A Generically Designed Professional Development Model for Teaching the International Baccalaureate Curriculum

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1.Introduction

The Ministry of Education (MEXT) has recently renewed its commitment to implement the international baccalaureate (IB) program more and more into Japanese public schooling. The integration of the IB project into the curricula has begun by targeting primary, middle and high schools in several prefectures. IB is supported by the philosophical ideas associated with constructivist learning theories and complementary inquiry based, problem solving, student-centered, teaching and learning methods. Contemporary approaches associated with constructivism, as the cognate of the word indicates, place an emphasis on building knowledge within the learner, and require students to actively participate in knowledge building activities that are coherently designed with the aims of helping students to develop skills in knowledge creation and innovation (Scardamalia & Bereiter, 2006; Takegami, 2021). These activities challenge the students to be active problem solvers, building on solutions to a given task. In student-centered classrooms, students are expected to take initiative in their learning, preparing and performing tasks that are both individually and collaboratively driven. The role of the teacher is to design lessons with appropriate activities and to be facilitators with having the abilities to scaffold tasks in ways for students to meet the lesson goals.

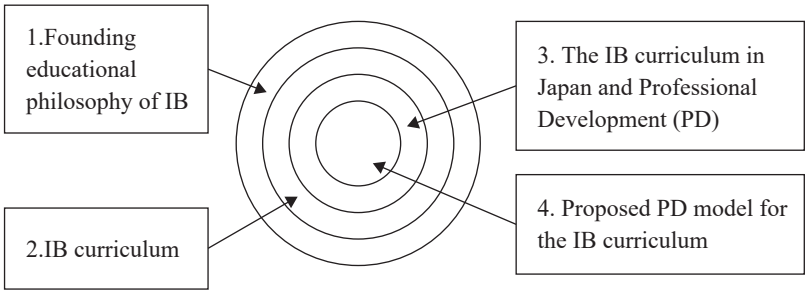
Herein lies the problem of implementing the IB curriculum. There are elements of an educational culture existing within both learners and teachers that can be seen as negative transference. Instructional practices often carried out in classrooms are based on traditional teaching approaches and lesson designs that are in contrast to the contemporary IB approaches and complementary methods aimed at active, knowledge building activities. Although there has been some advancement in progressively taught classes in middle schools and even some improvement in high

schools, pressures for preparing students for entrance exams have enabled a steadfast reliance on traditional teaching approaches. Teachers are the active participants in teacher-centered instruction of lessons, where students are passive receptors of the transmitted information that they are expected to master. Consequently, the problem can be stated in the following hypothesis: *If curriculum policy made at the institutional level (i.e., the national curriculum) does not match teaching approaches or what teachers are doing (or believe what they should be doing) at the classroom level, then the policy has trouble being implemented.*

The solution is to recognize the axiom that new curriculum policies built on innovative precepts and educational goals for learners require a simultaneous change in new teaching approaches, new materials and teacher beliefs (Fullan, 2007). To assist teachers to make these robust changes in preparation to teach an IB curriculum, professional development (PD) targeted at effective implementation is required. Based on this premise, this study will propose a generically designed teacher development model aimed at preparing teachers to implement the IB curriculum. The *generic* aspect of the PD model implies that it can encompass any specific subject or core areas of the IB curriculum to assist teachers in implementation. In this study, the model is contextualized within the concentric contextual factors in which it is embedded to better understand its formation (Figure 1).

Figure 1

Contextual factors in which the PD model is embedded



Note. This model is produced by the author, summarizing contextual factors in which the professional development model is embedded.

The above illustration provides an outline of the study and purpose, which is 1)

to show why specific PD targeting IB implementation is needed; 2) what type of professional knowledge is needed, and 3) how it can be carried out. First, a general to specific view of IB and the proposed model provides a historical and theoretical context of the IB program, defining its founding educational philosophy, principles and expectations. Then, the standardized IB curriculum showing core elements and academic areas are detailed. This is followed by an overview of IB project in Japan to provide a national context for its implementation. Finally, a proposed teacher development model is delineated as a framework to prepare the teachers on site at the local school level in their professional development. The proposed model is enriched by features taken from a developmental model used in the business domain, which are applicable to the domain of education. Underpinnings of the former are highlighted to show how they were informative in applying contemporary teaching and learning approaches into the proposed IB teacher development model.

2.Founding Educational Philosophy of IB

Combining globalization with the educational goals of the IB program are clearly evident in its mission statement as shown in the International Baccalaureate Organization (IBO) website:

> The International Baccalaureate aims to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect… [and to further] encourage students across the world to become active, compassionate and lifelong learners who understand that other people, with their differences, can also be right (2017).

The formation of the above IB mission statement is directly influenced by the philosophical ideas of four key educators: John Dewey, Jean Piaget, Jerome Bruner and A.S. Neil (IBO, 2017). Selecting these members as being influential in forming the IB curriculum is significant, and is especially informative toward the PD of IB teachers. Missing in this pantheon is Lev Vygotsky, whose ideas will be included in this study because they significantly interrelate with the above-mentioned members and are relevant to the interactive nature of the IB curriculum. It is worthy to draw out the connections of the ideas of all five influencers to assert the stance taken above in this study that contemporary teaching approaches are needed to implement

an IB program.

John Dewey (1859~1952)

Dewey was greatly influenced by Darwin's theory of evolution in *The Origin of Species* that organisms survive when they successfully adapt to changing environments. He wrote that what Darwin was to biology, he was to philosophy. "Just as Darwin had proved the notion of fixed biological species untenable, Dewey would seek to demonstrate that there are no fixed or certain truths" (Hickman, 2007, p.207). He made this statement to counter the positivist theory of knowledge (TOK), which was the dominant approach using the scientific method in *epistemology* – the philosophical theory of the nature of knowledge that sets out to determine how we know what we know by applying appropriate valid research approaches and complementary methods. He believed a positivist approach in epistemology produced static results, especially in the areas of social science. To Dewey, learning development was an evolutionary concept that was fluid and changeable. Adaptability was necessary for survival to meet challenges that humans will continually face in an ever-changing environment.

In education, Dewey argued that because the positivist TOK (i.e., the scientific method) was the dominant epistemology, it had become the most relied on metaphysical narrative to describe phenomena. In attempts to search for certainty, the scientific method was too reductionist and rigid, which created limitations on the learning process, because the rich tacit nature of knowledge stemming from subjectivity and intuition informed by the individual's experiences was too personal and could not be generalized as true. Dewey was a pragmatist and took the stance that the scientific method had limitations because absolute certainty (pure knowledge) cannot be achieved. He pointed out that in the scientific method, there existed corrections when mistakes were found. He referred to this fallibility as *fallibilism*, from which he takes his philosophical position rejecting absolute certainty (Hickman, 2007). Instead, he preferred the term *warranted assertions*, the idea that what appears as truth is a working assumption that may or may not be further supported in the future. Hickman writes that for Dewey, "[W]arranted assertions merge truth and inquiry together…" (p.7). The concept is an indication of Dewey's educational philosophy placing a strong emphasis on the knowledge building, learning process as an ongoing robust challenge to absolute certainty for further

inquiry that may produce new knowledge.

Thus, Dewey opposed the *grand narrative* (a term used by the postmodernist, Lyotard to describe the demise of positivism as a dominant narrative, see Hickman, p.17) as one-size-fits-all method. As a pragmatic, he emphasized that knowing occurs within a subjective, situational, problem-solving context. For example, Dewey felt that an overemphasis on sources of knowledge or fixed outcomes in curriculums that solely rely on and teach objective facts (transmitted truths) in which learners are expected to memorize, separated them from the discovery process of knowing that come from one's experiential, subjective experiences, which are a rich source of learning. Dewey was not anti-science and believed that knowledge should be the result of a disciplined inquiry. However, he felt that scientific methods seeking the end- result of knowledge took a reverse approach. He wrote, "It [knowledge] is also often supposed to have a meaning of its own—disconnected from inquiry. The result is that inquiry is subordinated to the fixed end called knowledge" (Dewey,1938, p.8). Dewey argued that the inquiry process should not be overlooked in education as it is the key to experiential learning. He made this point in his definition of the two terms, knowledge and knowing. *Knowledge* was the fixed or static result of inquiry, and *knowing* represented the lively dynamic, problem solving process that the learner feels connected to that produces knowledge (Dewey,1938). Dewey's embrace of the latter explains his inquiry-based approach to education, which influences the IB philosophy. Furthermore, in his inquiry-based TOK, he believed in the powerful role of intuition and subjectivity and supported the inductive learning process. He supported experiential learning in the classroom, using a more meaningful, experimental, learn-by-doing approach that allows the learner to discover outcomes in ways that make sense to them (Hickman, 2007).

In Dewey's view of education, traditional educational approaches grounded in a positivist (scientific methods) TOK produced an environment that prioritized knowledge transmission and diminished opportunities for learners to construct knowledge. He firmly posited that learners should be involved in the inquiry-based, knowing process of discovering outcomes on their own. On the other hand, if learners are unengaged, passive participants, receiving transmitted information or facts to memorize coming from teacher-centered instruction, they are merely spectators. Dewey labeled this *Spectator TOK*, in which learners are the receptors of externally-driven, transmitted knowledge (from the curriculum and the teacher) that

is outside of their realities and therefore, meaningless to their lived experiences. To Dewey the learning environment should not be a stagnant one, where learners are detached from meaningful learning in which they are fed a diet of "artifacts or pieces of dead wood of the past" (Boyles, 2006, p.15).

Thus, in Dewey's epistemology, which influences the IB curriculum, are the roots of student-centered, active learning education. He believed in creating a fluid classroom environment in which inquiry-based education supports a learn-by-doing approach, allowing learners to go through a learning process of knowing by giving them time to figure things out, to construct their own understandings and to be able to defend them. He believed that learning is experiential and that focusing on the dynamic process of learning was more beneficial for learners than arriving at the results and the product (Dewey,1938). Under Dewey's influence, for IB, the teacher's role is important to guide the learners in this dynamic learning process. This would mean the rejection of traditional, teacher-centered, transmission type teaching approaches.

Next, the work of the other members on the pantheon that largely influence the IB curriculum with the addition of Vygotsky are given below. Although the author focuses on Dewey, viewing him as the main influencer of the IB curriculum, it by no means diminishes the input of the other influencers. They are important and deserve more time than this study will give them. However, a brief summary of their ideas as they relate to PD will briefly be treated.

Jean Piaget (1896-1980), Lev Vygotsky (1896-1934), Jerome Bruner (1915-2016) A.S. Neil (1883-1973)

The listed key influencers of the IB philosophy including Vygotsky share one common characteristic in their views on learning, which is constructivism, especially disagreeing with the behaviorist that learners are to be treated as empty vessels of knowledge when they enter a learning environment. For example, Piaget found that a learner enters a learning environment with already formed cognitive structures based on previous experiences and knowledge. Having these preconceived structures, according to Piaget, the individual, when being presented with information in a learning environment, will either assimilate it into her already formed cognitive structures enhancing them or form new structures to accommodate entirely new knowledge. Moreover, this knowledge building process takes place within a learning environment that actively involves the learner in an inquiry based, learn-by-doing

manner. In the classroom, this means the individuals need to be given situations to discover and experience information in ways that allow them to configure it into their cognitive structures.

While Piaget focused on how the individual constructs knowledge, Vygotsky's contribution was that this knowledge construction occurs not in isolation but through social interaction with others. The social role in learning can be seen in Vygotsky's view that through interaction, language is an important psychological tool that learners use to develop their thought processes. Thus, learning is socially constructed and language is a most important medium. Vygotsky's views on social interaction in learning can be seen in his zone of proximal development (ZPD) concept (1978). At the bottom of the ZPD spectrum is what learners can do on their own without assistance, and at the top represents the potential of the learner to meet higher learning goals. The key to ZPD is grounded in Vygotsky's socially constructed TOK that the learner can reach her potential with the help of a more knowledgeable other (MKO), in other words, through social interaction (with MKOs—teachers, students and mentors), higher level learning occurs.

Bruner took Vygotsky's social view on learning including ZPD and applied it to social constructivism in the classroom. Whereas Vygotsky was vague on how an MKO would assist the learners to reach their ZPD potential, Bruner's research team on elementary school classrooms found there were steps a MKO (e.g., a teacher) should apply that they labelled, metaphorically as *scaffolding* (Wood, Bruner, Ross, 1976; also see Tharp and Gallimore, 1988, for a similar treatment of the concept with their use of the term *assisting performance*). The concept is powerful because teaching is scaffolding. In a social constructivist approach, the teacher is a facilitator, in a student-centered class providing the necessary steps to help learners giving socially mediated, timely assistance to facilitate their learning process in which they are at the center. In addition, interactive activities are given to students so that they can learn from each other. In a social constructivist classroom, learners are presented with an active, collaborative learning environment, often with open-ended and inquiry-based-learning activities that allow participants the flexibility to grow their cognitive structures.

Finally, creating an environment with fertile ground for cognitive growth and applying the ideas of the key influencers in action can be seen in Neil's educational

approach that materialized in his school Summerhill (1961). The school founded by Neil began in the 1920s as an international school and is still in existence where it began in England offering the IB curriculum. The school was founded in views that were similar to the Deweyan democratic approach to education. Believing in a creatively free and less rigid educational environment, students are respected for the knowledge they possess when they enter the school and for their natural curiosity empowered by following their interests to continue their learning. With this in mind, students are given flexibility to choose courses that interest them. The school also takes the social constructivist view by emphasizing learning potential of students when it occurs in socially constructed contexts. Having students actively participate in conversations with others about learning materials is seminal. Importantly, the school also emphasizes the necessity of teachers to participate in ongoing research in their professional development (A.S Neil's Summerhill, 2021).

A brief amount of time in this study was used to offer a synopsis of the key influencers because they are seen as seminal to the IB teaching philosophy and the expected professional qualifications of teachers to deliver the curriculum. Next, a look at the IB curriculum is presented.

3. The IB Curriculum

The IB project was officially registered as an organization in 1968 in Geneva. The founding educators developed the curriculum based on the progressive ideas of the above-mentioned key influencers that were trending in the 1960s. Two years later, in 1970 the IBO expanded to France and Germany and by 1986 it was widely present in regions throughout the world. The organization first focused on 16 to 19 age group in its IB Diploma Program (DP), then expanded to 11 to 15 age group in the Middle Years Program (MYP) in 1994 and the Primary Years Program (PYP) in 1997 for elementary school age children. Data comparing the DP from 1971 to 2016 show a significant spread of the IB:

Table 1

IB growth rate of DP over 45-year period (IBO, 2017)

1971	2016
681 DP exam candidates	161,104 DP exam candidates
Estimate of 749 students	Estimate of 1,250,000 students
7 schools	4,538 IB World schools
0% State schools~100% Private schools	56% State schools~44% Private schools

Note. Adapted from https://ibo.org/globalassets/digital-toolkit/presentations/1711-presentation-history-of-the-ib-en.pdf

The data presented above focusing on DP chart the popularity of the program. Significantly, data show that the program continues to spread throughout the world and has increased its presence in public schooling curricula. Next, a brief overview of the DP model, which has been selected for this study is examined. Details for the PYP and MYP can be found on the IBO website (2017).

The DP Model

The design of the DP model as presented by IBO (2017) depicts layered concentric rings leading to its core (See Figure 2). The outer ring frames the broad goal of IB to produce global citizens through *International-Mindedness*. To achieve this goal, the next inner ring lists six main academic subjects: *Studies in Language and Literature, Individuals and Societies, Mathematics, The Arts, Sciences, and Language Acquisition*. Within each academic area are a list of several subjects, in which students must choose two from each. Three of these subjects must be taken at a higher level, which require 240 teaching hours, and the others taken at a standard level requiring 150 hours.

Figure 2

The DP Model (IBO,2017)

Further into the core of the curriculum, are the three core course elements that guide the formation and presentation of the six academic areas: *Theory of Knowledge (TOK), Extended Essay (EE)*

and Creativity, Activity, Service (CAS). These three core areas reflect the educational philosophy of IB curriculum based on a learn-by-doing, inquiry-based learning approach. In addition, the three core elements that frame the activities of the six subjects create an interdisciplinary IB curriculum that brings continuity among subjects leading to holistic education. For example, CAS involves collaboration among students in projects that require creative solutions, putting the ideas into action for the purpose of helping society; EE is an individual research project in which the student has to produce a 4,000-word critical paper from one of the shorter essays they wrote for the academic subject courses; and the TOK element focuses on developing critical thinking skills through understanding epistemology. Students reflect on knowledge by examining the systematic processes of knowledge structures through analyzing the nature of knowledge, how knowledge is constructed, knowledge claims (how we know what we allege to know), and the differences between students' conclusions and others.

So far, the IB curriculum has been discussed from its outer ring stating its international goal. Then, the six academic subject areas depict a well-rounded curriculum covering the arts, humanities, math and science. These subject areas are not so unlike any found in many educational systems. However, the marked difference between standard traditional curricula and IB is demonstrated in the next inner ring toward the nucleus of the curriculum, which lists the three core elements and how these subjects are framed in a way that uniquely reflect the IB educational philosophy. Finally, and most significant to this study, what IB lists at the central core of the curriculum is *Approaches to Teaching* and *Approaches to Learning*.

Placing a strong emphasis on teaching and learning approaches at the heart of the IB curriculum is noteworthy. The IB educational planners fully recognize that appropriate teaching and learning approaches are central to the success of curriculum implementation. Therefore, if teachers, such as in Japan, are using approaches that are distant to the progressive-type of approaches required for IB, then what is needed is adequate PD to narrow the gap.

4. The IB in Japan and professional development

When the IB programs were first announced by MEXT, there was an eight-year goal to have at least 200 schools by 2018. By March 2012, there were 16 schools, mostly

in international schools and one private school (Iwasaki, 2013). At that time, the educational philosophy matched what progressive Japanese educators were looking for:

> For years Japanese educators have been calling for a curriculum emphasizing student-directed learning, "learning how to learn," adaptation, applied knowledge and skills, problem-solving skills—in short, a curriculum oriented to the practical and flexible application of knowledge in a changing world. Many believe that a decisive shift in this direction is needed to deliver on MEXT's stated goal of fostering *ikiru chikara*, the capacity to lead a fulfilling life as an independent and productive member of society. The IB program is such a curriculum (Iwasaki, 2013, online:nippon.com).

Although intentions were good, the immediate concerns were whether or not a rigid Japanese educational system would have enough flexibility for the IB program, and if there were enough capable teachers who could teach in the program (Iwasaki, 2013). These may have been the reasons why the original target was not reached. However, with MEXT's renewed interest and support, a new 2022 date has been set. There are, as of March 2021, 167 schools that either are certified or have applied for qualification (Neo, 2021). The educational system seems ready to find room for the IB program to adequately prepare students to communicate, compete and contribute more effectively in an intensely growing interconnected world. Consequently, the flexibility issue may be solving itself because of global demands, but a bigger challenge is to develop teachers who are capable of implementing the IB educational philosophy into their instruction.

The role of professional development

In preparing teachers to implement the IB program, there are several important considerations regarding appropriate PD. First, expecting teachers in Japan to implement a teaching approach that is required by the IB program means teachers have to change their teaching. They have to learn new ways to teach. However, it is a challenge to get teachers to move out of their comfort zones (see Takegami, 2021) supported by established educational practices to then adopt a progressive IB educational philosophy:

> [I]t is rare that teachers provide emergent contexts for the development of inquiry and knowing in the Deweyan sense. In terms of the superstructure of schools, this only makes sense. Order, discipline, and time-on-task expectations do not support inquiry that is varied, serendipitous, and transactional. Save the unique examples within some schools, the reality in most schools is that traditional expectations have been so deeply entrenched prior to teachers and students actually entering the hallways, that the task of changing schools is often seen as impossible. Epistemologically, if a parallel could be made here, it is as though "Spectator Theory of Knowledge" (STK), … is the given and the taken for granted in schools (Boyles, 2006, p.18).

When teachers were students, they were strongly under the influence of a traditional, institutionalized approach to education. As Vygotsky (1978) stated, "A mind cannot be independent of culture". Therefore, upon entering teaching, they are under the influence of their STK educational culture. There are no experiences to inform their ideas or beliefs, which would prepare them to make a transition to ideas found in a progressive educational culture, such as in the IB philosophy. Boyles (2006) made this claim about teachers in the following:

> They were reared as spectators (and often spectate in their college classes, too) and even when some students profess to wanting to "engage" their students in "active" learning, it still usually ends up being a souped-up version of traditional schooling… (p.18)

The point above is that by the time they have become teachers, their learning experiences within an institutionally shared educational culture have deeply influenced the way they teach. Even if it seems they are making changes in their teaching, it is a superficial change ("souped-up version"). Therefore, teacher educators must take into account factors that have a bearing on teacher change.

5. Considerations for designing a developmental model to address teacher change

One reason why it is difficult to get teachers to change is because teacher beliefs underpinned by institutional and personal experiences impact their instruction. Recognizing teacher beliefs is important in PD because they are motivators for why

teachers do what they do in their instruction (Borg, 2006; Burns, 1992). This is why as noted above, Fullan (2007) stated that change in teaching approach requires a change in teacher beliefs. Although beliefs are stubborn and often resistant to change, they can change. As Dewey wrote, "…[T]here is no belief so settled as not to be exposed to further inquiry" (1938, p.8). This has implications for professional development. In order to get teachers to change, PD must address ways to get teachers to further explore, the hidden cognitive domain of teaching. Teacher cognition represents the teachers' thought processes where beliefs, experiences and knowledge intermingle to inform their decision making and instructional planning (Clark & Peterson,1986; Woods, 1996). Although areas of teacher cognition are hard to access because they are not easily observable and messy to uncover (Pajeres, 1992), they are nonetheless important in teacher change. Therefore, when designing a PD model, there needs to be ways to tap into the teachers' thought process, which means introspection should be included in PD. By getting participants to explore their thought process, tacit teacher knowledge is exposed. It is activated and made explicit by having teachers go through a knowing process in which rich nuggets of their previous hidden knowledge can emerge and contribute to knowledge creation during their developmental process—as shown in the next section.

An informative developmental model from the business world

In this section it will be shown how a developmental model used to both access and build on the knowledge of company personnel in the business domain provide rich insights into the world of education and PD. With a growing globalized market, competition among international companies has intensified. In this very competitive market, companies need to fully use all the resources they have, especially human resources. Nonaka and Takeuchi, in their book, *The knowledge-creating company: How Japanese companies create the dynamics of innovation* (1996), designed a knowledge creation framework to counter traditional top-down hierarchical company management practices that did not consider the rich tacit knowledge of their workers. In their model, they specifically target workers outside of management as a rich source of knowledge for the purpose of creating a company environment that is able to cultivate creativity leading to innovative ideas among all of its staff. Their model focused on two core dimensions, explicit and tacit (implicit) knowledge. Polanyi (1958, 1966) labeled the type of knowledge we have that is not easy to describe, either verbally or writing, as tacit knowing or tacit knowledge. In other words, tacit knowledge means, "We know more than we can tell" (Polanyi, 1996, p,4).

Tacit knowledge is like the hidden gold of knowledge. It is the subjective knowledge that is formed within hidden layers of experience in workers that enable them to do their job autonomously and often expertly. The skills of workers to expertly perform their tasks are drawn from tacit knowledge that even they are unaware of. The master butcher may provide clear technical explanations and images for the novice to cut away different parts of the meat from a whole cow, but when the master butcher faces the carcass and makes the cuts, they are done effortlessly with precise movements in twists and turns that swiftly cut away the meat to the bone, in ways that even he is not exactly aware of how it is being done. This is because he is using his unexposed tacit knowledge to perform his duties, expertly.

The overall aim of Takeuchi and Nonaka's model is to expose the tacit knowing or expertise of company workers so that it will lead to knowledge creation. In short, how to make implicit knowledge explicit so that one's indescribable expert knowledge can be voiced leading to new innovations. Their work is particularly relative to this study, because the nature of their knowledge building model is very much aligned with IB philosophy and professional development (also see Takegami, 2021 for a more detailed account of how the framework is applicable to the domain of education), particularly in the four major modes that make up their quadrant: Socialization-Externalization-Combination and Internalization (SECI).

Table 2

Nonaka and Takeuchi's Four modes of knowledge creation (1995, p.62)

	Tacit knowledge To Explicit Knowledge	
Tacit knowledge from Explicit knowledge	Socialization	Externalization
	Internalization	Combination

Note. This table demonstrates the four modes of knowledge creation adapted by Nonaka, and Takeuchi (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*.

As the model (in Table 2) indicates, it involves a knowing process designed to elicit worker's tacit knowledge so that it finally emerges as knowledge to be shared by others. A key component that draws on the collaborative nature of learning is *socialization*. For example, through interaction with others, the emergence of teacher knowledge among participants happens by working together and sharing ideas during PD sessions. Consequently, their tacit ideas are then brought to the surface, *externalization*. Once revealed, they can be refined by what Vygotsky termed more knowledgeable others (MKO). The *combination* of the professional knowledge and experience of MKOs combined with the revealed tacit knowledge of teachers materialize into new knowledge, which are then internalized by all (including MKOs) for further reflection leading to developmental growth (*internalization*).

The SECI knowledge building model modes are rooted in the constructivist, learn-by-doing, 'build on what the learner already knows' ideas of the key influencers that formed the IB philosophy. Learners do not enter a learning environment as empty vessels, but with already developed cognitive structures filled with rich tacit knowledge waiting to be tapped. Through active learning and using interactive learning activities, learners are placed in a Deweyan, inquiry-based, learning process with opportunities, individually and collaboratively (socialization), to build on their knowledge as they complete tasks that confront them. The results of the discovery process can be formulated by written (journals, essays, reports) and in openly discussed (presentations, debates, panel discussions, open class interactions) activities (externalization). Through the guidance of an instructor (MKO) their ideas are further enhanced (combination), which then are reflected on by the learner for further growth (internalization).

In the above paragraph, replacing the subject *learners* with *Teachers as learners* provides a rationale for the following proposed "generic" IB PD model. The generic nature of the model allows it to be used for all subjects and core areas of the IB curriculum (see IBO website, 2017 for full details). The model would also be a superstructure for IBO provided specific workshops as well. The generic nature of the model meets the effective criteria that emerged from a report looking at 35 studies on PD frameworks, which drew positive conclusions in teacher development (Darling-Hammond, Hyler & Gardner, 2017). There are the seven shared qualities that were recommended as common design features of PD models. An adaption is presented below:

Table 3

Seven qualities of an effective PD framework (pp. v, vi, 23)

Common Design Features	IB Generic Model
1.They are content focused.	Focus should be on IB subjects and complementary pedagogies
2.They incorporate active learning strategies.	Teachers are active participants involved in learn-by-doing, interactive activities.
3.They engage teachers in collaboration.	Participants work together as a community, gathering, sharing, creating knowledge with the aim of changing the educational culture.
4.They use models and/or modeling.	MKOs provide examples through demonstrations, lesson plans, materials and video presentations of effective practices.
5.They provide coaching and expert support.	MKOs perform the role of facilitators offering timely advice and direction. Peers and participating members also contribute.
6.They include time for feedback and reflection.	Allows a process of internalization of information for knowledge growth.
7.They are of sustained duration.	Knowledge growth continues as participants see success when applying new strategies leading to belief change (Guskey, 2002).

So far in this study, a contextualization of the necessary factors surrounding the proposed model that needed to be considered were presented. Next is the design and flow of the generic PD model for IB curriculum implementation in Japan.

6.Proposed PD model for The IB Curriculum

If an entrenched traditional approach to instruction supported by the educational establishment creates negative transfer of practices suited for IB, then lesson study, an equally deeply rooted PD framework within the educational culture, provides

positive transfer. Lesson study, known as *Jugyokenkyu*, has been used for more than 50 years as a PD framework in Japan and is now widely accepted as an effective model for teacher development (Lewis, Perry & Murata, 2006; Yoshida, 2002). It is highly regarded because it directly draws on the action research principles of Plan-Do-See-Act (PDSA). In action research, teachers, and not outside researchers, are the main agents carrying out research inquiries about their instructional practices in a cyclical PDSA approach. In lesson study, participants are also involved in a cyclical process of PDSA, but the emphasis is on co-constructing a 'research lesson' ideally in collaboration, based on curriculum goals. Then, the lesson is observed by peers, who can learn from the lessons as well as give feedback. Features of the SECI model and seven qualities of an effective PD are applicable to the qualities of lesson study: It should be highly collaborative (socialization), on-site, and reflective. In addition, the domain of teacher cognition is recognized as an integral component. Through an interactive level of discourse, the emphasis is on the participants' implicit, tacit knowledge gained from formal learning and personal experiences to form and teach the research lesson (Dudley, 2013), where participants' actions materialize (externalization). The whole process is combined with feedback and professional knowledge from MKOs (combination), which lead to further development in teacher knowledge (internalization).

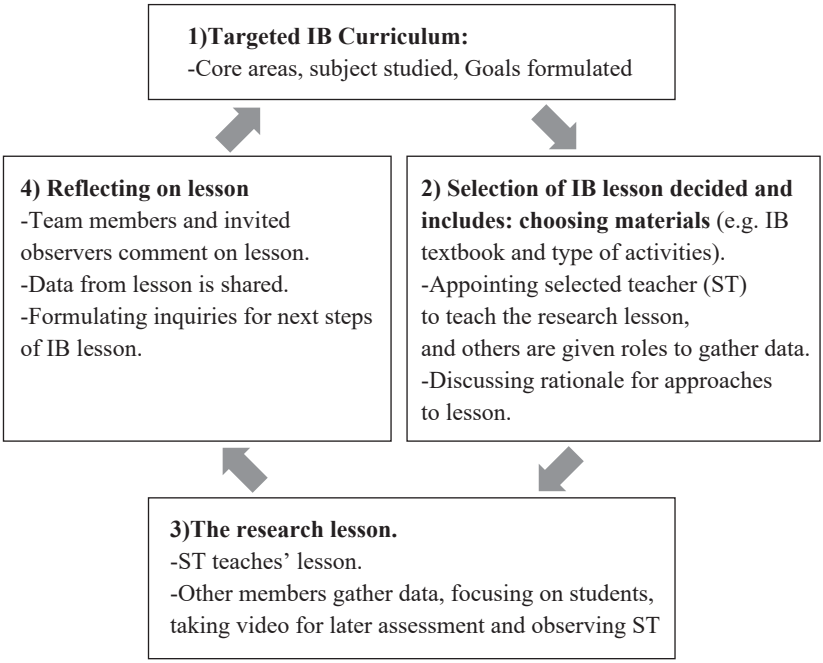
The generic PD model for IB implementation in local schools using lesson study cycle (LSC)

The PDSA circular flow is depicted in the major steps of a LSC (Lewis, Perry, & Murata, 2006): 1) Study curriculum and formulate long term curriculum goals regarding student learning, development and interests; 2) Plan the lesson, choose a lesson or revise a lesson with learning rationales and goals in mind; 3) Conduct research lesson, often one member of the teach conducts the lesson, while other members observe and gather data in real time, and 4) reflect on the lesson for further improvements, sharing data and discussing future improvements and inquiries for next steps.

The generic IB PD lesson study model incorporating the principles of SECI and qualities of effective PD are seen in the Figure 3.

Figure 3

The generic IB PD lesson study model



Note. This model is produced by the author, summarizing the generic IB PD lesson study

The model has a circular flow that encourages the teacher knowledge building process. It is meaningful, taking place on site in classrooms where teachers work. The model recognizes the teachers' cognitive domain. It is designed to be collaborative promoting a high level of interactive discourse aimed at stimulating the sharing of the participants' rich tacit teacher knowledge, making it explicit for all to gain. The socialization treatment accessing the cognitive domain can also play a vital role in changing teacher beliefs. Complimenting the inner thought processes domain of teachers is the observable, in-action domain as the lesson is conducted publicly.

The model is reflective as it gathers teachers (research team, peers and MKOs)

to participate in post lesson discussions, analyzing data gathered from the lesson combining members' experiences and knowledge to enhance feedback. The cyclical nature of the model is an indication that PD should be an ongoing process that offers opportunities for continuous improvement with internalization of new knowledge and the emergence of future inquiries seeking new knowledge. It should be noted that an MKO plays a valuable role working with the teachers in every stage, providing professional, formal pedagogical knowledge that is enriched by personal theories of teaching based on experience. The contents of the LSC deliberately provide a general step by step model. The generic attributes of the model grounded in SECI and seven principles of effective PD offer flexibility. The IB curriculum is a complete educational package having an educational philosophy, with an array of subjects, core approaches to implement them, and assessment instruments to evaluate student performance. It can be an overwhelming task for teacher educators to assist teachers in their PD to successfully implement the curriculum. Therefore, the purpose of the generic model using LSC, which is most familiar to Japanese teachers, is suggested as an adaptable, solid superstructure framework to initiate PD in whatever area of the IB curriculum that is targeted by plugging it into the model.

In the discussion above, an ideal portrayal of the generic model was presented, however limitations need to be considered. The outcomes of the framework will depend on the teacher developer (MKO) and participating teachers. It was noted that the teachers come from an educational culture that has deeply influenced their beliefs, experience and knowledge of teaching, which is quite different from an IB teaching philosophy. The participants have to be willing to make changes in their instruction. As levels increase from elementary school to university, teachers seem to become more autonomous and less inclined to open up their instruction in collaborative PD designed environments (Laskowski & Waterfield, 2014). For this reason, PD becomes particularly challenging in high school and even more so in universities. In the case of high school teachers, it may be quite a challenge to get them to willingly subject themselves to a IB teaching philosophy in their PD. This is because they come from an educational system in which colleagues, administrators and in some cases, parents recognize good teaching based on university entrance test scores using a teacher-centered, rigid disciplinary approach to classroom management. As the IB PD is being implemented in Japan, it may very well be that the focus could be on middle schooling, further down the autonomy scale, where teachers are more open to constructivist active learning approaches to

classroom instruction. As teachers at this level become more adept at implementing IB curriculum, it will add more positive or facilitative motivation for high school teachers to willingly make changes in their instruction.

Regardless of what level IB PD should take place, it is apparent with the support of MEXT that a number of schools are expected to adopt the IB curriculum. Parallel to this policy is the premise of this study that appropriate PD needs to be conducted. Moreover, as teacher developers are being asked to do IB PD throughout prefectures in Japan, as in the case of the author, it is suggested that they document outcomes of IB PD. In turn this data can be used to contribute to a national database from which other teacher developers can draw on.

7.Conclusion

The purpose of this paper was to address the challenges of preparing teachers to implement the IB curriculum. The study was prompted by MEXT's renewed interest in introducing IB into the schooling system, both public and private. Another impetus for the study was that the author has been asked to be involved in the PD of teachers regarding the IB programs at selected school sites. The premise of the study is that successful implementation will occur if there are appropriate PD frameworks to prepare teachers in their instruction to meet the goals of the IB curriculum. Thus, a proposed PD model was given. However, because the PD of teacher learning takes place within the social context of the classroom, and does not exist in a vacuum, it cannot be detached from the realities of the participating teachers. The model was contextualized around several impacting factors that needed to be considered and incorporated in its design. First, the contemporary teaching approaches and learning approaches required and expected by the IB curriculum planners are counter to what teachers and learners do in the traditionally taught classrooms. This was pointed out in the synopsis of the teaching and learning philosophies of the key influencers of IB. These influencers all were strong proponents of constructivist approaches (including Vygotsky as a social constructivist) to teaching and learning that required learners to be active participants in inquiry-based, problem-solving activities. This also means teachers have to change their approaches from teacher-centered instruction to offering activities that put students at the center of a knowledge building process. It also implies having an understanding that learners come to classrooms, not as empty vessels waiting to be filled, but with formed cognitive structures that need further

activation and development.

In addition, an overview of the IB curriculum was given to show how the design of the curriculum requires contemporary teaching and learning approaches as seen in Figure 1. The outer layer of the curriculum as it is presented by the IBO (2017) indicate the academic subjects were not unlike subjects found in traditional curriculums. However, the next inner ring toward the center of the curriculum were TOK, CAS, and EE core areas as shown in Figure 2. These areas are distinctly different from what those teaching from traditional teaching and learning approaches are used to. The IB core areas mostly demand discovery-oriented approaches to teaching and learning that involve the learner as an active participant in a knowing process. Thus, considerations of the seemingly insurmountable task involved in getting teachers to change, requiring new teaching approaches and a change of beliefs were built into the design of the model.

Two particular components were integrated into the proposed model. Elements of the SECI model were incorporated as means to include the cognitive domain of teachers. Getting at thought process, allows opportunities for participants to explore their instruction in meaningful ways so that they can make their rich tacit knowledge explicit, and once externalized can be shared by all and then internalized for further development. This process can lead to a change in teacher beliefs which manifest in a change in teaching approaches. Another feature is that the model is generically designed to account for the demands of the IB curriculum, which can be overwhelming at the beginning. Adapting the seven qualities of an effective PD framework into the generic model offered flexibility to accommodate any aspects of the IB curriculum whether they are the academic subjects, core areas or assessments.

Lesson study, a familiar PD framework to Japanese teachers, provides the action research cycle of PDSA that involves the participants in a dynamic developmental process aimed at getting them out of their static, comfort zones. The circular flow of the LSC offers the teacher developer (as the MKO) and the participants a step by step, evolutionary framework in which members participate in a meaningful, knowing process empowered by a learn-by-doing, inquiry-based learning environment that is on site focusing on specific areas of the IB curriculum. Moreover, following the principles of constructivism TOK, if knowledge is constructed in social interactions within a community, then activities should be

collaborative giving teachers the opportunities to share ideas so that they can further build on their teacher knowledge. Having participants go through LSCs within the generically designed model go a long way toward achieving these PD goals.

Finally, as mentioned the limitations of the proposed model is that there are no data to show its effectiveness for IB PD. However, LSCs have been in effect for more than 50 years and are well tested as an effective framework, to which the author can testify as conducting several PD sessions using LSC (see Takegami, 2020). As mentioned briefly in this study, as more and more PD for IB will take place on a national scale, it will require a national database for teacher developers to draw on. It is the intention of this author to make calls for a database and also to contribute to it based on the results of using the generic model proposed in this study.

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