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Impact on IB Students through Inquiry Based Learning

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ABSTRACT

Students in this 21st century benefit from the Inquiry Based Learning style of teaching and learning as the methods applied by the teachers help students to comprehend topics completely making the learning environment fun, joyful and lessons are easier to grasp. This article informs the audience about the effective implementation of the Inquiry Based Learning specifically in letting the students take ownership of their own learning which leads to enhanced critical thinking. Inquiry Based Learning is closely linked with the pedagogies of the International Baccalaureate making it easier and effective for both teachers and students to ride on the same boat smoothly while understanding the concept of the standard and practices of the International Baccalaureate while working on the methodologies of the Inquiry Based Learning. In this research the benefits of Inquiry Based Learning on International Baccalaureate students have been discussed, and through students' responses, and classroom observations it is evident that Inquiry Based Learning has a positive impact on International Baccalaureate students developing them to become lifelong learners. After the qualitative analysis was done on the Primary Year students, three interesting developments were found with the use of Inquiry Based Learning in class, developing deeper understanding, developing critical thinking skills and development of social skills.

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Introduction

Within a conceptual framework of Inquiry Based Learning benefiting the students, inquiry learning and active learner involvement can lead to important outcomes in the classroom. This study discusses whether Inquiry Based Learning has an impact on the lives of students studying in an International Baccalaureate school. It is mentioned in this study that students who actively make observations, collect, analyse, and synthesize information, and draw conclusions develop useful problem-solving skills. For students studying in an International Baccalaureate school, it is similar to the 21st century elements of educational reforms, in this age of technology, innovation, media, information literacy, social and cross-cultural interaction, students are more interested in learning on their own as these 21st century aspects suit their mind-set. School is a different meaning for them where they can voice out their opinion without fear and where the classroom environment is more relaxed compared to traditional times. Students love to explore on their own, they have the natural ability to question about things they don't know and at the same time they reflect on their learning to gain appropriate knowledge. This is similar to constructivism learning where students explore, question and reflect. The aspects of Inquiry Based Learning is discussed in this paper which can support these 21st century learners. This research gives an outline on the teaching strategies used by teachers in an International Baccalaureate Primary Year Programme school which follows a transdisciplinary teaching and learning method to cater the element of Inquiry in classrooms. The Inquiry Based Learning requires a constructive approach for the best effect of transdisciplinary teaching and learning on International Baccalaureate students. However stating all

the benefits of Inquiry Based Learning, this study also looks at the issue of how teachers and students understand the methodologies of Inquiry Based Learning, it also looks at how some teachers do not understand the significance and lack proper strategies to develop effective inquiry in their classroom. They might not understand the rationale behind the Inquiry Based Learning approach and how it can impact the lives of their students and themselves. Teachers might understand Inquiry Based Learning as only a tool for teaching, some might understand it as just a school policy which they need to follow. With classroom observations of the teachers, it could be analysed that Inquiry based Learning did have an impact on students learning and at the same time on the teaching strategies of the teachers. Through questionnaires provided to the students and teachers about Inquiry Based Learning, this study can inform the readers that there is a significant impact on students and teachers, this is also beneficial to a school following the International Baccalaureate programme as it fulfils the standard and practices as well. Preparing students for the future is essential for every educational institution, this study informs about the key principles, the three E's of 21st century education, engaged thinker, ethical citizen, entrepreneurial spirit. One important factor discussed in this study is the relationship between International baccalaureate programme and the aspects of Inquiry based Learning. This study is attempting to find out whether Inquiry Based Learning has any impact on the overall development of a student. It also explores ideas which would explain that Inquiry Based Learning also helps a teacher in becoming effective with his/her teaching strategies with students who have different abilities in learning. This paper helps in finding out new and better strategies in

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teaching methods and also deepen the knowledge about Inquiry Based Learning which would help give students the best possible learning environment, especially in an International Baccalaureate school. Through this study, teachers can be guided to build on their teaching styles and help them to understand the effectiveness of Inquiry Based Learning so that they can implement Inquiry Based Learning in their classroom for the progress of the students.

Background

This research explores the impact of Inquiry Based Learning and the development on a student for becoming a lifelong learner. It will also gauge whether IBL benefits the student or not while teachers implement the Inquiry Based Learning style of teaching in their classroom. As a teacher in an International baccalaureate school, it would be important to understand the relationship between International baccalaureate and Inquiry Based Learning and whether the relationship has an advantage or disadvantage on students' learning. I will be carrying out research about Inquiry Based Learning.(IBL) It interests me as I notice students and myself change in the way we think and perform are daily tasks. It interests the school and other IB schools as students are the key to a better world and Inquiry will help students to think critically for the development of themselves and their surroundings. This research is about how inquiry based learning is impacting the lives of students and teachers. There is a Chinese proverb that says, "Tell me and I forget. Show me and I remember. Involve me and I understand". This is the underlying concept of Inquiry Based Learning. "Inquiry is a technique that encourages students to discover or construct information instead of the teacher directly revealing the information"(Huziak-Clark et al., 2007,p. 311). "Inquiry-based learning includes students constructing knowledge and understanding through the teacher's encouragement to explore the world, discover knowledge, reflect, and think critically" (Santrock, 2001). Inquiry Based Learning is engaged, experiential learning sorted out around the examination, clarification, and determination of important issues (Barrows, 2000; Torp and Sage, 2002). Smith et al. (2001) focused on the impact of forms of instruction deemed interactive on learning in reading and mathematics. It is characterised interactive instruction as in classrooms that emphasize interactive instruction, students discuss ideas and answer by talking, and sometimes arguing, with each other and with the teacher. Students work on applications or interpretations of the material to develop new or deeper understanding of a given topic. Several researchers have tried to tease out how students learn. A Swedish researcher Saljo (reported in Ramsden, 2003:27-28), interviewed adults to find out about their conceptions of learning and subsequently identified five hierarchical categories. At the lower end were "surface approaches" including 1 - learning as a quantitative increase in knowledge (acquiring information), 2 - learning as memorising (storing information that can be reproduced) and 3 - learning as acquiring facts, skills, and methods that can be retained and used as necessary. At the other end of the continuum was 4 - learning as making sense or abstracting meaning (involves relating parts of the subject matter to each other and to the real world) and 5 - learning as interpreting and understanding reality in a different way, which characterise "deep approaches". For students to become lifelong learners in a transmission mode of teaching, teachers should act as a guide on the side, providing opportunities to test the adequacy of students' current understandings. One of the characteristics of the implementation of Inquiry Based

Learning is the teacher's understanding about Inquiry Based Learning. Teachers can encourage students to take a deep approach to learning by teaching to bring out the structure of the topic by actively involving the students through questioning or giving problems rather than teaching a rigid body of facts by building on what students already know, by emphasising depth of learning rather than coverage and by using teaching methods and assessment strategies that support the learning outcomes of the course (Biggs, 2003). Inquiry-based learning, if carefully constructed and implemented, can provide an excellent avenue for the development of deep approaches to learning. As this study discusses about the impact of Inquiry Based Learning on students and teachers, newly emerging insights and empirical findings in the learning sciences suggest that traditional approaches to education that emphasise the ability to recall disconnected facts and follow prescribed sets of rules and operations should be replaced by "learning that enables critical thinking, flexible problem solving, and the transfer of skills and use of knowledge in new situations" (Darling-Hammond, 2008, p. 2). Within this frame, rather than learning about a field of knowledge (i.e., facts and definitions) or learning elements and pieces of a field (i.e., procedures and rules), Perkins (2009) argues that students should be given opportunities to "play the whole game" (p. 25) where they can experience junior versions of how knowledge is created and communicated within specific disciplines. The impact of Inquiry Based Learning is that the learning becomes more student centred which can benefit students as they take ownership of their own learning. The students learn better when they are given an opportunity to freely inquire and learn how to learn. In an Inquiry Based Learning classroom, where students are engaged in their own learning, where leading questions with the use of 5W1H help students to critically think and expose them to real world problems. For example, in a direct approach like lecturing, teachers tend to rely on textbooks to guide their instruction. Teachers who believe in direct instruction feel that students will not be able to discover scientific knowledge for themselves. However, in a constructivist (involves the process of questioning, exploring, and reflecting) classroom students are allowed to explore their ideas through discovery. In summary of their findings, Carin & Bass, (2001) have shown that inquiry approach to instruction develops reasoning skills through students' investigations.

Problem statement

In an IB World school, it is expected that the inquiry environment would be as per the IB standard and practices however, the key element is the teachers' understanding of the techniques of delivering a lesson which suffice the aspects of IB teaching style, this is one essential factor to resolve because many teachers do not understand the significance of Inquiry Based Learning, strategies for implementation and for the effective impact on students.

Another important feature is the role of the teacher in an IB world school. The teachers come from various backgrounds which makes them apply their knowledge in the way they perceive is the best, most of them come from traditional teaching background however, in an IB school, the role of a teacher is to be a guide, a facilitator and this feature needs resolution so that teachers understand their role in an Inquiry Based Learning environment specifically in an International Baccalaureate school.

Methodology

Case studies typically combine data collection methods such as archives, interviews, questionnaires, and observations. A case study using a qualitative approach is used to investigate Inquiry Based Learning to allow to look deeply into the teaching and learning methodologies, drawing an assumption to a passage of viewing data on Inquiry Based Learning.

As a method, a Questionnaire to collect factual information is used in order to classify people and their circumstances to gather straightforward information relating to people's behaviour and to look at the basic attitudes/opinions of a group of people relating to a particular issue. The participants involved in this research were students and teachers from a school offering the PYP (Primary Year Programme). The students were from grade 4-6 while the teachers were from grade 1-5, who are homeroom teachers. Homeroom teachers in this school teach all the mainstream subject which are, English, Math and UOI (Unit of Inquiry). There were some subject specialists who were also a part of this study. Subject specialists are teachers who integrate their subject and support the UOI (Unit of Inquiry). The average number of years these teachers have been working in this school is 3-4. 10 PYP students, 4 PYP subject specialist teachers and 4 PYP homeroom teachers were participants. In accordance with the methodological methodology of investigating judgements, the reason for the open-ended questionnaire was to pick up information that would be rich in subtle element, including their proposals for what ought to happen in effective IBL usage.

For the implementation of the method, conducting QAT (Quality Assurance in Teaching) to start with to observe the lessons of some PYP teachers. The QAT can be done by senior team leaders or any staff from the senior management in this school. The QAT form has all the information required to gauge the teaching and learning methods of IB teachers and the criterion are set according to the IB Standard & Practices, (2014) document. An observation method through QAT(Quality Assurance in Teaching) was also used on the participants to analyse data. Marshall and Rossman (1989) define observation as "the systematic description of events, behaviours, and artefacts in the social setting chosen for study" (p.79). Observations enable the researcher to describe existing situations using the five senses, providing a "written photograph" of the situation under study (Erlandson, Harris, Skipper, & Allen, 1993).

Literature Review

Inquiry based learning is a constructivist approach, the key tenet is that an individual learner must actively construct knowledge and skills. Thus despite whether or not there is an objective reality, it is the individual who constructs their own reality through their experience and interaction with the environment. As an individual experiences something new, he or she filters this information through mental structures (schemata) that incorporate prior knowledge, beliefs and preconceptions to make sense of the information (Prince & Felder, 2006). Justice et al. (2007b) used five years of data to examine whether taking a first year Inquiry Based Learning course made a difference in students' learning and performance. In a comparative study between students taking an Inquiry Based Learning course and those who did not, and, taking into consideration factors such as age, gender, high-school grade point averages etc, it was found that students who took the inquiry course had statistically significant positive gains in passing grades, achieving honours and

remaining in the university. One important element in implementing the Inquiry Based Learning approach in a classroom is the teacher. A review in this study revealed confusion about the role of the teacher in an inquiry based classroom. There were references to the teacher as: the guide, (Chu, Tang, Chow, & Tse, 2007, p. 2) the one who sets a "rich environment in which students take on more responsibility in organizing and managing material for their own learning, and to develop a supportive social environment in which students can work collaboratively in small and large groups and learn to respect each other's 2016 ideas" (Turkmen, 2009, p. 3), a facilitator of projects Inquiry-Based Learning (Güven & Duman, 2007) including "students in educational decision making ... [and] as partners in the teaching and learning process (McCombs, Daniels, & Perry, 2008, p. 17), and "working together to develop substantive aims in the educative process... as both mentor and cooperative partner" and "guide" (Glassman & Whaley, 2000, p. 4). There did seem to be a consensus that the teacher was no longer the centre of the classroom giving "information about what has to be known and students ... [acting as] receivers of information" (Turkmen, 2009, p. 2, Güven & Dunman, 2007, Chu, Tang, Chow & Tse, 2007, Glassman & Whaley, 2000). A century prior, many reports have been composed about the requirement for all the more effective instructing and learning concentrated on the requests of life and work in the twenty-first century (edglossary.org) For example: Is the purpose of public education to get students to pass a test and earn a high school diploma? Or is the purpose to prepare students for success in higher education and modern careers? The push to prioritize 21st century skills is typically motivated by the belief that all students should be equipped with the knowledge, skills, work habits, and character traits they will need to pursue continued education and challenging careers after graduation, and that a failure to adequately prepare students effectively denies them opportunities, with potentially significant consequences for our economy, democracy, and society (21st Century skills.edglossary.org). Prince and Felder (2006) provide an overview of four studies evaluating IBL (Haury, 1993; Rubin, 1996; Shymansky, 1990; Smith, 1996; all cited in Prince & Felder, 2006). The research concludes that IBL is generally more effective than traditional teaching for achieving a variety of student learning outcomes such as academic achievement, student perceptions, process skills, analytic abilities, critical thinking and creativity. Inquiry Based Learning provides a means to assist students to make the transition from dualism to contextual relativism as the inquiry process involves students questioning knowledge and developing their skills in critical thinking. This is in direct contrast to more traditional, didactic teaching approaches in which knowledge is often presented as facts that students have to learn and regurgitate for assessment. The success of Inquiry based learning in schools depends on the educational techniques of the institution. It is the multiple intelligence work, cooperative and collaborative learning characterised by Inquiry Based Learning. Standards in educational institutions can be met with inquiry based learning by making sure that Inquiry Based Learning is incorporated early in the planning and by guiding students toward questions that will help them learn the required material.

Research Questions

To frame the research, the following guiding questions were used: -

1. What are the benefits of Inquiry based learning for students?

2. What are the factor that influences the success of IBL?

Data Analysis

Responses to the open-ended questionnaires are categorised by common themes and analysed based upon a qualitative approach. They are gauged for pattern theme, and content analysis (Sandelowski 2000; Stemler, 2001; Patton, 2002). With the content analysis, the responses are to be searched for frequent key words or themes. A logical analysis system, which was mentioned by Patton (2002), can be used because the responses are reported as answers to specific survey questions that represent existing frameworks essential in the dimensions of Inquiry Based Learning such as selecting and controlling variables, planning procedures, and interpreting patterns of evidence, are required for students to construct explanations and to engage in Inquiry Based Learning (Kuhn, Black, Keselman, & Kaplan, 2000; Shimoda, White, & Frederiksen, 2002; Windschitl, 2000). This analysis from the data identifies inquiry based learning skills that are critical for students to develop scientific explanations: to identify causal relationships, to describe the reasoning process, to use data as evidence, and to evaluate explanations. The analysis displays whether students and teachers develop inquiry skills to construct scientific explanations throughout a series of Inquiry Based Learning activities. The research questions in the questionnaire and during feedback sessions guide the study so that all gathered data can be put together to create a more substantial picture of the perceived level of implementation and effectiveness of Inquiry Based Learning within the research context.

Results (Discussions and Findings)

Based on the data collected, there were three key themes identified; developing deeper understanding, developing critical thinking skills and development of social skills.

After analysing the responses, it can be express that the students have benefited from the IBL style of learning as the methods used by the teachers help students to understand topics fully as the learning environment is fun, cheerful and lessons are easy to grasp. The response from students show that the IBL style is beneficial, it has helped in their development as a student and as a person. The students have mentioned that the teaching methods of their teacher is 'soft', 'helpful' and 'engaging' because the lessons are not boring. The other factor which was discovered from this data collection was that the engagement of students is beneficial for the success of IBL. In school settings, engagement is important because it functions as a behavioural pathway by which students' motivational processes contribute to their subsequent learning and development (Wellborn, 1991). For instance, engagement predicts students' achievement (Skinner, Zimmer-Gembeck, & Connell, 1998) and eventual completion of school (vs. dropping out; Connell, Spencer, & Aber, 1994). Engagement is further important because teachers (e.g., practitioners) rely on it as an observable indicator of their students' underlying motivation during instruction (Furrer & Skinner, 2003; Patrick, Skinner, & Connell, 1993; Skinner & Belmont, 1993). Thus, engagement is important both because it predicts important outcomes (e.g., learning, development) and because it reveals underlying motivation. By the response from the students, it can be understood that they learn better when engaged thoroughly with their teachers. After studying these responses, it can be stated that students can learn effectively in an environment where they are free to question, explore

topics and most importantly reflect on their learning. They must know whether their reflection is meaningful or not. In one of the responses, a student mentioned, "The Inquiry style of learning helped me a lot, it helped me in picking up the lessons taught with ease. The reflections helped me to refer back to what I have been taught". The IB learner profile attributes, attitudes and key concepts help me keep in touch with certain topics too", this means that students need to be supported with guidance to think critically to reflect on the right direction. Through the response from the students, it can be understood that students are aware of the social elements which can make a person good or bad. They learnt that being positive is a requirement to have good social skills. As one student mentioned that the teacher helped the student to learn good manners, to look at the positive side, to develop maturity and to become a better person, these are some of the skills which are required to be a good citizen.

Teachers play varied roles in supporting students' development with inquiry skills. These roles include being a modeller, a guide, a diagnostician, a facilitator, a mentor, and a collaborator, which indicate a varied amount of structure and scaffolding teachers build into an activity (Crawford, 2000; Osborne & Freyberg, 1985). For example, as a guide, a teacher provides specific directions for developing students' skills and strategies. When a teacher plays a role of a collaborator, he or she does not provide scaffolding but allows students to take a role of a teacher. In doing so, it can be analysed on how a teacher changes his or her role to support learning when students become more skilful at doing inquiry.

After collecting this data, it was observed that all teachers have the same outlook about IBL that it requires teachers to continuously encourage their students for effective implementation of IBL. Project-based learning involves completing complex tasks that typically result in a realistic product, event, or presentation to an audience. Thomas (2000) identifies five key components of effective project-based learning. It is: central to the curriculum, organized around driving questions that lead students to encounter central concepts or principles, focused on a constructive investigation that involves inquiry and knowledge building, student-driven (students are responsible for designing and managing their work), and authentic, focusing on problems that occur in the real world and that people care about. An important finding from the data was the motivational factor. Several motivation theories provide insight as to how teachers' motivating styles affect students' engagement (e.g., mastery vs. performance goal climates; Ames & Archer, 1988). According to this theory, a teacher's motivating style toward students can be conceptualized along a continuum that ranges from highly controlling to highly autonomy supportive (Deci, Schwartz, Sheinman, & Ryan, 1981). In general, autonomy supportive teachers facilitate, whereas controlling teachers interfere with, the congruence between students' self-determined inner motives and their classroom activity. Autonomy supportive teachers facilitate this congruence by identifying and nurturing students' needs, interests, and preferences and by creating classroom opportunities for students to have these internal motives guide their learning and activity. In contrast, relatively controlling teachers interfere with students' inner motives because they tend to make salient a teacher-constructed instructional agenda that defines what students should think, feel, and do. To shape students' adherence toward that agenda, controlling teachers offer extrinsic incentives and pressuring language that essentially bypass

students' inner motives. It is also noted that teachers need to shift the emphasis from textbooks to exploring questions and topics that are student centered (Keys & Kennedy, 1999). They also need to facilitate students building on their current knowledge and revising their understanding (Eick & Reed, 2002; NRC, 1996). Flick (2000) identified elements of cognitive scaffolding provided by teachers that supported inquiry learning. These elements of scaffolding included transforming the task accessible to students, structuring opportunities for learning, organizing a task for presentation, and identifying approximations of successfully completing a task. Although the teachers demonstrated various elements of scaffolding, their scaffolding "focused on using inquiry skills and not on learning the skills themselves nor how and when to employ those skills in scientific problems" (2000, p. 122). Thus, teachers have to communicate inquiry expectations and provide instructional support to develop skills that are important for performing inquiry.

Conclusion

Although teachers in this school have always tried to include opportunities for students to conduct research and create reports based on their research, inquiry based learning goes beyond the research process. Students also must be able to do more than research a topic and report back on their findings. They need to be effective planners, think critically, evaluate and assess their work, navigate the digital world, create new information and share their findings with the others. Teachers in this school need to be equipped with strategies and teaching styles which would support Inquiry-based learning to provide opportunities for students to develop skills they will need all their lives, learn to cope with problems that may not have clear solutions, deal with changes and challenges to understandings and shape their search for solutions, now and in the future.

One of the recommendation suggested to the head of school (Principal and PYP Coordinator) for equipping teachers with the knowledge of implementing Inquiry Based Learning, would be to have more one on one sessions with the teachers by experienced and or trained staff to explain them about Inquiry Based Learning. These experienced and trained staff could also provide demo lessons on Inquiry Based Learning approach for teachers to practically experience the effectiveness of Inquiry Based Learning in a classroom environment. Another way to support teachers could be to include some aspects of IBL in the weekly CPD (Continuous Professional Development) sessions. While these sessions are conducted, teachers can brainstorm and share each other's strengths and areas for improvement in their implementation of teaching strategies, specifically in Inquiry Based Learning.

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