PROJECT-BASED TEACHING-LEARNING IN PROMOTING STUDENTS' LEARNING IN THE HIGHER SECONDARY LEVEL OF EDUCATION

By

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A thesis submitted to the BRAC Institute of Educational Development in partial fulfilment of the requirements for the degree of
Master of Education in Educational Leadership & School Improvement

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BRAC University
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Declaration

It is hereby declared that

1. The thesis submitted is my own work while completing degree at Brac University.

2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.

3. The thesis does not contain material which has been accepted or submitted, for any other degree or diploma at a university or other institution.

4. I acknowledge all main sources of help.

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Approval

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Ethics Statement

I, hereby, state that this paper is my original work and all sources used are properly disclosed through proper citation. In order to ensure confidentiality, the identity of the research participants was not disclosed anywhere in the paper and the data collected from the participants was transcribed by me without any altercation and the result was presented through qualitative analysis without any personal bias.

Abstract

Project-based learning (PBL) is a holistic teaching-learning approach that focuses on the structure of inquiry that addresses core content through hands-on learning. It is a student-centred approach where learners are prompted to take responsibility of their own education and develop essential skills in the process. The main aim of conducting this research was to learn about the implementation of PBL and how it promotes students' learning in the higher secondary level of education. Learning more about this teaching-learning approach and its effectiveness could allow future incorporation of this strategy into the current educational practices in the country. In order to conduct my research, a qualitative approach was followed and the data for the study was collected through interviewing research participants, teachers and students, from one of the prominent IB schools in the country. The findings of the research gave me a vivid idea into the current practices of this teaching-learning methodology and the positive impact that it has on students' overall development. It has enabled me to understand how PBL is implemented in the classroom and how it benefits the learners, not only in terms of acquiring knowledge but also how it helps them to evolve and progress as individuals by building skills such as collaboration, creativity, critical thinking and problem solving.

Dedication

I would like to dedicate this thesis to the future generation of this country who are yet to be a part of a change that would redefine the course of education.

Acknowledgment

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Chapter 1

Introduction and Background

1.1 Introduction

Education resembles a revolving door that is constantly in motion welcoming new techniques and methods to enhance the quality of education we provide to the future generation. However, changes in teaching techniques are not always welcomed by the educators as it often requires a complete makeover of the techniques in practice. Over the past few years the use of technology in education has taken a dramatic leap. Using technology educators are now able to reach to a broader audience by engaging students through various interactive online activities, guiding them to do researches for the purpose of gathering knowledge, connecting to students at a personal level through the use of social media, and developing better interactions with the parents helping them stay informed about their children's progress. Although these changes are beneficial and required in order to keep learners up-to-date, there are many educators who resist these alterations. Be it incorporation of technology or implementation of a new teaching technique, resistance always seems to the first response as educators have long history of being introduced to novelty methods whose failure to serve the purpose have failed.

Therefore, there is always a natural inclination towards the questioning of these strategies that are introduced, which is why it is important to conduct comprehensive research focusing on the various aspects of these approaches to understand their effectiveness.

John Dewey, the 20th century educational theorist was a strong advocate of learning through experience. He pointed out that education is not preparation for life, but life itself. He defined education as 'that reconstruction or reorganization of experience which adds to the meaning of

experience, and which increases ability to direct the course of subsequent experience' (Dewey, 1916).

The project method was introduced by William Heard Kilpatrick who believed that projects in education should represent sincere and purposeful activity. These projects should be student-initiated that promotes intrinsic motivation in students which would allow them to emerge with a high degree of skill, knowledge, confidence and enjoy school as a whole (Kilpatrick, 1918). This method was later termed as project-based learning (PBL) which is defined as "student-driven, teacher-facilitated approach to learning" (Bell, 2010). In project-based learning, students are engage in generating knowledge and developing skills through an extended inquiry process that is structured around complex, authentic questions, and projects that involves students in activities such as designing, problem-solving, decision-making, and investigation (Marx et al., 1997)

In order to keep educators and students enthused and motivated in education, it is crucial that new methods as such are introduced and regularly adjusted to stay up-to-date. Various studies were conducted in countries outside Bangladesh in the past to show the effectiveness of this teaching technique and the challenges is had to offer to the school, educators, and learners. It is also seen that many schools adopted this teaching-learning technique and remodelled it to suit their curriculum. However, the implementation of this technique is still very limited in the context of schools in Bangladesh as only a handful of them follow international curriculum which can be adapted to PBL. Therefore, one of the main purposes of conducting this study is to give a fresh perspective on this particular teaching technique and its highlight its effectiveness in the field of education.

1.2 Research Topic

Classrooms around the world either follow a teacher-centred teaching approach or a student-centred teaching approach. The traditional teacher-centred teaching method is often criticised for not creating the environment required for the learners to develop critical thinking and problem solving skills (Serin, 2018). As a result, the main aim of delivering holistic education is lost.

In order to prepare our students to meet the requirements of the 21st century it is crucial that we instil them with the abilities to face challenges on their own and build confidence to take charge of their own education. It is now important more than ever now to help them develop skills that are going to be essential if they want to succeed in life.

Project-based learning is one such teaching technique that promises to offer all those that a child requires to grow up to become an independent individual. Therefore, it is important to evaluate the impact it has on the students who are at the cusp of stepping into the stage in their lives that would determine their future career and livelihood. Conducting a research to learn deeply about the practical implementation of the teaching technique and its impact on students' overall development is essential. Hence the following research topic was considered for the study.

Research Topic: Project-Based Teaching-Learning in Promoting Students' Learning in the Higher Secondary Level of Education

1.3 Statement of the Problem

Although several new teaching-learning pedagogical methods were introduced over the past few decades, many schools are still accustomed to using the traditional method of instruction. In a research conducted by Sheikh Asadullah (2017), the students that were found in the class were

well-disciplined and controlled which could have been due to the fact that most of the classroom were teacher-centred (Asadullah, 2017). Moreover, the school education is exam-driven and the learners' success is measured by the grades they achieve in their exams (Holbrook, 2005). Therefore, when teachers are teaching students to be successful in their standardized tests, students might be missing precious opportunities to develop competency skills such as critical thinking, creativity, collaboration, and productive reflection. (Lapek, 2018). Supporters who believe that these 21st century skills are crucial to the holistic development of a child stress the importance of student-centred methods such as PBL and other widely used student-centred teaching methods (Lapek, 2018) which are adversative to the traditional teacher-centred method of instruction (Carter, 2016).

Therefore, the present study explored how project-based learning is helping students learn through intrinsic motivation and develop diverse qualities like problem-solving, planning, and organizational skills that are fundamental in the 21st century.

1.4 Research Questions

In order to understand how project-based learning promotes students' learning in the higher secondary level of education, it was important that we looked into the current practices of PBL and how schools used this technique to complete their curriculum. In doing so it gave us a vivid idea into how the teachers are implementing PBL in the classroom and the challenges they faced and how they overcame them. We also got a glimpse into how it impacts their students learning and skill building abilities. This research also aimed to learn how well this teaching-learning technique is received by the students and their experiences.

The following questions has been used to guide the research process.

RQ1: What are the current practices of project-based teaching-learning in the higher secondary schools which follow International Baccalaureate (IB) program?

RQ2: How do project-based teaching learning practices of higher secondary schools that follow IB curriculum promote students' learning and develop of 21st century skills?

1.5 Purpose of the Study

The purpose of this qualitative study was to identify how project-based learning is being implemented in the classrooms and how students' performance and motivation relates to this instruction method.

The International Baccalaureate program and PBL have common essential elements and the frameworks presented by both IB and PBL try to integrate all the different subject areas and encourage students to see the connection between the contents taught in the class and the real world. They are taught to be independent learners who will seek answers to questions independent of the teacher (International baccalaureate & PBL, 2013). There are only handfuls of private educational institutions in Bangladesh which follow the IB curriculum ("Bangladesh," n.d.). Therefore, since the IB program and PBL have similar goals where they both aim for students to actively inquire and engage them in works authentic to their lives, observing the educators and students of an institution that follows the IB curriculum allowed us to get a glimpse into how PBL is implemented in the classrooms (International baccalaureate & PBL, 2013).

1.6 Significance of the Study

As mentioned earlier the most common teaching technique still in practice is teacher-centred which limits the possibilities of the students to explore their own understanding and their abilities

to generate knowledge (Biswas & Roy, 2010). Although there are some schools that do follow this teaching technique as a result of the way their international curriculum is designed, it is important for schools that follow national curriculum to also consider adapting to PBL in order to divert their focus from end of year assessments and grades to judge students' abilities. Therefore, it is important that other teaching techniques are researched and imbedded into the educational system which would also provide an innovative approach to the reorganization of the curriculum.

This study was significant as the new information gathered allowed us to look into how PBL is promoting students' learning and at the same time allowing them to develop skills that can be useful in practical lives within a team environment. However, successful implementation of PBL requires preparation.

Teachers need to ensure careful planning of the learning outcomes and goals for the projects in terms of what is expected from the students and what skills they would like them to attain. They then need to make certain that students are able to achieve these set goals through scaffolding, guidance, regular constructive feedback, assessments and ample practice (Maner & Yoo, 2017).

As educators our main aim to provide quality education to our students through teaching practices that would not only help them achieve outstanding grades but also motivate them to enjoy their learning and develop life-long skills. Therefore, this study could consecutively encourage our academic coordinators and educators to look deeper into this teaching practice in order to bring changes in their existing methods by planning teacher trainings and reformation of their existing curriculum.

Chapter 2

Literature Review and Conceptual Framework

2.1 Introduction

How can we motivate children to take charge of their own learning? How can we get children to think about what they are doing and its process, rather than just focusing on getting it done? How can we get children to truly understand the materials and their application in real life, rather than just fixating their attention on passing tests?

These are some of the questions educators find asking themselves throughout their teaching career. Motivational questions are often isolated from questions that focus on thinking and learning. However, if the main purpose of schooling is to foster the development of students' minds by engaging them in sophisticated and generous opportunities for deep understanding of curriculum content, then educators must concern themselves with motivational questions in order to examine how students engage in and persist at such activities. Students often develop poor attitude towards learning, lack of understanding and schooling due to the low-level tasks. Therefore, by introducing complex tasks which provides opportunities to solve real problems, it is possible to regain learners' interest and also ensure the constructive development of their knowledge (Blumenfeld, et al., 1991). Hence, the relationship between the teacher and the student takes the shape of that of a master and apprentice, where like the master, the teacher is responsible for coaching the learner by breaking down the tasks, using modelling and coaching to teach strategies for thinking and problem solving; and gradually allowing the learners to take responsibility of their own learning (Blumenfeld, et al., 1991). Moreover, as learning is considered to take place in a social context, learners can benefit from the approach that requires

them to collaborate with their peers and appreciate others ideas as resources for the purpose of learning (Brown et al., 1989; Resnick, 1988).

2.2 What is Project-Based Learning?

Project-based teaching learning is a model that systematizes cooperative learning around open-ended authentic projects that accentuates the development of knowledge and core competency skills like critical thinking, creativity, and collaboration (Thomas, 2000; Horpyniuk, 2015). It also elaborates on the definition by stating its interdisciplinary characteristics and involvement in demanding productive reflection (Solomon, 2003). Most importantly, as PBL is student-centred it allows students to take charge and develop their own learning style through inquiry instead of solely depending on teachers' instruction. Therefore, it is crucial that students are given the environment, opportunity, and motivation to become active questioners rather than passive acceptors in order for them to take their first step towards self-development. Through this they will not only be able to create concrete knowledge of the content but it will also carry more meaning and prove to be memorable to them (Horpyniuk, 2015).

According to the research carried out by J.W. Thomas (2000), project-based learning can be identified having these five distinct features.

1. Projects are the primary tools to deliver the contents that are central to the curriculum. They are also often used for the purpose of assessment.
2. Projects are based on the driving questions which are relevant to the content and are designed to ensure optimal student engagement in order to allow them to think critically to achieve solutions.

3. Projects require students to identify problems, develop and design solutions, and create an end product such as an invention, model, presentation or report.
4. Projects are always designed to be student-centered. They are responsible for the execution of the projects while the teachers act as facilitators who guide them through their projects helping them ask the right questions in order to lead them in the right direction.
5. Projects are designed to address real-life authentic problems instead of academic exercises and pursuits.

In order to understand how an effective PBL is implemented in a classroom, it is crucial to explore the essential elements that are required to make the teaching-learning process meaningful. In a study conducted by Larmer and Mergendoller (2010) the following elements were stated.

1. A need to know – In this step, students' interest is engaged by introducing the project through an event or an activity.
2. A driving question – In order to give the students a sense of purpose and challenge, driving question is introduced to the students.
3. Student voice and choice – Based on the driving question, students are given the freedom to select their own method for developing the plan for their project and presenting them, hence, making the process more important to them.
4. Twenty-first century skills – Students are encouraged to take part in collaborating, role-playing, team-building, critical thinking, self-assessing and making use of technology. These are some of the indispensable skills that learners are required to have in order to succeed in workplace and life.

5. Inquiry and motivation – Learners are engaged in real-life research using books, websites and other resources. This inquiry based learning allows the students to make the process more meaningful.
6. Feedback and revision – Receiving regular constructive feedback about their performance and end product are essential for learners to evaluate their work.
7. A publicly presented product – Learners are more aware of the quality of their production as they are required to present in front of an audience besides their teacher.

In order for effective implementation of the technique we must understand how important it is to have a well-thought out project. This is where the role of an educator or teacher comes in. As mentioned earlier, in PBL a teacher acts not as a provider of the concrete knowledge but a facilitator who creates a stimulating environment and provides all the necessary elements that are utilized in the creation of an effective project (Thomas, 2000); hence, opening up doors to the differentiation and individualization of the instructions given in addition to providing more opportunities to enhance high level thinking (Horpyniuk, 2015).

One of the key aspects of setting up an effective project is to ensure that open and authentic questions are asked. If the leaners feel that the task posed to them is unrealistic or staged and can be completed without much effort, it will result in them feeling demotivated. Hence, it is crucial that learners find relevancy in the task assigned to them; the task also needs to meet curricular goals and allow learners the freedom to explore multiple possibilities and solutions.

The projects must be designed in such a way so that it allows the learners to learn significant contents important to achieve curricular goals through the completion of the project. As project-based learning is directed through the asking of driving questions which are open ended, the

leaners can be motivated to engage in the project through various modes that increase inquiry. This increase interest gained through inquiry will then lead them to the PBL which will allow students to construct their knowledge through problem-solving, collaboration, designing, and discovery. They will be prompted to think critically and communicate with their peers to construct their own knowledge and use their own strength and understanding in order to work through their project. The function of the teacher in all this process will be that of a guide who will know where the journey starts and where it ends; it's the learners who will determine the course of the journey as they dive in to the depth of their inquiry (Horpyniuk, 2015).

Being the facilitator in a PBL classroom, the teacher is expected to possess knowledge of the content included in the project and know how to transfer that knowledge through the illustration of the content, explain learning strategies, be open-minded, and agree with the constructivist approach to teaching and learning. Educators must have comprehensive knowledge about the project and the approaches that will allow them to draw links between the central ideas of the project to the other subject areas covered in the curriculum. Therefore, assuming a teachers' role in a PBL centred classroom is a challenging task as it takes them far from the comfort zone where teaching is viewed as a process of feeding knowledge rather than an active process of knowledge construction; and this is one of the major concerns when it comes to the poor implementation of project-based learning (Blumenfeld, et al., 1991). Scaffolding is one another very important aspect that teachers need to employ in order to give learners the opportunity to generate hypothesis, make predictions, collect data and analyse them through the use of problem-solving skills and metacognitive strategies.

2.3 Current Status of Practicing PBL in IB Schools

Inquiry based learning is one of the pedagogical principles of all IB programs. Being actively involved in inquiry develops students' natural curiosity and skills that are needed to make them lifelong learners. Inquiry-based learning takes many forms, and project-based learning is one of them ("Approaches to teaching learning in the Diploma Programme (pre-publication)," n.d.).

Project-based learning and IB emphasizes on the development of deep conceptual understanding in learners ("PBL brings authenticity to international baccalaureate," n.d.). The goals shared by PBL and IB are very similar given that they both seek to develop 21st century skills in learners making them active inquirers, thinkers, communicators, open-minded, risk-takers and reflective. The essential elements presented in the IB program are very similar to that of PBL (*International baccalaureate & PBL*, 2013)

Essential Elements of IB program	Essential Elements of PBL
Driving questions	Significant content
Need to know	21st century skills
Voice and Choice	In –depth inquiry
In – depth inquiry	Driving questions
Revision and Reflection	Need to know
Public audience	Voice and choice
	Revision and reflection
	Public audience

Fig 1: Essential Elements of PBL and IB Program (*International baccalaureate & PBL*, 2013)

Both PBL and IB share similar structure of inquiry in the learning process. PBL is designed around a driving question and IB is framed around essential questions such as: Who are we? Where are we in space and time? How do we express ourselves? How does the world work?

How do we organize ourselves? How do we share the planet? Therefore, schools using the IB curriculum often find PBL to be a perfect fit as their teaching learning method ("PBL brings authenticity to international baccalaureate," n.d.). IB schools recognize that student drives learning and therefore, they are committed to using project-based learning as it delivers authentic challenges to students allowing them to be active and take charge of their own education (“Project-based learning,” 2020).

2.4 Implementation of PBL in Schools in Neighbouring Countries

Apart from the schools that follow the IB program, project-based learning is currently in practice in schools around the globe that are using different curriculums. Researches are also underway to study more about its impact on learners’ holistic development.

In 2018, in order to reduce curriculum load and focus more on the overall development of students, that includes development of life skills, UNESCO MGIEP, in partnership with Samsung, India, has initiated the My Dream Project. To complete the research study, over 60 Jawahar Navodaya schools from 8 regions within India will implement the project-based learning model along with social and emotional learning approach using technology. The Minister of Human Resources Development (India) recognized that the traditional learning system where learning took place passively is no longer sufficient to prepare students for the real world. In order to be prepared, it is imperative for the students to have both knowledge and essential 21st century skills such as problem solving, research, time management, and information synthesizing ("Project based learning," n.d.). In a research conducted to study how students benefitted from the use of project-based learning to learn Mandarin in two Indonesian high schools, it was observed that implementation of PBL presented students with the

opportunity to apply their four language skills in real context and help them develop their language skills along with improve their critical thinking, collaboration, communication, and creativity (Iriani et al., 2019).

The Vega schools in India are some of the uniquely designed schools that use project-based learning as their foundational teaching-learning methodology ("Vega," 2017). One of the key philosophy of the school is that the learners are more intrinsically motivated when they are given the freedom to express their personal interests, behaviour and attitude towards learning. The teachers in these schools are referred to as learning leaders who are responsible for facilitating learning experiences and creating opportunities for learning to take place more naturally. These learning leaders also receive ongoing, in-depth, and hands-on training in applying PBL techniques to support the inquiry approach. New projects are introduced by the learning leaders which create learning experiences and opportunities for learners to showcase their talent in different ways. These projects are usually hands-on, service oriented and benefit the wiser community. There are also other educational institutions that have taken the intuitive to introduce PBL as their teaching methodology. The Playmouth School in Mumbai, being one of them, took the initiative to introduce a year-long project where students of different grades created a microcosm of a village by creating their own farms at the school campus and growing fruits, vegetables, and flowers, and under the guidance of farming experts learned how to grow food organically, look after farms, track produce growth, and make organic fertilizer. The project ended with the installation of a Farmers' Market where learners had the opportunity to sell their own produce to various customers. Through this project, students learned about the fundamentals of botanical science, pollination, food cycles, symbiosis, nutrition and soil, weather patterns and basic mathematics. They were also exposed to the basics of economics, like pricing and

marketing. Moreover, they developed a deeper sense of appreciation and respect towards farmers for their role in the sustenance of the country (“Learning by doing: How project based learning can transform our education system,” 2020). Another well-known educational institution in Singapore, where experiential and inquiry-based learning is at the heart of their school curriculum, highlighted the importance of receiving an education that is embedded in inquiry and first-hand experience ("What is experiential learning and how does it benefit students?" 2021). Through working on projects, which leads them to discussion and collaboration, they also develop problem-solving and acquire deeper level of learning. Learners are made to realize that education is not only limited to being a part of the classroom and memorising facts but its main goal it to support continuous growth, development and making meaningful connections to the outside world.

2.5 Effectiveness of Using PBL

After any novel teaching-learning technique is introduced and implemented for certain duration of time, most teachers would weigh its success based on the academic scores. According to a study conducted by New American Schools Development Corp (1997), test scores of standardized tests of academic achievement of nine out of ten schools significantly improved. Several other studies showed significant impact of Expeditionary Learning (also known as Project-Based Learning) schools in student achievement. It was estimated that after two years these EL school had a progressive impact of 0.11 standard deviation and 0.16 standard deviation after three years. These impacts are equivalent to a student moving from the 50^{th} percentile to the 54^{th} percentile after two years and to the 56^{th} percentile after three years (Nichols-Barrer & Haimson, 2013). Several other researches that were carried out showed similar results as the students continued to proceed with the program (Nichols-Barrer, 2013). In another research

carried out by Schneider, Krajcif, Marx and Soloway (2002) showed that classrooms that followed PBL strategies outperformed others who followed traditional methods. Other researches also reflected the same outcome as their studies showed that learners who were subjected to PBL settings had not only greater academic achievement in testing scenarios but also their critical thinking, problem solving, and collaborative skills were improved (The Buck Institute of Education, 2014). This specific approach to teaching has also been gaining mass popularity among educators, even in Bangladesh, where speakers delivered speeches in a seminar 'Project Based Learning: An Approach for Quality Education' on how teachers can share awareness and curiosity within the student body and as a result benefit from sharing best practices and adding new dimension to teaching-learning in the classroom ("Project-based learning stressed for quality education," 052017)

2.6 Challenges of Using PBL

Despite being highly praised for the outcomes, PBL has also received negative criticism over the years. In a study conducted by S. Aldabbus (2018), where he studied the challenges imposed by PBL in Bahrinian Primary Schools, the teachers found it difficult to adjust the existing curriculum in terms of PBL. The projects were sometimes normal and just treated as a task to be completed after the teaching-learning process was completed, completely ignoring the core elements of PBL.

According to a study conducted by The Buck Institute for Education, some educators expressed that it was challenging to implement project based learning. Educators highlighted that the projects were time-consuming, they needed more time for summative and formative assessments, and they had little control over the flow of information. They also emphasized that it was

particularly difficult to narrow down to the learning objectives after having introduced a driving question and that it was hard to scaffold to each student as many could not follow the steps which in turn made it challenging to find a balance between assisting a student and giving them the independence to control their own learning.

One of the key aspects of using PBL is the use of technology for the purpose of research. Hence, it is challenging to ensure the availability of computers which is both impacted by monetary and time-sharing challenge (Marx et al., 1997). Moreover, teachers often struggle to maintain focus on the learning outcomes as the internet provides a plethora of information and it is crucial that it is only to be used as a means to attain the key learner outcome. Apart from technology, PBL also requires the use of varieties of materials and facilities for the projects, and sometimes the schools are unable to provide them. It was also found in the study by S. Aldabbus (2018) that some school administrators preferred the simpler methods of teaching which is less noisy and requires minimum expenditure. Insufficient resources, inflexible schedule and lack of technology were some of the leading factors that were found by Blumenfeld, et al., 1991 and Pereira, et, al., (2017) that obstructed the implementation of PBL (Blumenfeld et al., 1991; Pereira et al., 2017).

One of the key elements of PBL is the creation of authentic and challenging projects and ensuring that students are engaged and motivated to complete them. As students continue to progress through the school years these projects needs to change and yet remain relevant and challenging in order to be effective. In a study conducted by Bartscher (1995) it was seen that students' motivation declined as the years progressed due to lack of innovation in the projects (Bartscher, 1995). Another study by Ladewski, et, al., (1991) highlighted on the predicament that educators face regarding how much freedom to offer students in order to explore all the while ensuring that the curriculum learning outcomes are met (Ladewski et al., 1994). One other

important factors that was pointed out was how much support could the educators provide to the students given that making mistakes and learning from them was an important aspect of PBL. Teachers often found that this process was time-consuming and since it was an important process it was difficult to move to the other learning stages. Preparing fair rubric was one of the other challenges that teachers faced in the implementation of PBL. As students create multiple solutions and return them through several different modes of presentation, creating a rubric that is uniform for all questions the validity of the marks awarded to students. Educators often turn to summative assessments; however, doing this nullifies the importance of the process of learning through projects and eventually makes students more concerned about the assessment itself which is not the aim intended for PBL (Horpyniuk, 2015).

In the study conducted by Aldabbus (2018), it was found that some students dominated the work while the other learners did not have any active role in the projects which often lead to the projects being designed as per the interest of certain high achieving members of the group (Aldabbus, 2018). Also, some students tend to focus more on completing the task at hand very quickly rather than learning from the process. Eventually, these factors cause tension between the group members as the less active participants show unwillingness to be in the same group. One of the main reasons behind this issue is the lack of experience students have in terms of collaborative work which is absent in the traditional approach to teaching. Furthermore, using technology also plays a big role in this issue. According to the findings, some students have very limited access to devices and some do not have any access to technology outside school. As a result, they fail to collect and share information with the other members in the group. In the same study, the researcher highlighted that due to lack of effective communication between the teachers and the parents, parents underestimated the impact of PBL and were not interested

invest on the necessary materials required for the projects. There misconception of PBL led them to do the projects themselves instead of assisting their children in research.

In another research conducted to understand students' learning outcomes and attitudes towards project-based learning in Chinese context, it was emphasized that although many students acknowledge the effectiveness of PBL due its ability to enhance useful skills, a few were seen to lean towards the traditional lecture-based approach (Li, 2018). It was likely that students associated learning as memorizing for knowledge acquisition, given that the main goal or primary and secondary education in China are highly examination oriented.

Project-based learning is a student-centred approach to teaching which aims to provide learning opportunities that would allow the learners to develop competencies such as collaboration, reflection, critical thinking, intrinsic motivation, and creativity. This teaching-learning technique is very different from that of the traditional approach to teaching; hence, it allows the learners to interact more with each other and treats the teacher as a facilitator or coach. In various studies, PBL has shown to improve students' academics, behaviour, and their motivation and interest which allow them to retain information for longer period as they are actively in-charge of the entire process of learning. Although this teaching technique comes with challenges, it is possible to tailor the approach to allow for direct instruction to provide students with the kind knowledge that students require to solve a problem (Hmelo-Silver, 2004). Amid all the reproaches received from the critiques on the ineffectiveness of PBL, it is still one of the techniques that allow the students and educators to explore the new dimensions of teaching where the learners are prompted to fully engage in the process of learning.

Chapter 3

Methodology

3.1 Introduction

This chapter focuses on the research approach that has been used to conduct the study and gives detailed information about the research site, research participants, data collection methods, and technique used for data analysis. It also focuses on the ethical issues and concerns, credibility of the research, and also discuss the limitation of the study.

3.2 Research Approach

In order to understand how project-based teaching – learning promotes students' learning in the higher secondary level of education, it is imperative to identify its current practices in the higher secondary schools. Therefore, qualitative approach was the ideal way to conduct the research for data collection through some of the widely applied techniques. Qualitative research focuses on interpreting people's experience to understand the social reality of individuals. It provides us complete textual description of what people experience regarding a given issue. Qualitative research makes use of in-depth interviews to collect individuals' perspective and experience, focused group discussions in order to generate broad overview of the issue of concern, and observations to collect data on natural occurring behaviour (Mack et al., 2005).

The prime reason for selecting qualitative approach for this particular research was to identify a particular groups experience on the subject matter. Therefore, unlike quantitative research approach, the data collection was first done through a few appropriate data collection methods, after which an inductive approach was applied to derive explanations from those data, thus making the research more explanatory (Peshkin, 1993). Moreover, performing the qualitative

research approach allowed an in-depth understanding of how project-based teaching-learning is actually enhancing students' ability to grasp desired knowledge in a more effective way and eventually promoting their overall learning process through characterization of participants' perspectives and their experiences.

3.3 Research Site

As mentioned earlier, project-based teaching-learning is based on thought-provoking questions, problems, or challenges that require students' focus and implementation of prior knowledge to explore and solve the problem, but most importantly to learn more about the subject in the process. Although this innovative method to teaching may not be commonly found being applied in the traditional classrooms, it is however very similar to the approach instigated by the schools following the International Baccalaureate (IB) program as both highly accentuate on the development of conceptual understanding of the subject matter ("PBL brings authenticity to international baccalaureate," n.d.)Therefore, in the interest of acquiring adequate knowledge about the current practices of this teaching-learning method and how it is assisting in the development of students' learning process, the research site that was taken in consideration was School A. This is an international English medium school situated in Gazipur, Dhaka and it supports the IB curriculum. For the purpose of this research, teacher and students of grade 11 were chosen from this institution.

3.4 Research Participants

There were 3 male teachers and 3 female teachers among the participants. They had an average teaching experience of 12 years. The teachers who were selected taught different subjects, namely Mathematics, Physics, English B, Economics, and Business Management for grade 11

and, therefore, provided me with diversified information on how the core of this teaching technique remained uniform throughout different subjects. These teachers also had Masters Degrees in their related field and had received IB certificate for teaching and learning. Since these educators were trained in their subject area and had considerable experience in the field of education, particularly teaching in IB program, they were able to provide useful insight into how this teaching method is implemented in the classroom and how they are promoting students learning and helping them gain essential skills.

In order to gather third-person perspective regarding the teaching-learning process, two academic coordinators, who are currently employed at two of the well-known international schools in Dhaka were interviewed. Being experts in the field of education for an average of 13 years and working directly with the school administration, they were able to provide me with details related to the implementation of PBL and gave valuable inputs regarding the challenges it brings from a wider perspective.

The students who were interviewed were between the ages of 16 to 18 and studied in grade 11. There were 3 male and 3 female students among the ones who were interviewed. They were able to contribute essential information regarding how the way of teaching has helped them in promoting their interest in the learning process and how they were benefitted by it. They also gave an insight into how the teachers' role in the classroom served the purpose of this teaching technique.

3.5 Sampling Procedure

For the purpose of collecting data for this qualitative research, purposive sampling technique was used. Purposive sampling, also known judgement sampling, is the deliberate choice of a participant due to the qualities the participant possesses (Etikan et al., 2016).

For my research, in order to fully understand and analyse the similarities that the teaching-learning approach used by these schools and project-based teaching-learning has, it was fundamental to select teachers who teach the higher secondary level as research participants as they were able to provide insightful information regarding the student-centred teaching-learning methods used in the classroom and also how they help students achieve hands-on knowledge, critical thinking, problem solving, and organizational skills which goes beyond just theoretical knowledge. In order to gather teachers for the study, the school administration was contacted requesting them to provide teachers who have considerable experience teaching grade 11.

Moreover, students of grade 11 were also selected as participants who provided useful information regarding their own performance and their thoughts about how effective or efficient they find the teaching-learning process to be in the transference of knowledge and development of important values and skills.

3.6 Data Collection Method

The research methods that were utilized in data collection are interviews. Last year, in the month of March, all the schools were forced to shut down due to the spread of Covid-19. Since then the schools have been conducting their classes online. Due to the current scenario, some changes had to be made in the data collection process.

3.6.1 Interview method

The interview method was used to collect data from individuals. Interviews can be structured or unstructured; however, for the purpose of this study structured interviews were conducted using an interview guideline to explore the respondents experience and perception about the teaching method.

For the purpose of interview, a total of 3 male and 3 female educators who were all teachers of grade 11 were selected. Due to the ongoing pandemic, it was not possible to conduct face-to-face interviews; therefore, all the interviews were held via Zoom which is a platform that allows video calls through computers and mobile phones. The interviews were recorded with the permission of the participants. Participants were not compensated for their participation in the study.

Participants were asked 15 open-ended questions. The teachers' interview began with questions to learn more about the duration of their teaching career, their educational background and the trainings that they received in order to teach the IB curriculum. The questions that followed focused on gathering more information regarding how the teaching-learning method, i.e. project-based learning, is implemented in their subject area and how students are guided through the process and how they are benefitted. Question to identify whether this particular teaching technique was inapplicable in any situation also provided valuable information.

The same steps were followed in order to conduct interviews with the students. A total of 3 male and 3 female students were interviewed. They were all students of grade 11. Participants were not compensated for their participation in the study.

Participating students were asked 17 open-ended questions. The interviews that were conducted with the students began with questions to learn about their age group. The questions that followed were asked to see how they are involved in the process of project selection and how they contributed in determining the procedure and steps that were followed to complete the project. One of the important things that contributed in this research was the information that was gathered from these students regarding the skills that they developed as a result of this teaching-learning process. They also shared how these skills helped them in other aspects of their lives.

The two academic experts were asked questions regarding the implementation of PBL in the classroom, which was followed by questions about what teachers need to do to prepare themselves for the effective execution of this teaching-learning procedure, and what challenges this process brings and how they can be overcome. They were able to provide information that allowed me to consider a varied perspective to this approach.

During the interview, the responses were properly transcribed. Moreover, I was able to observe participants' reaction towards the questions they were asked and study their voice and tone as they answered them.

3.7 Role of Researcher

In order to collect data for my research, interviews were conducted with teachers and students. Throughout the interview process, my role as a researcher was to mediate the data gathered from the participants through the research tool. In doing so, it was crucial that I refrained from interpreting the raw data collected from the participants too quickly based on my existing knowledge which might have resulted in confirmation bias. Therefore, in order to ensure the validity and reliability of my study I had to exercise specialized skills that involved explaining

the study to the participants without biasing their opinions, conducting the interviews with an open mind, holding a neutral position as the facilitator in the entire process, and most importantly, analysing the interpreting the data as per the data analysis technique.

3.8 Data Analysis

A deductive approach was followed in order to carry out the data analysis. This involved analysing the collected data and carefully reviewing the key research questions and becoming aware of the objectives and purpose of the study again.

The interviews were transcribed and the transcribed data were then read several times to get a clear picture about its contents and notes were taken. Information were categorized, highlighted and linked to the research questions. Coding these data was the next step where they were analysed and reviewed to identify different themes and issues emerging from the collected data and categorizing the information according to that through colour coding. Additional notes were also taken to better understand the information interpreted from the data.

Finally, the qualitative data was presented in a summarized form. Quotes, which are raw data from the participants, were also included in the results. Therefore, I not only examined what the participants said, but I also took into account how they structured their response and the tone in which the subject was discussed.

3.9 Ethical Issues & Concerns

In order to collect data for the qualitative research, interviews were conducted, and for that it was important to first gain consent from the participants. In order to gain consent for the teachers' and academic experts' interview, the consent form was sent to the respective school, and for

students' interview, the consent forms were sent to the parents via students. The purpose of the study was shared with the participants and they were well-informed that the information collected from them would not be altered and would be used only for the purpose of this research. The identities of the research participants were withheld in the research paper for the purpose of maintaining confidentiality.

Also, during the study, being an advocate of project-based learning, I found myself weighing on the positives of the teaching process, although there are challenges imposed by this technique. Therefore, the drawbacks and challenges pointed out by the teachers were taken into consideration while analysing the results.

3.10 Credibility & Rigor

In order to ensure that my existing knowledge and experience is properly interpolated with my research work, I had to follow a series of steps that has led me to the completion of my study. Consulting with my thesis supervisor and getting her feedback on the research topic and designing the research questions were two of the major aspects of my study. Based on this the thesis proposal containing details about the research methodology, i.e. research tools, research site, prospective participants and data collection and analysis methods was created and presented in front of a panel for their approval. Upon receiving the approval, the primary thing of importance was reviewing various studies that have already been conducted on project-based learning. Going through these research papers helped me connect my existing knowledge of this teaching process to others' experiences and their research outcome. The field work was arguably the most crucial part of the project since its outcome is what determined the result of my study, and in order to ensure that it was executed properly, I had to spend considerable amount of time

waiting for the perfect opportunity to select and involve participants who would be able to impart their valuable knowledge and experience. Moreover, the triangulation of the data that was collected through interviewing teachers and students allowed me to get multiple perspectives and led me to a more comprehensive understanding of how project-based learning is affecting the students.

3.11 Limitations of the Study

One of the main challenges that were faced during the study was finding teachers and students for data collection. According to the initial plan interviews with 10 teachers in total from 2 schools and 2 FGDs with 5 students in each group from each school were to be conducted. However, due to the pandemic, it was difficult to contact the schools as they were closed and started conducting classes online. Unfortunately, out of the 3 schools that I contacted, only one responded and agreed to allow their teachers to participate in the study. The same issue was faced with gathering students for data collection. As many students could not be gathered, instead of FGD, interviews were conducted. Moreover, during the interviews that were held with the teachers and students the responses received from the participants were often short with limited information. This was overcome by asking probing questions to gather elaborate information.

Initially, as per the research proposal, two observations were to be held. However, due to the current situation where the classes are being conducted online, it was difficult to manage classroom observation since access was not granted to these online classes and also recordings of these classes could not be collected.

Chapter 4

Results

4.1 Introduction

As mentioned under Methodology in chapter 3, the research tool that was used to collect data from the study was interview. After the completion of data collection, the raw data was analysed through qualitative analysis and the findings for my study was arranged under various themes which are correlated to the research questions. The themes are as follows:

4.1 Purpose behind using PBL in the classroom

4.2 Implementation of PBL in the Teaching-Learning Process

4.3 Development of Skills in Students through PBL

In this chapter, I included all my findings in a cumulative manner by drawing connection between the data collected from teachers and students through thematic analysis.

4.2 Purpose Behind Using PBL in the Classroom

The participants highlighted how the use of project-based learning motivates students to become independent learners and gives them the opportunity to be familiar with the real-life application of the theoretical knowledge that they gain.

“Project-based teaching and learning helps generate independent learners who learn to deal with real life issues with more practical approaches. It also generates responsible and respectful global citizens.” (Interview # 1, 1.03.2021) Another teacher (Interview # 2, 5.03.2021) who was

interviewed also agreed to this by saying that the main purpose of this process is to make the students owners of their own learning and life-long learners. One of the other teachers said,

> "In my opinion the main purpose is to make learning more practical and long lasting rather than traditional pen and paper examinations which only test a certain aspect of teaching and learning process. It also shows how well the students can implement their knowledge in practical scenarios." (Interview # 3, 6.03.2021)

The same was inferred by one of the students who said,

> "Learning through doing projects help me think about the topic not just from a theoretical perspective but also how it can be applied in the real world. It makes subjects interesting and helps you learn by yourself. And by the end it helps you achieve a better understanding of whatever section of the subject you are learning rather than just reading something and then memorizing what you're reading and then writing it down." (Interview # 9, 24.04.2021)

"There is an old saying, you must be aware that if a person is hungry, don't buy him food or don't give him fish, teach him to do fishing instead. We are exactly trying to do that. Our ultimate goal is to make a student, a lifelong learner." (Interview # 4, 28.03.2021) A similar notion was stated by one of the teachers (Interview # 6, 10.06.2021) where she mentioned that PBL provides an opportunity for students to engage deeply with the target content, bringing about a focus on long-term retention. One of the students shared a similar idea where he mentioned,

> "Leaning happens whilst doing the activities or tasks required for the project, the blending of prior knowledge and new knowledge creates a rigid development of ideas. The project adds dimension to the subject matter, as it becomes an experiential task. The struggles of a project and the physical engagement ensure that I not only remember the concepts but have a deeper understanding as I am engaged with it on a physical and mental level." (Interview # 7, 23.04.2021)

One of the students highlighted how working on projects are more beneficial in learning how theoretical knowledge is applied in real life compared to only reading books (Interview # 8, 23.04.2021). It was also mentioned by one of the teachers (Interview # 5, 1.04.2021) that

educational activities in PBL can go beyond predefined curricula and can encourage learners to play a more positive role by working on projects through independent reading, researching sources, preparing reports, making models, performing experiments, cooperating with each other, and presenting their work in front of a live audience. Moreover, as students are engaged in tasks that require critical thinking skills, it helps them with prepare themselves for external assessments which are designed to test their theoretical knowledge based on their practical application. One other student (Interview # 10, 25.04.2021) mentioned that working on projects made the subjects more interesting and dynamic and provided a source of motivation to not just focus on the theory but also learn about the real-life applications of the theoretical knowledge. Similarly, another student mentioned "Working in a project helps me visualize all the possibilities, it stays in my mind permanently without any further hard work. It helps me understand a topic very quickly and effectively." (Interview # 11, 25.04.2021)

Hence, it can be deduced that the primary aim of using PBL is to ensure student engagement where students themselves should be able to understand and define their learning goals and outcomes. So, according to the interviewees, PBL helps generate independent learners who learn to deal with real life issues using more practical approach and hence, gives rise to responsible and respectful global citizens. They also believe that the use of PBL adds excitement and motivation to learning subjects which otherwise students would find dull and uninteresting. They also mentioned that PBL provided them with opportunities to apply the taught materials which proved to be very interesting and informative and also helped them tackle questions in their assessments that require critical thinking.

4.3 Implementation of PBL in the Teaching-Learning Process

4.3.1 Pre-preparation Stage of the Project

The implementation of project-based learning takes place in several steps. One of the academic coordinators stated that

> "The project-based learning (PBL) stems from the idea that a problem is put forward to the students and they get to solve the questions by employing the domains of researching, team work/collaboration, communication etc. In reference to that, a simple day to day problem or even a social problem is put forward to them; teachers guide them to move along their path in search for answers." (Interview # 13, 24.08.2021

Therefore, designing interesting and meaningful driving questions is crucial to ensure a productive outcome from the learning process. One of the teachers said that questions are designed based on students' prior knowledge and the requirements of the course (Interview # 2, 5.03.2021). Another teacher mentioned that "Some of the questions test their subject knowledge. However, most of the question are designed from real life scenarios where they have to show their ability of applying the theories learned." (Interview # 6, 10.06.2021) Similar idea was shared by another teacher who said "Based on the learning outcome, the question has to be designed so that it has to be purely an application based question, the basic, you know, what is this, how is this? It is not generally asked most of the time. You will notice that the questions have a real life situation." (Interview # 4, 28.03.2021) The interviewee also shared that for Theory of Knowledge or TOK course, one of the key components of both grade 11 and 12, which is about the process of knowing rather than just learning required information, questions such as "How do you know?" is explored.

However, one teacher gave insight into a different approach where the students are not given any set question, but rather set objective which the students must be able to explore and share their

findings (Interview # 3, 6.03.2021) He also mentioned that in order to meet the requirement of the curriculum, the students are also given the freedom explore their topic of choice and design their own research questions as per the curriculum mandated guideline. He went on to add information about Extended Essay, which is another core component where the students are prompted to carry out a project on their own topic of choice in relation to one of the 6 core subjects. Similarly, one of the students also added that students are free to select the topic of their project within the given parameters and by doing that they design their own driving questions (Interview # 7, 23.04.2021). Another student provided more information saying that,

> "For the Theory of Knowledge (TOK) course, we have to come up with our research question according to the guidelines of our TOK essay and TOK titles and all the other components of theory of knowledge. We also have to work on extended essay which also requires us to derive our own research questions." (Interview # 8, 23.04.2021)

According to the participants, the driving questions must reflect real-life situations and problems which would prompt the students to apply their theoretical knowledge in order to design the project. The data also suggests that while students are working on core components like TOK and Extended Essay, they are required to design their own research questions for their selected topics.

4.3.2 Planning and Preparation of the Project

Planning is the next vital stage in the implementation process. "Students go through the completion requirements, plan the process, have discussions, present the final product, and finally reflect on their result and overall work." (Interview # 2, 5.03.2021) Another teacher said "Mostly I would say that we highlight the objective as per the topic under discussion. We do a short briefing on what steps to be followed to reach the goal, and the necessary troubleshooting

as it progresses." (Interview # 3, 6.03.2021) Similar view was shared by one of the other teachers who said,

> "There are several steps actually. First, I introduce the problem to them. Then I need to explain the project, set goals for them and inform them about their tasks. Here I have to emphasize on the importance of taking responsibility. I need them to feel that they have a responsibility and they are in-charge of their education." (Interview # 5, 01.04.2021)

Another teacher highlighted how students make their own independent decision on how to complete the project within the limitations of the resources that are provided and the requirements stated in the rubric (Interview # 3, 6.03.2021). One of the academic coordinators gave a detailed explanation of the process through an interesting example. He said,

> "For instance, in a class one student might have caught flu and can be absent. Later, teacher asks the students to know more about the cause of the illness or why that particular student fell sick. Thus, forming small teams/groups; students work among themselves collaboratively. They research on what are viral infections, way they are spread and how can it be prevented; are done among themselves. Now, through collaboration and communication they make posters, presentation and dummy models in an attempt that they convey their learnings to usual people who are yet unware. The end result is all students are aware of diseases related to flu and its preventions as well as the remedy." (Interview # 13, 24.08.2021)

One of the students also mentioned how they are involved in the planning stage by saying "There are briefs which advise us on how to best proceed, but they are mere suggestions. Based on the nature of the deliverables, students often devise their own procedures which work best with their skills and schedule." (Interview # 7, 23.04.2021) Another teacher mentioned that students are provided with rubrics that allow them to design their plan (Interview # 4, 28.03.2021). She went on to elaborate that,

> "Based on the rubric, students have to prepare their plan and work on the proposal for their project. After they receive feedback, they talk about the methodology and implementation procedure. They finally talk about the next step which is analysis, inferences, and finally the conclusion and limitation of the project. These are the standard steps and everything is done by the students." (Interview # 4, 28.03.2021)

Similarly, another student went on to explain in detail how the project planning is done and executed by saying,

> "So we have to get together and decide on what we want to focus on. We usually discuss with our teacher and as a group we decide what our next steps would be. We have to keep the rubric in mind which basically tells us what is expected from us. We have meetings with our supervisor on a regular basis. This usually happens when we're working on Extended essay. It's an individual project that we have to start working on from grade 11 and finish at 12. So we meet with our supervisor to discuss the research questions and then we need to come with our strategy to move further in the project. We also get frequent feedback but our teachers never really tell us what we should do. Rather they guide us. The final product of the project differs from subject to subject. Sometimes it's a research paper, sometimes is a model of something. We have to present in front of our peers and teachers." (Interview # 10, 25.04.2021)

Another student shared similar information stating that,

> "We discuss with teachers and group members about the scope of the project. Depending on the type of projects and the activities involved in it, we come up with possible procedures. By discussing the pros and cons of all procedures, we select the most effective procedure to complete the project. The basic steps that we follow to complete our projects are: we identify the problem, we set and prioritize goals to solve the problem, we create the project schedule, we initiate the work, we identify issues while doing the work and try to solve it experimenting different processes, and we collect our findings and structure those in a presentable way. With these, we are able to complete our project." (Interview # 11, 25.04.2021).

According to the data, the teachers provide guidance to students to design their own planning in order to complete the project. As part of the guiding process, teachers provide students with rubrics which lets them know what is expected from them. However, the planning is mostly done by the student after it has the been thoroughly discussed with their peers and teachers.

The students who were interviewed provided detailed information about the steps that they follow to complete their project. One of the students mentioned,

> "Each project is unique in its own way. However, this is generally how I like to proceed. First, I break down the task and its requirement, then I try to fully understand what is expected, then I plan for the deliverables and break them down further to create internal deadlines, next is the crucial part this is research, then I plan the deliverable structure,

> next I review and revise my work with my peers and finally I present my work." (Interview # 7, 23.04.2021)

Another student elaborated on the steps she follows for working on two of the core components, i.e. Theory of Knowledge and Extended Essay. She said,

> "For theory of knowledge we have to come up with a real life situation. Then we have to talk to our TOK teacher who taught us what theory of knowledge was about and what we have to do as per the IB guidelines. After telling the teacher we brainstorm and talk about it and discuss what the topic is what we're actually going to do. Then we come to a conclusion to decide how the presentation is going to be like. We have to sit with our teachers from time to time, maximum 3 times and told them what we want to do. What they do is just tell us where the TOK comes in, where the IB components come in. Then we have to prepare for our presentation." (Interview # 8, 23.04.2021).

Similarly, another student also mentioned about the initial steps being discussion and brainstorming, followed by extensive research on the topic, all the while keeping in mind the rubric (Interview # 9, 24.04.2021). He also mentioned that they are required to speak to their teachers who tell them whether their approach is correct or not and then guide them accordingly, and finally they have to either write a paper, or do a presentation. Another student mentioned,

> "Well I start by doing my research about the topic and then sketching out a plan that I am going to follow to complete the project. Then I need to decide on what materials I am going to use. I need to keep checking the rubric to see if I'm meeting all the criteria. For group project, we have lots of discussions with our group members. It is important that we consider everyone's opinion and suggestion." (Interview # 10, 25.04.2021)

One of the other students also said that first they begin by identifying the problem and then they set and prioritize goals to solve the problem. They then create project schedule and eventually initiate the work. They identify issues while doing the work and try to solve them by experimenting different processes. Next, they collect their findings and structure them in a presentable manner (Interview # 11, 25.04.2021).

4.3.3 Teachers' Role in the Preparation of the Project

From the data collected, it can be inferred that throughout the process, a teachers' role is that of a supervisor who overlooks the entire process and provides students with the materials necessary for working towards the completion of their project. They are also responsible for monitoring students as they work, providing them with feedback and evaluating their work as they progress.

> "Students are helped with the freedom to choose their topic and approach to the topic. Teacher monitors the thinking process of the students through group discussions and helps linking to the main ideas where necessary, gives feedback to encourage, appreciate and improve students' participation. Students are given the expected criterion for each project-based tasks, visual aids, links for research if required, and rubrics for assessment tasks." (Interview # 1, 1.03.2021)

Another teacher mentioned "My role is to basically guide them and help them complete the project. I provide my students with websites, reference materials, previous researches so that they can study them." (Interview # 5, 01.04.2021) Similar idea was shared by one of the students where she mentioned,

> "They guide the thought process, teaching us how to think about the topic rather than exactly what to think. They remain impartial in what they suggest, but are helpful in teaching the tools we can use to come to a conclusion and have a more successful project. They provide us with instruction on the tools and approaches we can use to best attack the problem." (Interview # 7, 23.04.2021)

One of the academic coordinators also shared the same idea about teachers being guides. He said,

> "Teacher does not employ any direct form or lecturing or assessment of memorized content. Instead, teacher guides the students in helping them answer their own questions during their path of completing the project. The main benefit of this is that students are better prepared for life and solving real-life problems compared to the traditional method of education where remembering facts and information is given higher importance." (Interview # 13, 24.08.2021)

Another teacher highlighted how he personally likes for his students to work independently and do the troubleshooting by themselves while he intervenes to guide the students if they are completely off-track (Interview # 3, 6.03.2021). He also mentioned that the level of intervention varies based on students' ability and aptitude, and for his subject he provides lab equipment and simulation software. Similarly, another teacher also shared that since not all students possess the same abilities to approach the tasks that are given, some hand-holding is required (Interview # 4, 28.03.2021). She also added that a lot of different resources, reading materials, reference websites, and access to other previous students' work is given to students. Moreover, she said that emphasis is given on discussions that are held regularly to help students understand whether their procedure is correct or not. One of the student inferred that same saying "We have discussions with them where they guided us through the process and provide suggestions where we needed to keep us on track. The school provided us with the materials and we had the opportunity to use the library for research purpose." (Interview # 8, 23.04.2021). Similarly, another student also mentioned that teachers mostly act as guides by explaining the topics when needed and providing them with all the necessary resources like websites, previous project papers, reference materials and rubrics which helps them stay on track. Another student also said,

> "For any issues we have in understanding the topic, the teachers are always there to explain it clearly and repeatedly to us. They sometimes also give us random ideas that could be worked on for that particular project. If available, they show us models of previously done projects by the seniors. The teacher suggests a few YouTube videos, or topic related articles which they think should help us progress, however, they make sure it is us who are working with our designated members to collect the accurate information by ourselves, which helps us to utilize our true selves to the fullest, which of course is then rechecked by our teachers." (Interview # 12, 10.06.2021)

According to the research participants, the teachers remain impartial in what they suggest but are helpful in teaching the tools, provide necessary materials and act as guides so that the students can reach the conclusion and end up with a successful project.

Monitoring students as they work is also an important part of the project-based teaching-learning process. “Entire task is divided in segments where teachers are informed of learner’s research, planning and presentation through individual/group discussion, jotting down ideas, planning and making drafts, proof reading the drafts and making the final presentation (Interview # 1, 1.03.2021). Another teacher mentioned about the use of process journal which is maintained by the students. She mentioned that,

> “The process journal gives their day to day work on that particular project, whether it's an extended essay or a personal project, that process journal tells the teacher what exactly they’re doing and what are the innovative areas of the resources they've gone through and how are the proceeding and what is the line of thought. And the process generally includes the websites, articles, magazines, which they're referring. It also has mind maps of the particular topic they're planning. And so it helps us understand how the student has been proceeding with his work or about his authenticity and his thinking process.” (Interview # 4, 28.03.2021)

Another teacher mentioned about the use of rubric and also the process journal to track students’ progress (Interview # 5, 1.04.2021) One other teacher informed about the use of technology saying “I make use of technology, for example: Google Doc/Sheet/Slides, Padlet, ManageBac help me to monitor my students' progress constantly.” (Interview # 2, 5.03.2021)

Providing feedback to the students play a major role in ensuring the success of the teaching-learning process. “Giving feedback teachers focus on students' understanding of the concept, proving evidence to support their ideas and their abilities to reflect on the discussed topic to bring conclusion to their tasks.” (Interview # 1, 1.03.2021) Another teacher added,

> "At the end of the day students' work needs to meet the requirements stated in the rubric since they are scored according to the criteria mentioned in the rubric. So, we can only provide feedback to improve students' work and that improvement needs to match the rubric. That is our feedback. We are not allowed to say the thing that needs to be done." (Interview # 4, 28.03.2021)

One of the students shared the same viewpoint where she said "We have meetings with our teachers where we share with them what we want to do and what they essentially do is, rather than tell us what to do, they just want to show us where does the theory of knowledge come in." (Interview # 7, 23.04.2021). Another student mentioned that for personal projects students are required to meet with their supervisors at least a minimum of six times as per the IB requirement and during those sessions they are expected to share their plans and what they have done so far and according to that students would get the feedback (Interview # 8, 23.04.2021). Another teacher shared that,

> "I ask them questions to understand how strong their conceptual understanding is. I mostly give the feedbacks based of their progress according to the rubric and let them know how they can improve their work and meet the requirement. I also encourage students to accept feedbacks and criticism from their classmates after they have presented their work. I believe it helps them grow as human beings." (Interview # 5, 01.04.2021)

One of the other teachers also mentioned that she provides constructive feedback to students so that they can do self-reflection in order to bring productive changes to their work (Interview # 6, 10.06.2021). Similarly, a student also shared the same by saying "They give his verbal feedback based on the criteria set for task completion. I go through the feedbacks I receive and try to reflect on my work to see if I can make it better. I try to apply different ways." (Interview # 9, 24.04.2021) Another student said,

> "It is obvious after weeks of hard-work no one would want to hear a negative comment. However, it is necessary to work on our flaws. Which is why most of our teachers came up with an interesting idea of making the students criticize the projects of other groups, often with a question answer session, to which the teacher adds his or her points. This allows us to judge ourselves and at the same time work on the places we are going wrong, pointed out by the teachers." (Interview # 12, 10.06.2021)

The same idea was shared by one of the other teachers who mentioned she uses peer feedback to make her feedback sessions more interesting and productive (Interview # 6, 10.06.2021).

Therefore, according to the interviewees, the feedbacks given by the teachers are mostly based on the rubrics and they provide students with opportunities to reflect on their progress and shortcomings which would allow them to bring improvements in their work.

From what I have gathered through talking to the teachers, time management is a very critical area in PBL. One of the teachers said,

> "So this a very critical area actually and many students often don't realize it. Time management is a problem. So what we do is usually guide them to prepare a schedule which they must then maintain. We also give them reminders to stick to their timeline. We tell them if they are behind their schedule. Until now we have not seen anyone miss their deadlines unless there is an unavoidable circumstance." (Interview # 4, 28.03.2021)

Similarly, another teacher also mentioned that students are instructed to create their own time management strategies and to ensure that he instructs them to make sure of Gantt Charts (Interview # 2, 5.03.2021). Another teacher mentioned that each segment of the project has some deadline and students are made aware of meeting those deadlines (Interview # 1, 1.03.2021). She also mentioned that an appropriate lesson plan helps the teacher and students to be on time. One other teacher highlighted the importance of setting goals and prioritizing tasks wisely by removing non-essential tasks and planning ahead (Interview # 6, 10.06.2021). Similar thought was shared by one of the students who said that planning ahead and prioritizing tasks was crucial as they had many projects to work on simultaneously for different subjects, and it was required for them to set their own deadlines so that they could complete their work on time (Interview # 7, 23.04.2021). Moreover, since the tasks assigned to them involved a lot of research and critical thinking, it was crucial for them to spend a substantial amount of time completing each one of them.

4.3.4 Evaluation of Student' Work

Evaluation is one other very important aspect of PBL and through the data collected from the interview, it has become evident that it is an ongoing process that begins from the preparation stage and continues until the post-project stage, and in each of these stages students' progress is assessed using rubrics.

One of the teacher said,

> "A set rubric for each task helps the teacher know the progress of each learner that finally helps to understand the overall performance of the class. Students' personal evaluation of their understanding of the concept is an important tool to know their learning progress. This helps the learners know their improvement areas and informs the teachers to know the need of the learners improving/modifying the teaching approach." (Interview # 1, 1.03.2021)

Another teacher mentioned that,

> "We have to have discussions with them on a regular basis where we talk about their project plan and how they are going to go about completing the project. Like I said before evaluation is an ongoing process and it starts from the beginning. And for this we mainly use the rubric to track their progress." (Interview # 5, 1.04.2021)

Two of the teachers (Interview # 2, 5.03.2021) (Interview # 3, 6.03.2021) stated similar viewpoints about evaluation saying that the progress is evaluated based on the rubrics provided by IB and also through analysis of students' historical records. This helps them to assess the overall standard of the completed task. Another teacher also mentioned about the use of rubric but at the same time highlighted on the usage of formative assessments and ongoing interactions and observations (Interview # 6, 10.6.2021). Similarly, one of the students also shared that they are evaluated based on the rubrics which are provided to them prior to beginning their work (Interview # 8, 24.04.2021) She also mentioned that since they are evaluated at every step of the

process, it allows them to reorganize their approach and work towards modifying their project in order to meet the requirement posed by the rubric.

4.3.5 Factors for Successful Implementation of PBL

The participants, especially the teachers also spoke about conditions that are crucial and are to be met if project-based learning is to be successfully implemented. One of the teachers mentioned "The objective of project-based learning will fail if the teachers are not trained and efficient. Connection and knowledge of ICT is mandatory to effectively run project-based learning. It also requires willing learners to get the best of the learning outcomes." (Interview # 1, 2.03.2021) Similarly, a student also mentioned that students' ability to comprehend the tasks and self-motivation is an important aspect for being able to participate and gain from project-based learning (Interview # 9, 24.04.2021). The same idea was shared by one of the teachers who highlighted that the only scenario where PBL will not yield effective outcome is if the student is not motivated to learn at all (Interview # 3, 6.03.2021) Another teacher said "This will not be possible if the students do not have a minimum level of prior knowledge, resources are not available and there are time constraints." (Interview # 2, 5.03.2021)

Although the teaching-learning approach at question is student-centred, it is crucial that the teacher is well-prepared. One of the academic coordinators highlighted the importance of teachers' readiness by saying,

> "I think teachers need to give themselves ample amount of time to research and develop what sort of projects are they looking to do in class, what goals will be met by these projects and how will students approach such projects. These transformative teaching techniques required deep knowledge of what student based learning entails, a good understanding of a student's psyche, and ways to help students through all problems they can face." (Interview # 14, 24.08.2021)

Similar opinion was also shared by another academic coordinator who stated the following.

> "The teachers would need to possess a detailed knowledge of the projects that students will be assigned. This is very necessary as the students would need guided feedback from the teachers at one point or the other. Also, they must know how to take the students or guide them in the right path of their research. In this regard, teachers must prepare short activities which keep the students inspired, enthused and facilitate thinking. Lastly, they must be excellent time managers so as to allow students to explore more of the project within the time required." (Interview # 13, 24.08.2021)

4.3.6 Students' Opinion of PBL

As part of the investigation, students were asked if they prefer this teaching-learning approach to traditional approach. One of the students said "Yes I prefer this. It makes education more lively and relevant" (Interview # 7, 23.04.2021). Another student said "I prefer this since I've always attended IB schools." (Interview # 9, 24.04.2021) One other student elaborated on his experience by saying,

> "This approach definitely. Before coming to this school I was in a different school where the teacher would always give lectures and we would have to take notes and later sit for tests. I always found it very difficult to concentrate and end up getting in trouble. But the way that these teachers teach has really helped me realize my true passion for learning. Working on projects made subjects more interesting and dynamic and also motivated me to not just focus on the theory but also learn about real-life applications of what we learned." (Interview # 10, 25.04.2021)

However, a comparison was made by one of the students (Interview # 8, 23.04.2021) where she stated her experience as someone who is taught through PBL and her friend who studies in a school that follows mostly lecture-based approach due to the requirement of the curriculum. She highlighted how different the teaching approaches and the requirements of the curriculum were. Where she was expected to present work on an extended essay which is an independent project besides preparing for external assessments for the six subjects, her friend had to only focus in studying specific subjects for the external exams. She concluded by saying that having to undertake many projects wasn't easy and therefore she often felt pressured.

4.4 Development of Skills in Students Through PBL

The participants discussed how, through the use of project-based learning, learners learn to become independent and responsible. “Project-based learning is an effective learning approach that helps growing independent and responsible learners. In the process of this student-centred learning process, learners take the agency making learning convenient and timely.” (Interview # 1, 2.03.2021) Another teacher highlighted,

> “This approach actually allows the students to take charge of their own learning and they are able to generate their own knowledge. This way they are able to remember things for a longer period of time. Students learn to ask meaningful questions, which is an important skill to have, and look for answers and solutions. It helps them develop critical thinking skills. And since they are made to work together most of the time they work in collaboration which is good for their social skills.” (Interview # 5, 1.04.2021)

Similarly, another teacher mentioned that students develop a lot of skills such as research skills, communication skills, thinking skills, social skills, making skill development one of the primary aim of project-based learning (Interview # 4, 28.03.2021). The same idea was shared by one of the students who said,

> “I think I have developed good communication skill as we have to interact very frequently with my classmates and teachers. I also have become better at analysing and approaching any subject matter more critically. I have also become better with my creative skills. In this new era, I think these skills are quite important especially once I move into the actual world and start taking up big projects where I have to collaborate with many people.” (Interview # 12, 10.06.2021)

The other students also shared similar thought on the skills that they have developed through this teaching-learning process. One of the students said,

> “I have developed interpersonal skills, time management, writing, using persuasive language, and in comprehending information. I have also developed problem solving skills and critical thinking. I use these skills in every aspect of my life and approach issues more methodically and work more effectively.” (Interview # 7, 23.04.2021)

Another student emphasized on the development of research skills saying,

> "Project-based learning has helped me develop research skills. I see a lot of my friends from other schools who struggle to ask the right questions and are often unable to clarify themselves, but for me these things come naturally. I am able to interview people with ease and initiate meaningful conversations. I believe the social skills that I have acquired will help me when I go for higher studies since that would include a lot of research work. I have also developed multitasking skills which I believe will help me in my professional life." (Interview # 8, 23.04.2021)

One of the students also said,

> "Well, the skill that I have mastered would be public speaking. Since for the projects we always had to have discussions and present our findings to our peers and supervisors and also do presentations or make videos, speaking confidently was something we had to work on. So public speaking was a huge component. Also, since we have to work on simultaneous projects for different subjects, developing good time management skills was crucial. Delegating tasks and working collaboratively are some of the other skills that I have gotten good at, especially since we often have to work in groups. I believe these skills will help me when I go for higher studies or when I go onto working and managing real life projects." (Interview # 9, 24.04.2021)

Another student mentioned when asked about skill development,

> "Many I would say! Since we work in groups I think I'm a better team player then I was before. I interact more with others now and do not hesitate to ask questions. In fact, I can ask more meaningful questions now. I have become more outspoken thanks to all the presentations and public speaking. Oh and I have also become better at doing researches. I'm sure when I move onto my university I will be needing this a lot. Not just in university but also in other aspects of my life. My parents have seen a good change in me since I have joined this school." (Interview # 10, 25.04.2021)

One of the other students focused on the development of decision making skills saying,

> "While working on projects I have had to take many decisions that had immense impact on the outcome of my work. So I would say that taking decisions effectively has got to be an important skill that I learned. Also, as we had to work on many projects together with others, I think I have developed good leaderships skills and also learned to better myself in terms of working as a team. Hopefully, I can utilize these skills to solve problems which I face in everyday life without feeling cluelessness." (Interview # 11, 25.04.2021)

Therefore, according to the teachers and students who were interviewed, project-based learning helps in the development of many skills, especially communication skills, collaborative skills, critical thinking, problem-solving, research skills, creativity and decision making skills which are

some of the 21st century skills that are important for individuals to acquire in order to succeed in life.

4.5 Challenges Imposed by PBL and Ways to Overcome them

The academic coordinators highlighted some of the challenges that educators face while implementing PBL in the classroom. One of them emphasized on the limitation that educators face in terms of time (Interview # 13, 24.08.2021). Another important aspect that he mentioned was the fact that teachers needed to provide proper guidance to the students which is crucial in order to ensure that students do not go off-track. They also need to ensure that students get to meet all the literacy and numeracy skills by the end of their project. According to the interviewee this problem can be overcome provided that the teachers make thorough and updated study on the project as the knowledge keeps getting updated and doing so would allow them to provide the right feedback or guidance to their students when required.

He also added, "Assessing individual progress of students remain a great challenge as the rubric must be followed strictly. Also, it must be identified about the magnitude of contribution done by the student within the group". Therefore, to overcome this, he suggested the following,

> "Also to ensure the individual student progress, a tracker or learning diary of a student needs to be administered. In addition, each student must be monitored and formatively assessed during activities designed. Activities must be very meticulously thought out so that the targeted literacy and numeracy skills are acquired by each of the students." (Interview # 13, 24.08.2021)

One of the other academic coordinators mentioned that teachers may find it difficult with getting students to accept bring in the driver of their own learning as not all the students are ready to take that responsibility (Interview # 14, 24.08.2021). According to him, this challenge can be eliminated if the students are convinced that the project is not like traditional learning and it is up

to them to control the pace of their learning as well as its quality, and that there is a visible outcome to these projects. This might effectively increase their interest. He also added, “One way of doing it can be to make the projects more accessible to the public, and for industry experts to come in and motivate students on the necessity of being the driver of their own learning.” He went on to saying that,

> “Secondly, students must be given all decision making power and be active learners in this approach. They should be allowed to express themselves how they see fit, form groups and play roles hey are comfortable in, and also maintain their own schedules. Teachers should not impose their own will on the students learning, but should just direct them whenever necessary.” (Interview # 14, 24.08.2021)

Another important aspect that he shared was regarding situations where there is more than one teacher responsible for a subject. He said, “Also, it could be difficult for subjects containing more than one teacher to offer project based learning if all these teachers are not on the same page with all matters, do not see eye to eye on how to approach the project and also do not derive the same value from it.”

According to one of the academic coordinator, challenges were not only in regards to teachers and students, but parents as well. He stated,

> “Lastly and most importantly, our parents are not aware of the qualitative assessments and reports for their wards. They are more inclined in measuring the child's progress in terms of the marks attained. It is hard to explain to them about the child's progress in terms of learning through qualitative review.” (Interview # 13, 24.08.2021)

In order to overcome this problem, he believes the following might prove to be useful. “Lastly, more informative and discussions must be held with parents in order to educate them about this system of education and its benefits in the long run. Once, parents understand the true meaning of it; they will start to accept this over the content-based education system.”

Chapter 5

Discussion and Conclusion

5.1 Introduction

The research papers and articles that I read on project-based learning has allowed me to develop a strong understanding of this teaching process. However, conducting a research myself to learn its current practices in Bangladesh and how this particular technique is helping students learn has given me the opportunity to increase the depth of my knowledge. It has allowed me see and perceive the notion through the eyes of a teacher and a learner and appreciate their effort to a level unimaginable.

Project-based learning is not easy. It is one of the most sophisticated teaching-learning processes I came across. From what I understood by talking to the teachers, PBL requires a teacher to fully understand the content and design ways in which they can be presented to the learners in ways so that they can relate them to the actual world. In this setting the teacher takes the back-seat while the students take control of the steering to take their learning to the right direction. Does this mean that the teacher doesn't have any role to play? Certainly not. The teacher is in-charge of navigating the students through the ups and downs and guiding them into the right direction. In order to make this ride as smooth as possible, an effective planning is very crucial.

In order to learn more about the process and how PBL is implemented in the classroom, I had the opportunity to speak to individuals who are experts in their field of education and have experience teaching using the International Baccalaureate program. I also had the opportunity to speak to students and learn from their experience. Interviews were conducted to gather data from teachers and students.

The main purpose of my research was to study the current practices of project-based teaching-learning in the higher secondary schools and identify how this learning practice promotes students' learning. The results that I gathered indicate that project-based learning is an effective approach that allows students to take charge of their own learning process through the application of their knowledge to address real-life problems and develop essential 21st century skills such as critical thinking, problem-solving, and communication.

5.2 Discussion

5.2.1 Advantages of Using PBL

The field of education is constantly evolving with time. Innovative teaching techniques are studied to understand their usefulness in providing the best possible educational experience to students. Education is not only limited to the learning of concepts, but it is about how the acquired knowledge can be used in real-life situations. When I was a student, I remember asking my math teacher about the real life applications of trigonometry. I am certain that this is true for other learners too who at some point in their educational career has questioned their teachers about the importance of what they are learning. Failing to see what they can gain from their knowledge makes them lose connection with what they are learning, which eventually leads to demotivation and causes the learner to lose interest.

Hence, the teacher finds themselves asking "How can I motivate my students and get them excited about what they are going to learn?" Based on the outcome of my study, I believe introducing a realistic setting where learners can apply the skills they are learning to solve a real-life problem can help them find that connection and also construct new knowledge through the use of multiple sources, discussion and creation of something that is their own.

My data concludes that project-based learning is a student-centred teaching-learning process that helps in the development of independent learners who are motivated to investigate and address real-life problems. The whole process not only makes the learning more practical, giving students the opportunity to relate and apply their theoretical knowledge to practical problems, but also at the same time helps them acquire many essential skills in the process. The PBL approach used by the teachers is a means to make students life-long learners by making them take responsibility of their own learning by engaging in activities that requires investigation, research, experimentation and collaboration with other individuals. It is also seen to foster students' educational growth by enhancing their motivation and interest in the subject matter. One of the research findings states that PBL makes teaching and learning more interesting and enjoyable, hence increasing students' motivation to employ creativity in project implementation and also completing schoolwork (Ningsih et al., 2020)

Therefore, the main purpose of using project-based learning approach is to create an opportunity for the learners to develop themselves as self-motivated individuals who are capable of taking responsibility of their own learning through working on projects which require them to be apply their theoretical knowledge to address real-life practical problems.

5.2.2 Use of Authentic Problems and Questions

In order to fulfil the purpose of effective project-based learning, it is crucial to ensure that it is properly implemented. From my research it was found that the basic structure that is followed by the educators in order to implement PBL in the classroom, first, involves the introduction of the problem or the research topic. This is done through the introduction of a driving question which is open ended that addresses real-life situation and is thought provoking. The questions are also

designed to meet the requirements posed by the curriculum in order to fulfil the learning outcome. One of the keys to setting up an effective PBL is to pose an authentic question or task to the students which is relevant to the curricular goals and would allow the students to explore multiple possible outcomes, solutions and product (Horpyniuk, 2015). It was emphasized that often times there are no set questions but only set objectives which students are encouraged to explore and then present their research findings. As per the requirement of the IB curriculum, for one the core elements that students have to complete throughout grade 11 and 12, Theory of Knowledge (TOK), students are prompted to design their own research questions according to the provided guidelines which basically leads them to answer the question – "How do we know?" This allows the students to relate their learning to real life problems which increases their inquisitiveness and also ensures that the knowledge acquired through this is retained for a longer period of time than it would have been if the content was simply taught in the class. For another core element, which is Extended Essay, students are given the opportunity to investigate a topic of their choice which they must relate to the subjects taught at school. Therefore, for these two core elements, students are driven to design their own research question and explore the topic extensively. They then communicate their ideas and work on developing an argument for their hypothesis.

5.2.3 Students' and Teachers' Role in the Implementation Process of PBL

It has been found that once the driving questions are introduced, extensive discussion is essentially held where the objectives of the project are highlighted and students are briefed on the steps that are to be followed in order to complete the project according to the set rubric. Depending on the type of project, students either work alone or in groups where they are encouraged to design a plan of action through brainstorming and conducting researches using the

various resources provided by the teachers. Working in groups allows the students to develop healthy communication and collaborative skills and they learn to think critically and use their strengths and knowledge to work through the project. It is understood that learners are given complete freedom to decide how they want to complete the task, provided they meet the requirements posed by the rubric that is shared with them. It is crucial to allow the students the freedom for their choice and voice about how they want to use their own ideas in designing their project (Aldabbus, 2018). This allows them to take charge of their own learning which helps in the development of their confidence.

In the research paper titled "Motivating Project-Based Learning: Sustaining the Doing, Supporting the Learning" the author highlighted the role of a teacher in PBL by saying "In project-based education, teachers need to (a) create opportunities for learning by providing access to information; (b) support learning by scaffolding instruction and modelling and guiding students to make tasks more manageable; (c) encourage students to use learning processes; and (d) assess progress, diagnose problems, provide feedback, and evaluate overall results" (Blumenfeld, et al., 1991) My research revealed that throughout the implementation of PBL, the teachers act as supervisors who provide students with necessary resources such as case studies, reports, etc. and overlook and evaluate students' progress according to the project design rubric. Meanwhile, students are given complete freedom to carry on their work how they see fit and the only time the supervisor intervenes is when the student deviates from their intended path, and the level of intervention mostly depends of the students' ability to re-evaluate their choices and skills. The supervisors also keep track of students' work and progress using the process journal that students use to record their methodology, all the information they gather for the purpose of the project, and their overall progress. The use of different digital tools to monitor students'

progress is also practiced by the educators making the process more efficient and effective. They also monitor students' thinking process and during their regular meetings, provide constructive feedback to the students which allow them to reflect on their work and re-evaluate their approach if needed in order to meet the goal, thus helping them develop analytical and problem-solving skills. At different stages, students come together to share their views and ideas with their supervisors and classmates by providing them with details of their findings and the hypothesis they have applied to reach the conclusion. Learners have frequent meetings with the supervisors where they provide detailed explanation of their project focus, their findings, and the principles and concepts that they have used during the project. This also creates a scope for the supervisors to highlight ways in which students can bring improvements in their work through scaffolding as per the requirement of the rubric. In order to promote higher-order thinking, it is important for teachers to remain active with their students and constantly encourage them to analyse data, synthesize information, and evaluate their work and provide justification of their claims (Grossman et al., 2019). These informal measures allow the teachers to provide guidance and feedback to students in a much more effective way compared to typical standardized test or workbook activities which focuses mainly on the low-level comprehension and is inappropriate for examining long-term and short-term benefits of PBL (Blumenfeld, et al., 1991).

The evidence gathered from educators and learners show that while working on projects, students develop one of the most important 21st century skills - time management. As the completion of the project is determined by the completion of several tasks within the project, deadlines are provided for those which helps students to plan their own project time line and stay on track. As students are required to simultaneously work on multiple projects for different subjects, it is critical for them to develop effective time management skills to ensure successful

completion of the assigned tasks. Once the project is complete, students are given the opportunity to represent their learning through a model, research paper, multimedia presentations, print materials, performances, or a video blog, in front of their teachers, peers and sometimes external audience. This gives students a sense of ownership of their learning as the projects they work on require them to utilize higher order thinking skills to interpret data, draw conclusion and apply their existing knowledge.

5.2.4 Self-assessment by Students in PBL

It was observed through my study that a lot of emphasis is given to self-assessment in the project-based teaching learning approach, hence, the use of rubrics at every stage of the learning process. The rubrics act as a self-assessment tool for the students to see how they have progressed and how well they are doing to qualify their project as a standard one. They allow the students to visualize their goal, and helps them to assess their own performance during the assignment which, I believe, adds an important dimension to their learning. Through the use of rubrics, students are directed towards self-evaluation of their findings, reflection on their learning, and generation of effective strategies to further their progress which is a clear indication to students being trained to become independent life-long learners. In a paper titled "Student Self-Assessment: The Key to stronger Student Motivation and Higher Achievement" it was stated that "Students organize, evaluate, and internalize when learning and self-assessment is part of that process. They must connect new knowledge, understandings, and skills with what they have already stored and used. Self-assessment fosters' students' ability to make these connections themselves; provided a mechanism to enhance learning in meaningful, rather than rote manner; and results in greater student motivation and confidence." (Mcmillan & Hearn, 2008)

5.2.5 Prerequisites for Productive PBL and Challenges

The teachers who were interviewed sounded very positive and enthusiastic as they spoke about the subject matter. The teachers did agree that the implementation of PBL is not easy, especially if the teachers are not well-trained in this teaching-learning method. In order for teachers to become accomplished project-based practitioners, they must be able to focus on four primary goals: supporting deep disciplinary content learning, engaging students in authentic work, supporting student collaboration, and building an iterative culture where students are always prototyping, reflecting, redesigning, editing, and trying again (Grossman et al., 2019). Therefore, it is important that teachers receive proper trainings in order to be able to implement this teaching-learning process. The academic coordinators who are accustomed to working closely with educators and are aware of the teaching-learning practices being implemented in the classrooms also presented with the importance of teachers being equipped with proper knowledge to design and guide students throughout the process. Educators responsible for employing PBL in the classroom are trusted with the task of introducing projects that students would find having its place in the real-world which will boost their motivation to take drive their own learning. Moreover, teachers' inability to keep themselves updated could have an irreparable impact on students' progress as they will be unable to guide them and provide them with the proper feedback.

Moreover, since, PBL requires students to engage in extensive independent research, it is important that learners are proficient in the medium of instruction, which is English in this case. Therefore, inadequate language proficiency in learners has a critical impact on the outcome of PBL. However, according to my findings this issue can be addressed by providing ESL classes to help students attain that level of expertise so that they can fully emerge themselves in the

learning process. Another possible reason that could affect the outcome of PBL is if students lack the ability to comprehend the tasks and motivation. However, the element of choice that is offered in PBL and differentiation allows learners to develop their own interests and can help them engage in deeper learning, thus amplifying their intrinsic motivation (Bell, 2010).

Considering the fact that students need to engage themselves in investigative study to work on their projects and make use of various applications to present their final work, the use of information technology is embedded into the teaching-learning process, and I believe it is essential for teachers and students to be flexible in terms of learning to acclimate to new variations in information technology. Therefore, rigidity in learning to develop new knowledge and skills in IT and inaccessibility to technology can result in ineffective use of PBL.

Besides schools and teachers, parents play a major role in a child's education. Proper support from them is essential in order for the teachers to ensure that learners are effectively involved and are progressing. The concept of PBL is still vague among parents and one of the reasons why PBL is not widely implemented is because of lack of support from parents. As they were taught in a more traditional approach, they are not acquainted with the new pedagogy (Boss, 2001). Therefore, they still are mostly inclined towards their child's marks rather than focusing on the qualitative assessment reports which gives them an overview of their advancement. Hence, in order to implement PBL successfully it is vital for the parents to be on board. They may have many questions concerning whether students learn enough through PBL, how it affects their scores, and if students will still learn the basics ("Building parent support for project based learning," n.d.). Therefore, building proper parent and community support for PBL through informative sessions and discussions could help parents understand the impact PBL has on students. It will allow them to see that alongside gaining subject-area knowledge and skills,

through PBL, students will develop critical thinking, problem-solving, and creative skills as well which are essential in joining the modern workforce ("Building parent support for project based learning," n.d.).

5.2.6 Effect of PBL on Learners

The students also sounded very optimistic and satisfied with the project-based learning approach considering how much they have been able to acquire through the way they are taught and the skills they have developed through the process. They spoke very fluently with confidence and were able to deliver their thoughts and their experience in a very organized manner. Their ability to communicate with such confidence might be a result of the impact that PBL approach has had on their personality development. The learners were easily able to identify their strengths and how they aim to utilize the skills they have acquired through their study in the future. However, a different perspective was brought to light regarding the pressure that is created due to the number of projects that they are having to invest on simultaneously throughout the school year for different subjects. Therefore, there is scope for a further study to see how teachers can collaborate among themselves to address learning outcomes for different subjects through common projects, hence minimizing the number of projects for students.

5.2.7 21st Century Skills Development in Learners Through PBL

Based on the data collected from the educators it can be deduced that the projects that are introduced to students add dimension to the subject matter. They not only help students retain the concepts but allows them to get a deeper understanding as they are involved in the development of knowledge through hands-on activities. As per the IB curriculum, the Theory of Knowledge (TOK), one of the core elements that is covered throughout grade 11 and 12, allows the students

to develop awareness of the interpretive nature of the knowledge. It also allows the students to be mindful of themselves as critical thinkers so that they can apply their knowledge with integrity. Another core element, the Extended Essay, offers students the opportunity to develop practical skills to take on undergraduate research in the future. As students are extensively involved in research work through these projects, they learn to pursue solution to problems by asking and devising their own questions, debating ideas, making predictions, designing plans, collecting and analysing data, drawing conclusions, and communicating their ideas and findings with others. Therefore, apart from these, through actively taking part in PBL, students develop important life-skills such as delegating tasks and working collaboratively while working in groups, effective communication skills through extensive discussion, investigative skills that allow them to ask probing questions, creativity, critical thinking, and decision making skills.

The development of creativity in learners is supported in one of the research papers titled "Effectiveness of Using Project-Based Learning Model in Improving Creative-Thinking Ability" where it is mentioned that in the study carried out to see the difference in creative thinking skills between the experimental class students (students who were examined using PBL) and control students (students who were examined using conventional lectures), it was observed that the increase in the ability to think creatively was higher in the experiential class than the increase in the control class (Ningsih et al., 2020)

Most of the 21st century skills that are developed through PBL are not measurable, but they will allow the learners to become productive members of the society. In the research paper "Project-Based Learning for the 21st Century: Skills for the Future" researcher Stephanie Bell said "In the future, children must enter a workforce in which they will be judged on their performance. They will be evaluated not only on their outcomes, but also on their collaborative, negotiating,

planning, and organizational skills. By implementing PBL, we are preparing our students to meet the twenty-first century with preparedness and a repertoire of skills they can use successfully."

A research conducted on the topic "Student-Centred Learning and Current Practice in Bangladeshi College Education" stated that the current teaching practice in Bangladesh is less productive in the long term as it is seen to have a negative impact on the development of students' creativity, and their ability to reflect and discover their true potential and that a paradigm shift from teacher-centred learning to student-centred approach is what we need to introduce in our education system (Faruki et al., 2019). Project-based learning which offers student-centred approach holds the key to changing this situation. Therefore, understanding the current practices of PBL can help develop ways in which it can be incorporated into our teaching system to bring about necessary changes for the overall development to students' learning. Maintaining a low teacher to student ratio, providing necessary resources, and training teachers to familiarize them with the pedagogical approach to PBL and its application in the classroom are, therefore, essential prerequisites.

5.3 Conclusion

The study sought to find out about the current practices of project-based teaching learning in higher secondary schools and how this learning practice promotes students' learning. For the purpose of my study, a school that followed the International Baccalaureate (IB) curriculum was selected as the research site and the teachers and students who were in this school were selected as research participants. This school not only follows this teaching practice for their higher secondary level of education but also for their primary and middle year students.

In order to collect data for the research, interviews were conducted with these participants. The data was analysed to reveal the purpose behind using PBL in the classroom, the implementation process of this teaching technique, designing of the driving questions which is one of the essential elements of PBL, the planning and completion of the projects, teachers' role in the whole process, the way in which students are monitored and given feedback, time management, evaluation method, and development of skills in students.

Conducting this research has allowed me to shed light on how project-based learning is implemented in the classroom by introducing real-world projects to deepen students' learning which would consequently help students gain deeper knowledge of the content. This teaching-learning process is also seen to promote social learning where students become responsible, learn to set goals, become independent learners, and develop proficiency in 21st century skills of communication, negotiation, and collaboration which are crucial for future success.

Being a teacher I have always looked forward to using different teaching techniques in the classroom in order to engage my students in meaningful learning that would not only help them with retention of newly learned information but also use them in any given situation. Apart from excelling in their studies, I have also tried to ensure that they develop essential abilities such as problem-solving skills, collaborative skills, confidence and analytical skills. Having being introduced to project-based learning on a theoretical level, conducting a research to study about its real-life implementation allowed me to gain deeper understanding on its implications and usefulness in promoting students' learning. Therefore, I look forward to utilizing my experience that I have gathered through this study to bring improvements in my own teaching methods and share ideas with my superiors and the community to develop awareness, and hopefully bring prolific changes in the teaching-learning methods used in the institution.

5.4 Recommendations

The following recommendations and suggestions are made after reflecting on the results gathered through this research:

- Project-based learning should be introduced among schools through workshops and seminars. The school administration can be introduced to the teaching-learning process through seminars where they will be briefed on the requirements for successful implementation of the process and its long term effectiveness in creating lifelong learners.
- Teachers should be provided with proper trainings on how to apply PBL. Teachers can be divided according to the subjects they teach and focused training sessions can be organized to give them a thorough idea regarding what is expected from them and how they can develop themselves to meet the requirements of setting up an effective PBL classroom.
- The teacher to student ratio must be reconsidered for effective application of PBL. Although this is difficult in public schools, breaking down the class size and appointing more proficient teachers could address this problem.
- The school curriculum must be revised and designed to incorporate PBL. Diverting focus from assessing students' abilities only through standardized testing can bring considerable change in the curriculum.

Recommendations for Further Study

- Further research can be carried out to learn how project-based learning is implemented in primary and middle school levels. This will allow us to understand how young learners

are taught using this teaching method and how well they are able to get accustomed to the process and benefit from it.

- Another important study can also be conducted to see how teachers can collaborate among themselves to address learning outcomes through common projects, hence minimizing the number of projects for students.
- A thorough future study on the implementation of PBL during online classes that are being held during the Covid-19 pandemic would be beneficial, and a prospect of a different pedagogy may evolve.

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Appendix A. Consent Letter

Institute of Educational Development, BRAC University
Master's Thesis Program
MEd in Educational Leadership & School Improvement

Consent Letter

I am Fatema Tuz Zohora, MEd. student in Educational Leadership & School Improvement at BRAC Institute of Educational Development of BRAC University. A research-based Master thesis will have to be submitted to my thesis committee as part of my obtaining the degree. You are invited to participate in a study titled **Project-Based Teaching-Learning in Promoting Students' Learning in the Secondary Level of Education**. The purpose of this proposed qualitative study would be to identify how students' performance and motivation relates to the instruction methods that are implemented in the classroom. As the education system and the approaches are always changing based on the needs of the 21st century, it has become crucial to learn about the different techniques that are implemented by the teachers.

You have been chosen as a possible participant in this study. I will interview you to know your views on the issue, and your experiences about the matter with the students as it will contribute to the study a lot. Probably, it will take around an hour. There will be no monetary compensation for your participation. There is no identified risk from participating in it.

The researcher will maintain the confidentiality about your identity. Any information that is obtained in connection with this study and that can be identified with you will remain confidential. The researchers named below will be responsible to ensure the protection of the information.

If you are willing to participate in this research, we would request you to sign this consent form. Your participation in this research is voluntary. Therefore, you may withdraw your participation at any time during the interview or later while the information is analyzed.

If you want to know more about this research or if there is relevant clarification that you may require, please contact the following persons.

Ms. Dilruba Sultana Research Supervisor MEd in Educational Leadership & School Improvement Address: BRAC University Email: dilrubaied@yahoo.com	Name of the Student: Fatema Tuz Zohora MEd in Educational Leadership & School Improvement Address: International Hope School Bangladesh Email: fatema.zohora@ithsbd.net Mobile: 01627324009

I have read the consent form or my acquaintance read it to me. I completely understand my rights about participation and am willing to participate in this research.

Name: _____ Signature & Date: _____

Appendix B. Interview Guide

Interview – Teachers

Topic: Project Based Teaching-Learning in Promoting Students' Learning in the Higher Secondary Level of Education

Brief Description of the Research: We would like know about the current practices of the project-based teaching-learning practices and how it's promoting students' learning.

Purpose of the Research: The purpose of this proposed qualitative study would be to identify how students' performance and motivation relates to the instruction methods that are implemented in the classroom.

Information about the participant:

- Name
- Teaching Experience
- Educational Qualification

1. What do you know about project-based teaching-learning process?
2. What do you think is the main purpose behind using this process in the teaching of science?
3. Have you received any professional training regarding the implementation of this process?
4. How is this teaching-learning process implemented in your subject area?
5. How are the questions designed in order for the projects to meet the students' learning needs?
6. What steps are followed in the planning and completion of the project?
7. How involved are the students involved in the planning?
8. What sort of assistance do the students receive from the teachers throughout the process?
9. What materials and resources are provided by the teachers?

10. How are the students monitored as they work on their project?

11. How are students instructed to manage their time as they work on their project?

12. What kinds of feedbacks are provided to the students?

13. How do the teachers evaluate progress and relate that progress to others?

14. How beneficial is this approach in the students' overall development?

15. Are there any situations in which project-based learning approach is not applicable?

Interview – Students

Topic: Project Based Teaching-Learning in Promoting Students' Learning in the Higher Secondary Level of Education

Brief Description of the Research: We would like to know how project-based teaching - learning practices are promoting students' learning.

Purpose of the Research: The purpose of this proposed qualitative study would be to identify how students' performance and motivation relates to the instruction methods that are implemented in the classroom.

Information about the participant:

- Name of the participant
- Age level

1. What do you know about project-based learning?
2. How do the teachers interact with you in the classroom?
3. How are the topics for the projects decided?
4. Are the projects that are assigned to be done in groups or individually?
5. How do you determine the procedure and steps that are to be followed to complete the project?
6. What are the steps that you follow to complete your project?
7. How do the teachers assist and guide you throughout the process?
8. What kind of resources do you receive from the teacher?
9. How is your outcome assessed by the teachers?
10. Do you get feedbacks from your teachers?
11. How do you reflect on your work to bring improvements in your project based on the feedbacks?
12. How do your teachers relate these projects to the learning topics?

13. How does working in a project help your understanding of the subject matter and overall learning?
14. Do you prefer this approach to learning or the traditional way? Explain.
15. What other skills do you develop when you work on the projects assigned?
16. How can you utilize these skills in other aspects of your life?
17. Is project-based learning used in specific subjects? If yes, then what are they? Do you think it should be used in other subjects as well?

Interview – Academic Coordinators

Topic: Project Based Teaching-Learning in Promoting Students' Learning in the Higher Secondary Level of Education

Brief Description of the Research: We would like know about the current practices of the project-based teaching-learning practices and how it's promoting students' learning.

Purpose of the Research: The purpose of this proposed qualitative study would be to identify how students' performance and motivation relates to the instruction methods that are implemented in the classroom.

Information about the participant:

- Name
- Teaching Experience
- Designation
- Educational Institution

1. How is project-based learning implemented in the classroom?

2. What do teachers need to do to prepare themselves and what skills are required to implement project-based learning?

3. What are the challenges and difficulties that teachers face while implementing project-based learning in school?

4. How can these challenges be overcome?