Human ingenuity: An overview of IB thinking

The AAIBS (Association of Australasian International Baccalaureate Schools) annual conference in Adelaide 17–19 April 2009 explored the theme "Human ingenuity: Pedagogy for the 21st century learner". In addition to breakout sessions, the theme was dissected through keynote speakers who focused on ingenuity from different perspectives: system approach; entrepreneurial; IB overview; and a neurological angle. This short paper summarizes a potential overview or position of the IB with respect to human ingenuity and a relationship to the so-called 21st century learner. The MYP defines human ingenuity in *MYP: From principles into practice* (2008) as follows:

"The way in which human minds have influenced how we think, work, play, construct and conduct friendships and other relationships, interact with each other, find solutions to problems, cause problems, transform things and rationalize thought. It also considers the consequences of human thought and action." (page 31)

IB structures

The three IB programmes were developed separately and stand alone. They were devised by different practitioners and at different times. Each has structures that support the development of ideas of human ingenuity with students but in no consistent fashion across programmes. In the PYP, students can be exposed to ideas about aspects of human ingenuity in many units of inquiry related to any of the six transdisciplinary themes. MYP students will learn about human ingenuity through units of work that use the human ingenuity area of interaction as a context for learning. Diploma Programme (DP) students have the opportunity to investigate these ideas in theory of knowledge lessons, and across their subjects through the TOK lenses (see appendix 1). The continuum of IB programmes may not provide a smooth trajectory, but there is a level of coherence that gives recognizable identity and value. In schools that implement two or three IB programmes teachers and administrators are required to work together on the basis of a common philosophy.

The table below summarizes the structures that can be used by IB teachers to examine human ingenuity (see the appendices for greater detail and practical uses).

Prog	Structure	Detail offered to teachers	Examples
PYP	Transdisciplinary themes	See appendix 2	**Central ideas**: How we express ourselves: We can use play to express our feelings and ideas in order to come to new understandings. How the world works: Understanding the way materials behave and interact determines how people use them. Where we are in place and time:

			Past civilizations shape present day systems and technologies.
MYP	Areas of interaction (human ingenuity)	**Student learning expectations** for the area of interaction *human ingenuity* may include: the meaning of “ingenious”; a range of systems, solutions and products; the processes involved in innovation, creation, development and change; the individual desire to create, develop or change things; how systems or products develop and change over time; the impact of innovation and creation on individuals, communities, societies and the world; the products of innovation, creation and development in context; how subjects have “ways of thinking”; a range of systems, solutions and products.	Grade 8 sciences: *What is a good law?* Grade 9 English A: Frankenstein—*what is the relationship between tragedy and archetypal hero stories?* Grade 10 extended mathematics: *how long have people been occupied with ”counting techniques”?* **Eg. Personal project titles**: Can I create a 10 minute stand-up comedy routine about life in Hong Kong? Hyperinflation: When it's smart to burn your cash! How can my development of a tourist lodging model help promote Bangladesh's tourism market? How and why medieval castles were built; Quilting a family's history
DP	Theory of Knowledge	The **theory of knowledge** course, which requires students to reflect on the nature of human knowledge across the hexagon, provides an excellent platform for building interdisciplinary understanding. As students compare and contrast different ways of knowing and the different methodologies used in areas of knowledge they are forced to reflect on what it means to be human. In order to encourage this, links with theory of knowledge are identified in subject guides but teachers are encouraged to explore their own.	We can use mathematics successfully to model real-world processes. Is this because we create mathematics to mirror the world or because the world is intrinsically mathematical? In what ways might social, political, cultural and religious factors affect the types of human science research that are financed and undertaken, or rejected? In science the idea of progress is dominant: new knowledge builds on what is already known; knowledge once discovered cannot be “unlearned”. Is the same true in the arts?

What is the origin of *homo faber*/human ingenuity in the MYP?

By 1983, a group of interested schools had been discussing for three years the possibility of a programme to precede the DP. During heated discussions the conclusion was reached that the child, not the subject matter, should be the guiding principle at the heart of the curriculum. They examined the key linking concepts of the DP—theory of knowledge, creativity, action, service (CAS), and the extended essay—seeking ways to integrate similar thinking that would permeate a middle years curriculum. Gerard Renaud, the architect of the DP hexagon and creator of the

theory of knowledge component, helped to explore approaches to learning, the idea which led to the notion of the areas of interaction, the distinctive feature of the Middle Years Programme design. The group was concerned about global issues, and the responsibility to offer every student the opportunity to understand different cultures and the values that human beings share. From this image the octagon metaphor reflecting the essential interrelationship between all areas of learning was developed, with the child in the centre, embraced by the areas of interaction, and by the eight subject areas on the periphery.

By this time, in the mid-1980s, a number of key players had joined the original team; among them were John Goodban from the United World College of Singapore, Ben van Bronckhorst from the Swedish Globetree Foundation, and Matthew Brennan from UNIS. One of the first questions had been: what should the role of technology be? John Goodban was leading group discussions on community service, and had been actively involved with the IB work on technology, and invited Ben van Bronckhorst to address the concerns. Ben, an engineer and conservationist, contributed his knowledge and unique perspective, seeing technology as an evolutionary human legacy above and beyond computer education. Initially, the group conceived of technology as an area of interaction, though it is now identified as a separate discipline in the curriculum design. The approach still reflects Ben's respect for the creative technical achievements of human beings in all settings over time. This approach is reflected in the *homo faber* area of interaction, a name apparently thunderously proclaimed by Robert Belle-Isle when, as they were searching to put the concept into words, he rose to his feet, banging his fist on the table in what was described as an unforgettable moment of enthusiasm.

Homo faber described man as worker, inventor, transformer and improver of his/her surroundings. This term, "*homo faber*" had been coined previously by Robert Belle-Isle at the ISA Wellesley conference in 1985, to summarize the technical achievements of mankind across the ages in the service of us all. The comment was made that *homo faber* had the same connotation as technology. The curriculum committee qualified the description by pointing out that while technology also represented a particular subject, the sense of *homo faber* ran through many of the syllabuses and therefore had an integrative function.

Homo faber became human ingenuity in 2008 as part of an IB move to replace Latin terminology.

Are we addressing 21st century learners with these IB structures?

This brings us back to the issues discussed at the IB Council of Fellows concept retreat this year. We must continue to focus on teaching and assessing in multiple ways to reach more learners: disciplined minds, synthesizing mind, creating mind, respectful mind and ethical mind. The publication of *Diploma Programme: From principles into practice* (2009) has huge potential to further develop this idea in the DP.

How easy will it be for students to be individuals and to have time for personal reflection with a desire for developing self-reflection skills? Do IB programme teams need to think again about existential intelligences and the Kurt Hahn concept of aloneness?

Can our programmes reflect society whilst providing a deep, stable and thoughtful approach to learning? It is important to remember the need to adapt to technology and learn from young people without it being necessary to be at the forefront to make the best use of it.

In terms of being fit for purpose for 21st century learners, Veronica Boix-Mansilla of Harvard Project Zero said in 2008: "The quality of an educational program is to be judged by the deep

understanding it instils in its students and, by the relevance of what students learn. To meet the demands of contemporary societies wisely, young people of today must become able to navigate growing international interdependence, participate actively in the local and global sphere, understand the environment and its sustainability, care for mind, body and well-being and become reflective learners in dynamic knowledge societies. Responding to these demands, the MYP curricular model articulates a much needed bridge between what is typically learned in schools and the most pressing questions that concern our societies. Attentive to adolescents' development, the program emphasizes rigorous learning in the disciplines and interdisciplinary synergy, inviting students to tackle relevant issues—from climate change to globalization—thus preparing them for the work of the next generation."

The IB overview of human ingenuity

It can be seen clearly that all IB students have the opportunity to inquire into the ways in which humans have influenced our lives, while acknowledging consequences and impacts. Teachers in each of the programmes must plan and develop units that allow students to think about how humans have attempted to solve problems and, as/more importantly, how the students can solve problems.

However, one could argue that this is not what we might call the "IB overview of human ingenuity". In *Diploma Programme: From principles into practice* (2009), it is stated that the curriculum continuum itself must be seen as a product of human ingenuity in the context of each school. Creative teacher professionalism is fundamental to each of the three programmes. Human ingenuity doesn't just mean inventions and great ideas, but is a state of mind and a realization that humans essentially construct meanings and values in all contexts. The curriculum itself is constructed in a school. The IB requires teachers to develop their own courses of study. The value of this idea can be seen in the following quotes.

"I have taught science as part of both IGCSE and the MYP. The MYP allows me to teach real science in a rigorous but authentic way. It allows me to explore science that is of interest to the students and make it meaningful and relevant. I am not driven to cover a content syllabus that I find myself rushing through in the last months just so the students can pass an exam."

Brian Webster, *IB World*, May 2008, page 5

"One of the strengths of the MYP is that it provides a general framework and structure while at the same time liberating teachers from prescriptive curricular and summative assessment , thus allowing them to create challenging curriculums and new teaching methodologies." (Adrian Watts, *IB World*, November 2002, page 16

"The lifeblood of British schools has become choked by a regime that frogmarches children through exam after exam, leaving them bereft of the skills they need to get on in the world and beyond the school gates. So what? Well, for both teachers and students, it has meant that originality of thought, creativity, thinking skills and personal initiative have all been sacrificed on the altar of rote learning and instruction in how to pass exams. It replaces academic sponginess with academic rigour…the IBMYP restores trust to teachers and schools, giving them freedom to develop their own courses and to decide what is best for their pupils—albeit according to the exacting standards of the IB." (Anthony Seldon, Sunday Times, March 2009)

The IB might believe then that human ingenuity is demonstrated in that the programmes were originally constructed by educators with vision; and that this spirit of ingenuity is seen now in

every IB school in each of the programmes as teachers construct excellent courses based upon IB frameworks.

Malcolm Nicolson, June 2009

Appendix 1 – AOI into TOK

In each programme we need to be actively and explicitly involved in teaching appropriate questioning and inquiry skills to facilitate development in this area. In the DP one way of achieving this is to use some of the area of interaction questions to develop the foundation skills. These questions are more concrete in nature and can be incorporated into the planning of the unit. Used as prompts for students and embedded within unit planning, they can assist students to become more accustomed to asking questions as part of the learning process.

The table below sets out how the selected MYP areas of interaction, student learning expectations and key questions can be used in the first section of the theory of knowledge (TOK) course as well as when introducing certain specific TOK aspects such as knowledge claims. In addition, each of the key questions selected below assists the student to answer the foundation question for TOK: How do I know what I know?

MYP areas of interaction relevant to developing TOK thinking skills

Area of interaction	Student learning expectation	Key questions	Relevant TOK skill
Approaches to learning—information literacy	Accessing information—including researching from a variety of sources using a range of technologies, identifying primary and secondary sources Selecting and organizing information—including identifying points of view, biases and weaknesses, using primary and secondary sources, making connections between a variety of resources	How can I access information? How do I know if the information is reliable? What will I do with this information?	Development of the awareness and understanding phase of the inquiry cycle. In TOK, this specifically relates to students understanding what type of information is appropriate for TOK. What does good quality TOK information look like and how do students find it? How do students deal with information sources such as philosophical theories, TOK textbooks, Wikipedia, Google searches? What role does the library play in this process? How is information used effectively in assessment tasks? For example, how does a student turn descriptive information into an effective example in the essay or as the basis for the internal assessment? Foundation skill for starting to ask questions and asking questions about the nature of knowledge claims. In particular, the identification of biases and different points of view. Starting the process of learning to reflect on knowledge rather than just learning it. Starting to make connections between areas of knowledge. Starting to recognize the ways of thinking in the different areas of knowledge and ways of knowing. Identifying different types of evidence available to enable students to inquire.
Approaches to learning—thinking	Inquiring—including questioning and challenging information and arguments, developing questions, using the inquiry cycle	How do I think? What tools can help me think in different ways? What planning tools do I	Developing questioning skills. Using thinking tools to help students understand that there are different ways of thinking about knowledge and knowledge claims. Using scaffolded planning tools to guide students through the analysis process as

	Applying knowledge and concepts—including logical progression of arguments Identifying problems—including deductive reasoning, evaluating solutions to problems Creating novel solutions—including the combination of critical and creative strategies, considering a problem from multiple perspectives	have?	set out in the internal assessment criteria. Developing skills in devising and presenting logical arguments. This can be added to the inquiry process that starts with a knowledge claim, relevant knowledge issue, analysis, counter claims, conclusion and implications. Using structured logic (including reason as a way of knowing) to start to evaluate knowledge and knowledge claims. Starting to develop the idea that solutions need to be evaluated and the idea of implications. Students developing their own planning tools to enable them to have a scaffolded process for building their TOK inquiry skills. This fits in with the formative assessment in its current form.
Approaches to learning—reflection	Self-evaluation—including the keeping of learning journals and portfolios, reflecting at different stages in the learning process	How do I reflect? How have my reflections helped me learn? What other reflection tools and resources can help me?	Developing the voice of the knower. We use TOK journals and other formative assessment to assess the development of understanding. Getting the students to use active reflection to help their learning in TOK and to practise their TOK thinking skills. Understanding that TOK is a process that reflects the inquiry cycle rather than just learning content. Continual reinforcement of the idea of "what does it mean to be a TOK student?"
Approaches to learning—transfer	Making connections—including using knowledge, understanding and skills across subjects to create products or solutions, applying skills and knowledge in unfamiliar situations Inquiring in different contexts—including changing the context of an inquiry to gain various perspectives.	What are the "big ideas" of each of the different subjects? Do the big ideas of the subjects overlap? How can I use my knowledge, understanding and skills across subjects?	Understanding the nature of the knowledge in the areas of knowledge and ways of knowing. Understanding that subject areas have ways of thinking that lend themselves to evaluation and analysis. Allowing students to make links and comparisons between knowledge areas. Addressing knowledge issues and analysing knowledge claims on the basis of different perspectives. Speaking from the perspective of the voice of the knower and making links to their experiences as a learner. Starting to develop the idea of implications. For example,if I come to a conclusion in one area of knowledge/way of knowing, how can I apply it/what does this mean if I apply it to another area—does my conclusion still hold?
Human ingenuity	Reflection on: The impact of innovation and creation on individuals, communities, societies and the world How subjects have "ways of thinking"	What are the consequences of creating? How can I make responsible choices based on my understanding? What impact have creations had on individuals, society and the world? What future developments can I foresee? How can I use my thinking in one subject to help me in another?	In terms of the application of TOK thinking skills to a real-life situation in terms of the internal assessment oral. What is the situation under investigation? What are the knowledge claims I can identify from this situation? What knowledge issue can I extract from this situation? (based on asking about consequences, impact / implications) What are the implications of my conclusions in this situation? Making links across and between the ways of knowing and areas of knowledge Understanding that having knowledge implies a responsibility on behalf of the knower.

*Table courtesy of Briony Morath (MLC School, NSW, Australia)

Appendix 2 – PYP transdisciplinary themes

Who we are: An inquiry into the nature of the self; beliefs and values; personal, physical, mental, social and spiritual health; human relationships including families, friends, communities, and cultures; rights and responsibilities; what it means to be human.

Where we are in place and time: An inquiry into orientation in place and time; personal histories; homes and journeys; the discoveries, explorations and migrations of humankind; the relationships between and the interconnectedness of individuals and civilizations, from local and global perspectives.

How we express ourselves: An inquiry into the ways in which we discover and express ideas, feelings, nature, culture, beliefs and values; the ways in which we reflect on, extend and enjoy our creativity; our appreciation of the aesthetic.

How the world works: An inquiry into the natural world and its laws; the interaction between the natural world (physical and biological) and human societies; how humans use their understanding of scientific principles; the impact of scientific and technological advances on society and on the environment.

How we organize ourselves: An inquiry into the interconnectedness of human-made systems and communities; the structure and function of organizations; societal decision-making; economic activities and their impact on humankind and the environment.

Sharing the planet: An inquiry into rights and responsibilities in the struggle to share finite resources with other people and with other living things; communities and the relationships within and between them; access to equal opportunities; peace and conflict resolution.