concepts. Language is culturally determined but most children in all cultures have an extensive vocabulary by the time they are 6 years old. Vygotsky believed that children use self-directed talk or private speech to guide their own thinking. Together with Bruner and Piaget, Vygotsky thought that human interaction underpinned the development of language. On the other hand, Chomsky (1957) argued that children have an instinctive ability to recognize and test the structure of speech.

Nonetheless, the link between language and learning has been firmly established. As language develops so does the ability to manipulate thought. The way in which language is used with a child becomes the basis of their own verbal reasoning and processes of learning (Vygotsky 1986); Rogoff (1990) has observed that only children and first-born children acquire language and communication skills more quickly than children in larger families. Yet second and subsequent siblings are more likely to develop an early understanding of how other people think. The appreciation that other people may think differently from you is a key developmental stage that has an impact on the learning processes of young people. It usually occurs in Piaget's (1971) concrete operational phase.

Erikson (1968) also believed that early experiences mould a child's future character and behaviour. He provided a developmental framework that each person goes through, and highlighted the tensions that are experienced at each stage. It is how these tensions are resolved that shapes the adult. Key childhood stages include:

- Trust/mistrust from birth to 18 months. Food and comfort are the prime needs of infancy. How these are delivered determines the degree of trust or mistrust that is developed in the child.

- Autonomy/shame or doubt from 18 months to 3 years. This stage marks the beginning of self-control and confidence. Shame and doubt may develop if a child's efforts to act independently are not valued.

- Initiative/guilt from 3 to 6 years. The quest for autonomy is continued, but not all actions conform to desired behaviour. Hence, some are not encouraged. How this dilemma is explained and handled will influence a child's self-image.

- Industry/inferiority from 6 to 12 years. At this stage a child is keen to accomplish the tasks of school. Comparison with others and feedback on competence have a crucial effect on how students see themselves as learners.

- Identity/role confusion occurs around adolescence. At this point, the search for personal identity that has been developing from infancy comes to the fore. Tensions may arise from the need to conform to others but also to be true to personal beliefs.

Primary years (3–12 years)

These are important school years in shaping a child's development. During this time the child is almost constantly in a state of disequilibrium, experiencing unfamiliar environments and grappling with uncertainty and new problems. However, children in this developmental stage possess a natural curiosity and appetite for risk that needs to be channelled into the strategies for learning that will support their lifelong endeavours. Children's concentration span increases with age. As they mature, they are better able to persist at a task for longer. Younger children are less likely to believe ability is stable. The perception that ability can improve with practice (Nicholls 1984) needs to be confirmed rather than refuted. In the primary years, children also begin to compare themselves with their peers. They evaluate their own performance using the indicators that appear to be valued by the community. In terms of developmental differences, research (Twenge and Campbell 2001) suggests that younger children are more likely to have relatively high perceptions of their own competence. The need for carers and teachers to encourage new roles, ideas and strategies is tempered by the need for guidance on appropriate directions and on understanding the feelings and perspectives of others.

Middle years (12–16 years)

In this phase, young people move on from their experiences of scaffolding to become autonomous learners. The quality of feedback from adults is crucial in giving young people the self-confidence to make this transition. Feedback needs to be well focused, realistic and constructive. Students need to shift their perceptions that questioning and evaluation is something done **to** them to something that should be done **by** them.

The ability to self-evaluate increases with age. Self-evaluation is a key skill for effective learning, but teachers have observed (Martin et al 2002) that it is often not completely mastered even in the formal operational stage in high school or secondary school. It has been observed (Twenge and Campbell 2001) that the overall mean level of perceptions of self-competence declines with age. In particular, research (Evans et al 2010) suggests that the decline is greatest when many students make the transition to secondary school at around 11 years of age. The drop has been explained in both psychological and sociological terms. The psychological explanations focus on the changes in children's cognitive skills and self-beliefs as mediators of this age effect; whereas the more sociological explanations stress the changes in the nature of the school environment as the children move into secondary schools.

Diploma years (16–19 years)

By the time young people embark on final school examinations most will think and function as adults. They will understand that there is more than one way to undertake a task or enquiry. One of the major functions of all levels of education is preparation and selection for the next life stage. In the examination years, this step tends to be the main focus for the majority of students (and usually their parents). Whether or not students see themselves as "good" learners is frequently dependent on their grades compared with their fellow classmates and, to some extent, on verbal and written feedback from subject teachers and tutors. Sternberg and Lubart (1992: 249) make a telling point when they suggest that love of one's work is unlikely to be viewed by students as a compensation for poor grades. Comparisons with peers almost always lead to disappointment. Learning how to develop and sustain relationships, how to work with others, how to

make use of, and how to build on, the expertise of others may be as important as examination results in improving life chances.

Transdisciplinary learning

In most societies there is consensus that the school curriculum should be founded on a common body of knowledge that graduates need to have mastered in order to function effectively in that society. Traditionally, the school curriculum has been arranged as a set of disciplines or subject areas. However, many educationalists believe that disciplinary knowledge is fragmented and limiting for learners. In addition, the explosion of knowledge, a more pluralist society, clearer understanding of theories of learning, and a change in the social milieu of many students have complicated the traditional curriculum (Tomlinson and Little 2000).

What students are required to learn in a school that crosses cultural contexts is influenced by beliefs on what is demanded from the global citizen. In this environment, the body of "sacrosanct" knowledge may be less clearly defined. Global citizens need more than substantive knowledge. They need to achieve flexibility, to see themselves as lifelong learners and to be able to apply their ongoing knowledge in new and creative ways (Brown et al 2001). These are the skills that are also much demanded by employers (MacBeath 2000). In IB World Schools, a curriculum that encourages well-balanced, creative and independent learners is sought. Interdisciplinary connections are vital in developing such transferable skills and in understanding their exchangeability across contexts.

The difference between disciplinary and interdisciplinary learning is that interdisciplinary learning integrates ideas from more than one subject area in order to clarify thought and deepen understanding (LTS 2010). It compares and contrasts facets of different disciplines, linking them into an overarching theme. This leads to transdisciplinary approaches that begin with the idea or problem to be explored and call on knowledge from several disciplines to bring about a resolution. In this approach, ideas are again connected to real-life experiences and analysed to create new knowledge and deeper understanding (Kaufman et al 2003). Learners often experience interdisciplinary and transdisciplinary learning as topic work in primary schools and project work in secondary schools. A further benefit of this curricular organization is in the transfer of responsibility for learning to the student; power is transferred from teacher to student. Rather than being presented with facts and information, the learner is required to reflect on the assignment and select his or her own focus for, and mode of, study. Thus, he or she is challenged without feeling daunted (Eraut 2007). Depending on age and aptitude, other learning strategies that learners might select to draw upon include:

- gathering information about the topic
- thinking about, questioning and analysing ideas
- organizing the data or ideas into findings or arguments
- presenting the findings
- evaluating the product.

Transdisciplinary learning is frequently collaborative. In general, young people see working with peers as supportive and self-directed. This builds confidence in generating their own ideas and initiating appropriate tasks. Further, motivation to learn is fostered and creative thinking encouraged. Communication skills are also enhanced (Bullock et al 2002).

There is an insistent persuasion that school activities designed around the transmission of subject (disciplinary) knowledge are less helpful, in the long term, than those that are based on an understanding of important life themes (transdisciplinary approaches). Observers such as Kress (2000) believe that the curricula of schools in Western societies remain entrenched in the requirements of the 19th century while Clarke (2000) argues for an interconnected curriculum that is exemplified by the IB learner profile.

> The school should enable … a sense of connection between the learner and the natural environment, learner and social responsibility, learner and work, learner and learning, learner and the sense of self.
>
> (Clarke 2000: 9)

However, Clarke's observation serves to illustrate the many demands on a school curriculum. In order to meet these demands most effectively a mixed approach to teaching and learning is likely to be preferred. Therefore, we need to understand better the impact of disciplinary, interdisciplinary and transdisciplinary approaches on the education of children and young people. With each approach the cognitive, conative, affective and cultural aspects of learning will be affected to varying degrees.

Conclusions

Learning is neither simple nor straightforward. The more learning is probed, the more complex it becomes. Thus, a comprehensive and systematic search of relevant literature was undertaken for this review. The review used an organizational framework that linked the IB perspective of education with a social constructivist model of learning in order to present a theoretical base for the 10 IB learner profile attributes. The selected literature was cross analysed to consider aspects of learning at different phases of education. Key issues pertinent to the primary years, middle years and diploma years phases of learning have been identified. The meta-analysis also explored strategies for curriculum delivery. Strengths and drawbacks of transdisciplinary and interdisciplinary approaches have been considered alongside the more accepted disciplinary model.

Overall, this review of the literature reveals some agreement on the fundamental processes of learning. Most theorists believe that it is engaging with, and thinking about, a concept or activity that is the foundation of learning and development (inquirers). Learners must seek to connect with the content that is to be learned (knowledgeable). They need to know that learning is not always easy (risk-takers) but there are personal skills for learning that can be acquired and enhanced (thinkers). Learners need to understand themselves, their strengths, weaknesses, motivations and drivers (reflective).

Intertwined with this, and above all, learning is social. Sociologists have argued for the importance of the affective or social relationship that is formed between the learner and a "more capable other". Ideas are passed between teacher and learner, with the learner gradually achieving understanding and responsibility (principled). These educational relationships are set within particular environments that are unique for each situation. Learning environments can be formal or informal. Interactions can be first-hand or vicarious, with adults or peers. Interpersonal and cultural relationships have the power to broaden horizons, motivate and guide a learner (open-minded). The link between language and learning has also been firmly established. As language develops so does the ability to manipulate thought (communicators). In short, learning is involved and individual, but learning activities are mediated through social engagement.

Learning is dependent on individual psychology, social relationships and cultural contexts. The major conclusion from this body of work is that successful educational relationships are the foundations of effective learning. Learning how to develop and sustain relationships, how to work with others, and to make use of and build on other's expertise (caring) may be the key for young people in developing their identities as learners and, in turn, improving their life chances (balanced). The 10 attributes of the IB learner profile broadly encapsulate this theoretical analysis.

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Appendix

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.

IB learners strive to be:

- **Inquirers** They develop their natural curiosity. They acquire the skills necessary to conduct inquiry and research and show independence in learning. They actively enjoy learning and this love of learning will be sustained throughout their lives.

- **Knowledgeable** They explore concepts, ideas and issues that have local and global significance. In so doing, they acquire in-depth knowledge and develop understanding across a broad and balanced range of disciplines.

- **Thinkers** They exercise initiative in applying thinking skills critically and creatively to recognize and approach complex problems, and make reasoned, ethical decisions.

- **Communicators** They understand and express ideas and information confidently and creatively in more than one language and in a variety of modes of communication. They work effectively and willingly in collaboration with others.

- **Principled** They act with integrity and honesty, with a strong sense of fairness, justice and respect for the dignity of the individual, groups and communities. They take responsibility for their own actions and the consequences that accompany them.

- **Open-minded** They understand and appreciate their own cultures and personal histories, and are open to the perspectives, values and traditions of other individuals and communities. They are accustomed to seeking and evaluating a range of points of view, and are willing to grow from the experience.

- **Caring** They show empathy, compassion and respect towards the needs and feelings of others. They have a personal commitment to service, and act to make a positive difference to the lives of others and to the environment.

- **Risk-takers** They approach unfamiliar situations and uncertainty with courage and forethought, and have the independence of spirit to explore new roles, ideas and strategies. They are brave and articulate in defending their beliefs.

- **Balanced** They understand the importance of intellectual, physical and emotional balance to achieve personal well-being for themselves and others.

- **Reflective** They give thoughtful consideration to their own learning and experience. They are able to assess and understand their strengths and limitations in order to support their learning and personal development.