PEDAGOGICAL PRACTICES OF SCIENCE CLASSROOMS AT THE PRIMARY LEVEL OF AN ENGLISH MEDIUM SCHOOL IN DHAKA CITY.

By

SAYEDA NAZMUN NAHAR
ID: 19357006

A thesis submitted to the BRAC Institute of Educational Development in partial
fulfillment of the requirements for the degree of
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Submitted to:

Ms. Nazia Tasnim

Submitted by:

Sayeda Nazmun Nahar

ID: 19357006

Section-A

BRAC, IED

Declaration

It is hereby declared that,

1. The thesis submitted is my/our own original 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 have acknowledged all main sources of help.

5. Finally, I would like to state that, it is me who is to be liable for any errors and inconvenience.

 Student's Full Name & Signature:

_____

Sayeda Nazmun Nahar

Student ID: 19357006

Approval

The thesis titled "Pedagogical practices of science classrooms at the primary level of an English Medium School in Dhaka city".

Submitted by

Sayeda Nazmun Nahar

Student ID: 19357006

of Summer, 2021 has been accepted as satisfactory in partial fulfillment of the requirement

for the degree of Master of Education in Educational Leadership & School Improvement

on 30/07/2021.

Examining Committee:

Supervisor:
(Member)

_____
Nazia Tasnim
Research Associate (Faculty Member), BRAC Institute of
Educational Development

Academic Coordinator:
(Member)

_____
Mohammad Mahboob Morshed, Ph.D.
Assistant Professor, BRAC Institute of Educational Development

External Expert Examiner:
(Member)

_____
Sabira Sultana
Lecturer, BRAC Institute of Educational Development

Head of the Institute:

_____
Erum Mariam, Ph.D.
Executive Director, BRAC Institute of Educational Development

Ethics Statement

I hereby pronounce that, the research accessible in this paper is my individual work. The data collection process was conducted by the guidance provided by the BRAC Institute of Educational Development, BRAC University. The participants' consent was taken prior to data collection and confidentiality was maintained throughout the research work. My personal biases did not influence the data collection process and outcomes of this study. No living beings were harmed during the period of this research.

Sayeda Nazmun Nahar

Student ID:19357006

Abstract

The learning of the students inside a classroom depends a lot on the teaching techniques and methodologies used by the teachers. It is very essential to meet the intellectual demands of the new generation children and address to their interests with proper expertise to ensure effective learning. Through this research, the researcher wanted to explore the teaching techniques and the pedagogy of the science classroom inside an English Medium School. This is to understand the variety of techniques and materials they are using for teaching the students. By this study researcher wanted to find out about teachers' preparation for science teaching and about their perception. She also tried to discover the kind of trainings teachers receive and the challenges teachers face while executing the planned lessons, using the particular teaching methodologies. Therefore, the participants of this research were the science teachers of the English Medium School. During the research, in order to collect the data, the researcher used semi structured interview guidelines for teachers. Through purposive sampling participants were chosen. They were reached out via Zoom App and Phone-conversation. I analyzed the collected data through thematic analysis. Some of the key findings of this research are- teachers of the English Medium School use progressive teaching techniques that includes visual display, hands on activities, games, experiments. All these teaching techniques make the class more interactive. In terms of assessments they have a different kind of approach and they assess every aspect of a student's contribution including class participation and their active participation in several activities done inside the class. Through paper pencil assessments the students get analytical questions to solve them based on their acquired knowledge. They also receive several trainings every year to improve their efficiency, skills and increase their knowledge in the fields of lesson planning, classroom management, Information technology etc.

Another major finding is that, despite the teachers being very eager to conduct the class with

appropriate teaching techniques and methods, it is hard to manage time because of the class duration being 40 minutes and the class size being 25 students or more. Most of the teachers (participants) believe that they could do much more given that the duration of the class is longer.

Dedication:

This Thesis paper is dedicated to my father and mother for their immense support and inspiration. I thank my parents from the bottom of my heart for always believing in me through thick and thin.

Acknowledgement

It is an immense pleasure to thank my advisor Ms. Nazia Tasnim and the entire team of Faculty members of BRAC IED who have helped me to gather knowledge on this vast area of education. Without their help and guidance, it would have been difficult to reach here. My heartiest gratitude to all those mentors for their kind support during this study.

Sayeda Nazmun Nahar

Student ID: 19357006

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Glossary

Pedagogy: The method and practice of teaching, especially as an academic subject or theoretical concept.

Curriculum: The subjects comprising a course of study in a school or college.

Inclusive Education: Inclusive education means all children in the same classrooms, in the same schools. It means real learning opportunities for groups who have traditionally been excluded – not only children with disabilities, but speakers of minority languages too.

Anecdotal: Information based on or consisting of reports or observations of usually unscientific observers

Credibility: Capacity for belief

Rigor: Strictness as in dealing with people

Special needs Children: A special needs child is a youth who has been determined to require special attention and specific necessities that other children do not

List of Acronyms

PCK   Pedagogical content knowledge

TA   Thematic Analysis

IE   Inclusive Education

Ofsted   England's Office for Standards in Education

PjBL   Project Based Learning

MCQ   Multiple Choice Question

DISA   Dhaka International Schools Association

IT   Information Technology

PEDP   Primary Education Development Program

TQI   Teacher Qualification Index

ISTE   International Society for Technology and Education

Chapter 1 Introduction and Background

1.1 Introduction:

Teaching learning techniques play a vital role in the learning as well as the holistic development of the students. It is the teaching techniques that influence children into a certain direction. Children are different in terms of their perceiving and comprehending ability. According to Mayer (1992), "Cognitive theories suggest that learning occurs with the result of information formation developing with dominant priorities. According to this, learning is based on that a learner processes the information that he configured with his own cognitive process and this process shapes new learning. The advances in this direction are related to what they learn and how they learn, not how much they learn. The main metaphor expected to be argued is, perhaps, students are active learners rather than they are passive receivers". As a result, teachers need different approaches to address and satisfy their unique learning abilities.

I am a teacher, working at an English Medium School and I believe that this study will help me as well as other teachers out there in order to understand the different pedagogical practices that could be implemented for better learning of the students.

According to Hinchliffe (2000), there have been two traditions in teaching learning, one is instrumental learning, that can be explained as pedagogy and the other one is education, meaning teacher and students getting engaged in a form of enquiry. It is very important that the impact of a class must be felt through the fact that the learning actually took place. This is essential to achieve some set of skills and knowledge through education. On the other hand, this is also important to address the free spirits in order to enrich their capacity and make them try to reach beyond that. Therefore, the major difference between instrumental learning and education is that through the

first, the outcome is assessable and through the latter, the outcome of education is fundamentally open.

Now I will discuss about English Medium Private School Education in Bangladeshi context. Bangladesh is a developing country and since its independence, the education sector of Bangladesh is developing tremendously along with the changes brought in the curriculum and teaching learning patterns. Hassan (2019) says, English medium schools have a great influence on our education sector and with passing days, more and more people are interested to enroll their children in English medium schools due to several reasons, such as: English is the most powerful language and officially recognized language in the world. It is the language of computer, courts and judiciaries. World's most countries use English as their second official language. Hence, English is the only internationally communicable language and this is why people in Bangladesh prefer to obtain education from English Medium Schools (EMS).

The year 1990 has been the major period for the growth of English Medium education in all over the world which was still stressed to establish in the global community (Mousumi, 2017). Within the last decade or so of the twentieth century English-medium international schools got recognized in several countries where host country nationals are allowed to attend international schools, in order to give their child a competitive edge. International English Medium schools in Bangladesh began to flourish and gain acceptance due to certain features that could make them parallel with other parts of the world. The first reason could be, conventional education failing to deliver quality education to the local elite, hence, insisted them to receive English medium education. Secondly, there could be shortage of schools which led to the growth of English Medium Schools. Recently, English-medium schools and its existence in Bangladesh have elevated many questions in the society since it often acts like a private enterprise with a profit objective (Hayden, 2008).

Education expert Latif (2004) when talking about educational standards of Bangladesh stated that, the pedagogical practices in Bangladesh are very mainstream and rigid for which the development of the students are not that great. I believe, the pedagogical practices in the classroom has a lot to do with the overall improvement of the current situation of the education sector of Bangladesh.

Samfira (2014) says, a flexible and diversified teaching methodology is supported and encouraged by modern pedagogy that provides a very wide range of teaching-learning methods. The great variety of teaching methods used in modern pedagogy provide opportunities for the enrichment and growth of the teachers' teaching and educational proficiency. Through effective teaching methods, proper learning can be guided and established. It is a common way of procedure that unites teachers' and a students' efforts. A teacher's creativeness and personal growth level controls how these teaching methods are used and combined. Therefore, we need to focus on progressive approaches of teaching in order to engage and attract more students in the classroom.

This is why I have decided to explore the existing approaches and methodologies of science classrooms that are being implemented by the English Medium Schools. As being part of English Medium School, I know that the teaching approaches used in here is different than that of the Bangla Medium Schools Bangladesh. Thus, this study is believed to benefit all the educators in broader aspects through providing guidelines and evidences on the implications of various approaches in the Science classroom. I know that different English Medium Schools might have different approaches in the Science classroom. However, it is convenient to pick one English Medium School for this study in-depth and to understand the situation thoroughly, only then the results of the study can be attainable and measurable at the same time.

1.2 Research Topic:

Research Topic: Pedagogical practices of science classrooms at the primary level of an English Medium School in Dhaka city.

Many of the science teachers do not know about Pedagogical Content Knowledge (PCK). However, this area has received extensive research attention since mid-1980s. Of course, it is important for the teachers to have the core content knowledge to elaborate and explain the contents to the students. However, it is equally important to be able to deliver the subject matter in such a way that is received by the students with great enthusiasm. There is a huge gap between knowing a certain topic and delivering the content using the right tool and effort. (Kind V. , 2009)

Through the interviews, I would like to know more about the teachers who are teaching science to the students in the English Medium Schools, what educational background do they belong to and what professional trainings they have in order to teach Science to the students of primary classes.

I have selected this research topic to fulfil my own need of understanding on the various approaches of teaching-learning science at primary grades. To look into the growth of the teaching skills, we must focus on learning new ways and techniques and not limit our knowledge within some traditional boundaries of pedagogical practices. Thus, my research topic speaks about the educational approaches practiced in science classroom in an English Medium School in Bangladesh.

1.3 Problem Statement:

Clarke (2012) says, there are various types of students in the classroom. We often take the cognitive ability of the children for granted that include motor skills such as holding something understanding the primary language that we call our mother tongue, unless we see an infant or a child struggling to do that. It is therefore evident that the comprehending ability of each child and also the amount of outcome each child will produce varies.

It is essential that all types of students' intellectual needs are being addressed and their capacities being enhanced. The concept of inclusive education (IE) steps in. IE focuses on the reform of the education system to fit the learners and does not expect the learners to fit the system. (Ahsan, 2013) This is important that the teachers take a note of it and start preparing their lesson plans accordingly in order to include all types of learners in the classroom and ensure proper learning to take place.

In addition, Orchard (2015), said that there are some skills that can best be acquired through practice and practical implications and continuous supervision of an individual. On the other hand, some knowledge can just be learned through gaining proper and in-depth knowledge on the particular topic. Teaching is such a skill that cannot be learned through academic studies, rather it needs to be practiced in real life scenario and teachers will learn to be even better with each passing day through trial and error. This is why it is essential to have trainings for the teachers more often based on their needs and the ones that focuses on their subject matter which will help them to become a better teacher through the learned and acquired knowledge and techniques from the training sessions.

Hence, I would really like to know more on the previously discussed areas such as teachers having the pedagogical content knowledge, teachers addressing all types of learning styles that students possess and the teachers having proper trainings for the teaching techniques they are implementing in the class room. This can be done through understanding the science teachers' perception on implementing the new teaching approaches. I would also like to explore the attitude of the teachers towards learning new techniques for their classroom practices.

1.4 Research questions:

As mentioned earlier, the research topic for this study is, Pedagogical practices of science classroom at the primary level of an English Medium School in Dhaka city. As a result, it is very important to come up with set of questions that will act as a guideline towards achieving effective results from the study. Thus, in order to address my research topic and the problem statement, I have come up with the following Key Questions:

1. What are the pedagogical practices of science classrooms in the English medium school?

Sub Questions:
✓ What is the current scenario of the science classroom in an English Medium School?
✓ What new progressive approaches and materials do the teachers use in science classroom?

2. How the assessment procedure is designed to ensure the learning of the students?

Sub questions:
✓ How the assessments procedures are planned?
✓ How the assessments procedures are executed?

✓ To what extent teachers can implement different types of classroom assessment related to their pedagogy?

3. What kind of trainings are provided to prepare the teachers for implementing such approaches and how do teachers perceive these trainings?

Sub Questions:

✓ What are the trainings do teachers receive on different teaching techniques and lesson planning?

✓ What is the teachers' perception on the effectiveness of the trainings?

✓ How can teachers be guided in an even better way by the school in order to implement the learned approaches?

Indicators: Pedagogical Practices, Materials used in the classroom, Teachers' trainings, Teachers' preparation to implement the techniques and methodologies, Learning styles, Inclusive education, Lesson plan and assessment.

1.5 Purpose of the study:

The objective of the study is to understand the teaching learning approaches that are used in the Science classrooms of an English Medium School in Bangladesh and how these pedagogical practices are being executed among the children. According to Hinchliffe (2000), most of the institutions focus on traditional pedagogy in which it is expected that in the end the students will learn things that can be assessed and measured by the society and the knowledge will come to a significant use of the society. As a result, the teachers mostly use traditional approach in teaching.

However, the teaching learning is more effective when it ensures two-way communication and has a variety of tools and materials involved in the teaching techniques.

Through this study the teaching techniques and tools used by the teachers in the science classroom will be identified and the perception of the teachers towards implementing certain approaches will also be understood.

The study will also discover the kind of trainings received by the teachers in order to prepare themselves better for conducting science class. I would also like to discover about the different kinds of materials that they find available in the school premises in order to facilitate them for taking better classes.

The study also focuses on the assessment process of the students through which the outcome of the students' learning will be assessed and in the best possible way.

1.6 Significance of the study:

While researching for this study, I have found that there aren't enough relevant research papers done previously in the perspective of science classroom pedagogy for English Medium Schools in Bangladesh. Hence, this study is surely going to create some value to the teachers as well as other researchers who are interested in the similar areas. It is important to understand the situation of teaching-learning and pedagogical practices in the education sector of Bangladesh in order to develop the current educational situation that is following a traditional teaching-learning practices. Carrying out a research on multiple schools could give much better and appropriate results. Specially I choose English medium school as they have a different curriculum. However, due to the shortage of time it was not possible to carry out a quantitative research on multiple English medium schools. Therefore, I have chosen a single school to understand the teaching-learning

practices in the science classroom in-depth through a qualitative research and believe that other schools will get benefit from this study.

Through this study, we will know about various teaching techniques and usage of different tools and materials, hence, the teachers who are enthusiastic to learn new teaching techniques and methodologies will be benefitted the most. This study is also expected to benefit all the teachers out there who are struggling to implement different pedagogical approaches to teach the children and satisfy their unique needs. Both Bangla Medium and English Medium Schools will be benefitted from this study by getting exposed to various creative and modern approaches of teaching.

The study also talks about the trainings that need to be provided to the teachers for implementation of the approaches. The participants of this study have also talked about the challenges they face while implementing the learned teaching techniques inside the classroom. As a result, through this study other schools will also be enlightened to provide various trainings in the most effective way possible. I believe, through this study, the whole education sector of Bangladesh will be benefitted and can be enriched in terms of implementing progressive approaches and receiving different types of training and get the best out of it.

Chapter-2 Literature Review and Conceptual Framework

In the following Literature Review, I am quoting and paraphrasing all those books, journals, reports and articles that I have gone through and that have helped me to finally have a better understanding of my research topic of Pedagogical practices in science Classroom. I reviewed various papers from different countries across the world having the similar kind of mind set and opinions on every theme that are mentioned in the following. Based on the research topic and research questions I have organized my literature review under the following categories:

1. Modern pedagogical practices in science classrooms

2. Inclusiveness in science classrooms

3. Teachers' readiness to implement the various teaching techniques in science classrooms

4. The importance of teachers' training towards professional development of the science teachers

5. The Assessment procedure for science classrooms

2.1 Pedagogical practices in science classrooms

In relation to education, pedagogy is defined as the art of teaching which involves the teachers' skills to convey the knowledge, he has in a manner that students are able to understand, remember and apply. The pedagogical skills can generally be divided into classroom management skills and content related skills (Hinchliffe, 2000).

The modern pedagogy encourages a teaching methodology that is diversified and flexible at the same time, which provides an extensive range of teaching learning methods. Hence, facilitating greater opportunities for the enrichment and development of teachers' teaching and educational proficiency as well as ensuring the students' effective learning. The cognitive process includes

thinking, knowing, remembering, judging and problem-solving. The students' cognition refers to their menta processes involved in gaining knowledge and comprehending them. Through this process the learner shapes new learning based on what they learn, how they learn and not how much they learn. It is important that the students are active learners and not passive receivers (Skutil, 2015).

Some of the creative teaching techniques that the science teachers use in their classrooms are:

- ✓ Involving students in activities to enable the understanding of scientific concepts
- ✓ During the discussion, asking probing questions such as "why do you so think so"?
- ✓ Using visual aids (charts, pictures etc.) to explain the concepts.
- ✓ Organizing field trips for increasing the information of the students.
- ✓ Encouraging students to role-play for explaining Science concepts.
- ✓ Using different techniques during activities such as flashcards etc.
- ✓ Engaging students in learning from various sources other than the textbook (CDs, magazines, etc.) (Tufail, 2020).

People assume that the best teachers are the ones who have sufficient knowledge and passion for the subject they teach. Especially for the science teachers, it is said that the qualification of the teachers can forecast the performance of the teachers in the classroom. However, a report from England's Office for Standards in Education (Ofs.Ed.) emphasizes on the fact that simply passing on the information that is known by the teachers to the students is not enough. It is very important that the teachers use various skills considering the students' interest to receive them. There is a huge difference between knowing about a topic and having knowledge about how to deliver that particular knowledge (Kind V. , 2009).

Pedagogical content Knowledge (PCK) is important for the science teachers to possess. PCK enables the teachers to teach the students by creating different strategies for addressing different types of students who can have a better understanding of the concepts delivered to them (Kind V. , 2009).

2.2 Inclusiveness in science classroom:

Inclusive education (IE) is a term that focuses on including all types of learners belonging to different background and capacities in the same classroom. The final goal of IE is to embrace all learners by providing them with an unbiassed access and involvement in school. Having to focus on IE the teachers need to ensure that variety of teaching methodologies, tools and techniques are being implemented and utilized in the classroom in a balanced manner (Malak, 2013). In this study I focused on addressing all types of learning styles possessed by the students in the science classroom.

2.3 The importance of teachers' training towards professional development of the teachers

Through professional development the teachers receive a chance to rethink and modify their classroom practices. It is a policy of capacity building of the teachers and after the capacity is built, it should be implemented as required. When teachers gain specialized knowledge on teaching methods and the curriculum, it increases their capacity. On the contrary, professional development is widely believed to be essential for facilitating implementation and application. It is evident from a large-scale survey, that professional development increases teachers' knowledge on contents, pedagogical strategies, alignment of curriculum and assessment, and a variety of other topics (Acar E. , 2014).

It is very common that the schools in the developing countries hire teachers immediately when they have a need of a particular teacher in a position regardless their trainings and efficiency. It is then very important that the teachers are trained later accordingly in relevance to the kind of content they deliver to the students and develop their skills and knowledge on that particular area. The most effective trainings are usually provided in the schools as teachers collectively involve in planning, assessing and evaluating student progress, creativity and reflection on the content (Kleinhenz, 2015).

It is essential to have skilled trainers and their positive attitude towards providing in-school support in combination with training programs in order to achieve high quality professional learning of the teachers (Kleinhenz, 2015).

2.4 Teachers' readiness to implement the various teaching techniques in science classroom

In the education sector in general, there is a positive correlation between teachers' readiness to adapt with the new teaching techniques and the student learning development. Based on the evidences from research involving the teachers in student learning outcome success, Lynch says that high levels of teachers' readiness in a school, act as an indicator of improvement in the holistic development of the students' as well as the schools (Lynch, 2017).

It is evident from a study that investigated the readiness of teachers towards implementing project-based learning (PBL), delegated by a top- down policy at the national level, in Qatari government primary schools. The study reported a lack of readiness among teachers at the initial stage of change with a good number of qualitative data. This was because of the teachers' lack of understanding of the particular learning approach which resulted in their low confidence in

implementing the approach and recognizing the suitability and benefits of it. "The presence of a supportive system and effective professional development programs play a vital role in accelerating teacher readiness to implement new techniques" (Du, 2020).

2.5 The Assessment procedure

The assessment of the students is a crucial part of the education system as a whole. This refers to the quality of the education system within an inclusive school. It also impacts the quality of teaching, the results of the students and the experience of the students in the process. To implement all-inclusive assessment policies the teachers should evaluate the learning of the students whether the knowledge gained is correctly liked with goals and are communicable or not. There should be variety of methods and tools of evaluation to address the different levels of intelligence of different students. Emphasizing on formative assessments which help students identify their strengths and weaknesses and the target areas that need effort, hence students achieving their maximum potential (Jana, 2014).

In an all-inclusive teaching learning environment, it is essential that the assessment procedure is innovative, involving the best assessment practices and tools. The precise aims while assessing all kinds of students should be trying to assess what the students have learned and are able to relate their knowledge with their life through implementing innovative and effective assessment procedures. For incorporating such assessment policy, the schools must have best practice in methods and tools for assessment, and the appropriate teachers to implement these assessment policies (Watkins, 2007).

I believe the situation is the same considering the context of Bangladesh. Since, human nature is somewhat similar everywhere. There are areas to improve in the assessment process and it is

important that the teachers are highly adaptable to the changes to keep the graph of learning moving upward.

2.6 Conceptual framework:

While conducting the research, the research questions act as a key guideline to achieve the final results of the study. To have effective outcome of the study I have focused on the pedagogical practices that are implemented in the science classroom of an English medium school. The trainings that are received by the teachers should also be talked about and the perception of the teachers towards the trainings they receive. As assessment is an integral part of the pedagogy, it is also important to know how the assessment procedure is designed in order to in the school to include all types of students.

To understand the research topic and the themes better I have found the relevant literature to guide me throughout the study. The Literature enlightened me on how the variety of pedagogical practices that are implemented all over the world and use of the different tools in the classroom by teacher can involve students better. How the teachers are trained to be the better version of themselves and how the assessment plays a vital role in the development of both the classroom teaching and the learning of the students at the same time.

After the literature review and organization, I have found that there are many areas of teaching methodologies which are comprised of a combination of pedagogy and used teaching materials and teachers' trainings and teachers' perceptions. Through this study I want to identify some of the factors that influence the teachers to practice the approaches efficiently such as, supportive management, having ample amount of resources etc. Through this study both teachers' perception

and the factors that influence them towards being proactive, will be addressed. To represent the whole study graphically, it should look like the following:

Figure: 1 Conceptual Framework Flowchart
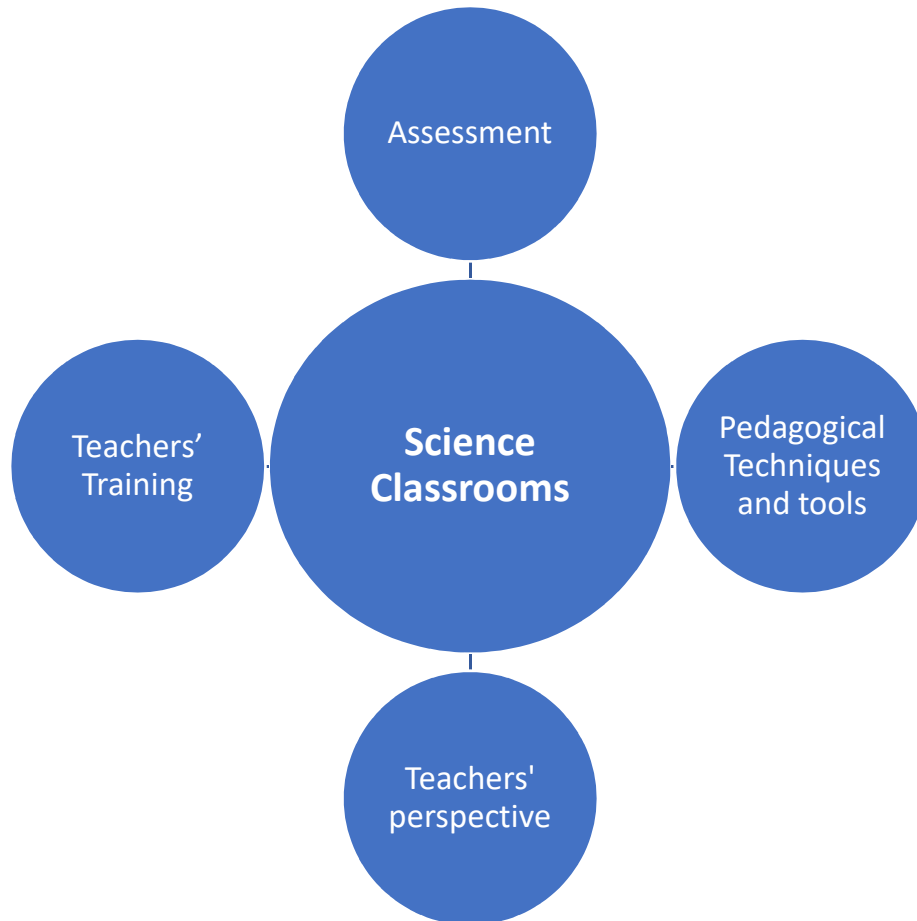
Chapter-3 Methodology

3.1 Research Approach: Inductive Approach

According to Thomas (2006), the concept of inductive approach in a qualitative research is that the researcher here will begin with an area of study and eventually will allow the theory to emerge from the raw data. Inductive approach refers to the study of detailed raw data to originate concepts and themes related to the research topic. Through inductive approach researchers often come up with research findings through analyzing the frequent, dominant or significant themes that are related to the research topic. In the process of analyzing the data, the researcher may end up finding an unexpected result or outcome and that is going to be considered to be an important finding. Some of the major objectives of inductive approach are:

- ✓ The researcher would analyze various relevant research data and collected raw data and condense them into a brief, summary format.
- ✓ The researcher would be able to find clear links between the research objectives and summary findings that are derived from the raw data
- ✓ Finally, the researcher will construct a model or theory based on the fundamental structure of experiences that are apparent in the script data.

To conduct the study, I have chosen some of the teachers of English Medium Schools who are teaching Science in the Primary School. The School that I have chosen is located in Gulshan. However, due to this pandemic situation, I could not collect the data in person being on the spot. Hence, the study was mostly online and through gathering more knowledge from other similar kind of researches.

This research is a qualitative research and has an inductive approach. This is because, "inductive approach, also known in inductive reasoning, starts with the observations and theories are proposed towards the end of the research process as a result of observations. Inductive research involves the search for pattern from observation and the development of explanations – theories – for those patterns through series of hypotheses. "No theories or hypotheses would apply in inductive studies at the beginning of the research and the researcher is free in terms of altering the direction for the study after the research process had commenced" (Dudovskiy, 2018). Thus, the approach of this research is inductive approach.

3.2 Research site:

The research site is an English Medium School. There campus is in the area of Gulshan at Dhaka city. This particular School is considered to be one of the top ranking private, English medium schools of Bangladesh. It started with only 9 students on August 29, 1995. However, the student body today stands at 1805 and there are 167 academic staff members.

The curriculum at this School is based on UK Edexcel Curriculum with modifications appropriate to the local needs in Bangladesh. Extra-curricular activities play a vital role at SJWS. These are available for Classes 1 to 12. They also offer weekend sessions of swimming and football/ basketball/ cricket practice at a specific time of the year. Along with academic excellence they emphasis on developing all inherent talents students may possess through their diverse extracurricular activities to build up their confidence and leadership skills. This school strives to ensure academic achievement while providing a safe and supportive learning environment for the new generation (Admin, 2015).

For this study, I have chosen this particular school because I am an employee of this school and I already have a positive rapport with the school authority for which it was convenient for me to get an easy access to the teachers of the school and to the information about the school as well. As this research is on the teaching-learning approaches used in science classroom in English medium schools, it is more convenient for me to reach out to the teachers of the school and its people and finally get an in-depth opinion on the pedagogical practices of Science class and end up with a fruitful outcome from the study.

3.3 Research Participants:

For this research, the participants are the teachers of the English Medium school. While choosing the research participants, I wanted to have a good combination of both old and new science teachers of the school, meaning that there should be some very experienced teachers as well as some teachers who are still in the process of learning to become a better teacher. I also focused on the various background they belong to and still serving the science department of the school. This is to understand if there is any impact of the teachers' educational background on their teaching abilities in the primary school.

While selecting the participants, I also wanted to make it gender balanced. However, that was not possible since this school does not have any male science teacher currently working in the primary school. So, this was not possible and all the participants were female teachers. I also ensured that the teachers I have selected has varied number of trainings received in their professional career in order to have difference or variety in opinion.

I have exclusively chosen the science teachers of the primary school as my research participants because the research topic is about the teaching techniques used by the teachers to deliver the

lessons, which means the research topic is mostly teacher centric and the teachers are the one who would be able to give appropriate information on the areas covered in this research. Moreover, the research questions are also addressed towards the teachers and their perception about the teaching techniques and the training provided to them. Hence, teachers are the sole participants for this research.

3.4 Research sampling:

Since this research is a qualitative research, purposive sampling is more appropriate in order to get in-depth, rich data ensuring variations in the data. In Qualitative research, Purposive sampling is common. "Particular individuals are chosen with characteristics relevant to the study who are thought will be most informative. Purposive sampling also may be used to produce maximum variation within a sample. Participants being chosen based for example, on year of study, gender, place of work, etc" (Anderson, 2010).

I intended to use the above-mentioned sampling method since; purposive sampling gives the researcher an advantage to collect data from people who are within the reach and easily accessible. Being an employee of an English medium school, I suppose, I am going to have a better access to the teachers in the school and they are going to be cooperative enough to make this study a success. Hence, the data collection process will be much easier, time efficient and faster. In the following table the information for data collection is illustrated:

School	1
Science Teachers	5
Total Participants	5

3.5 Research Method:

As a research method I am using qualitative approach. "Qualitative research necessitates having a small sample because of the detailed and intensive work required for the study. So, sample sizes are not calculated using mathematical rules and probability statistics are not applied. Instead qualitative researchers should describe their sample in terms of characteristics and relevance to the wider population" (Anderson, 2010).

I am trying to understand in-depth about science teaching-learning and "Qualitative research is not concerned with numerical representativity, but with the deepening of understanding a given problem. In qualitative research, the researcher is both the subject and the object of his research. The objective of the qualitative methodology is to produce in-depth and illustrative information in order to understand the various dimensions of the problem under analysis" (Queirós1, 2017).

Qualitative research deals with the collection, analysis and also interpretation of data which cannot easily be reduced to numbers like the one in the Quantitative researches. As a result, in a qualitative research, the data collected needs to be thoroughly studied, and the in-depth interpretation must be done by the researcher, taking the gesture, posture of the participants into account while conducting an interview.

To achieve the desired answers for the research questions, the data needs to be elaborate and in-depth information was collected. This is why some questions in the research tool was open-ended. AS elaborate conversations are required to get the answers for the research questions, hence, I have conducted the long in-depth interviews using Zoom App and over Telephone as well.

3.6 Research tools:

It is essential to have a clear and specific research objective needs to be identified to understand which method should be applied (Anderson, 2010). There are many types of qualitative data among which I have chosen Semi-Structured Interview Guidelines for interviewing my research participants. According to Alshenqeeti (2014), to be able to choose the right kind of tool in terms of collecting data in a social science research is itself a very essential part of the research since, it determines the validity, reliability and the success of the research in a broader aspect. A qualitative research involves detailed understanding of human behavior. Moreover, in qualitative research, all the data are non-numerical and this type of research require to explore and describe the quality and nature of people's behavior, experience and their understanding. Interviews are thought to be more effective as it allows interviewees to speak in their own voice and express their own thoughts and feelings (Alshenqeeti, 2014). During the interview, I audio recorded all the interviews for further analysis also.

On the other hand, if interview is compared with questionnaire, interview is more powerful and effective in prompting narrative data that eventually allows researchers to examine people's opinions in greater depth. "Interviewing is considered to be a valuable method for exploring the construction and negotiation of meanings in a natural setting" according to Cohen (2007).

Here, in this study, a set of open-ended questions under the semi- structured interview guideline was used as the research tool for the interviews to get an in-depth feedback and opinion from the participants.

The questions were focused on the areas of the pedagogical practices in the science classroom in the primary level (Grade 1-4) of the school, the training and development of the teachers and the

perception of the teachers towards the training provided to them. Focusing on these areas helped to meet the requirement of the research questions.

Through using Semi-structured interview as a tool for the data collection method in this research, many in-depth data, I could be received and the participants brought up some new areas to light.

3.7 Data collection process:

As stated earlier, the data for this study was collected through interviews over Telephone and Zoom from all the research participants, who are the science teachers of this school.

According to Dörnyei (2007), a 'good' qualitative interview has two key features: "(a) it flows naturally, and (b) it is rich in detail" (p. 140). To ensure these two criteria, it is therefore necessary for researchers to recognize that they are there to 'listen' not just speak. In addition, researchers should not only be neutral, but also at the same time, they should be able to provide such an atmosphere where the interviewees feel comfortable to talk freely and spontaneously regarding the matter (Alshenqeeti, 2014).

Since, I have chosen the Telephone and Zoom as a media for collecting data through interviews due to covid-19 pandemic, it is apparent that there was no face-to-face interaction between the interviewer and the interviewees. As a result, the interview over telephone and zoom has some disadvantages such as: establishing rapport with the respondents and recognizing limitations of resulting data. However, some of the advantages of taking interviews over phone were, these were cost effective and the time slots were very flexible for both the participants and the interviewer (Glogowska, 2010).

"According to Blaxter (2006), it is worthwhile doing interviews because it offers researchers the opportunity to uncover information that is "probably not accessible using techniques such as

questionnaires and observations". Moreover, they add that interviewing is not merely a data collection tool, it is rather a natural way of interaction that can take place in various situations. Additionally, Dörnyei (2007) argues that with the presence of the interviewer, mutual understanding can be ensured, as the interviewer may rephrase or simplify questions that were not understood by his/her interviewees. As a result, more appropriate answers and, subsequently, more accurate data will be reached. Additionally, this data can be recorded and reviewed several times by the researcher (when necessary) to help producing an accurate interview report (Berg, 2007; Alshenqeeti, 2014)

Despite some of the drawbacks of conducting telephone interviews, the current situation is such that there was no other option other than collecting the data over phone or using Zoom App. Due to the current pandemic situation, Interview was conducted with a set of semi-structured questions via online platforms like Zoom or Phone. Semi-structured questions helped to address the areas which were brought up by the participants. So, as the conversation continued the interviewer modified the questions depending on the flow and direction of the conversation and its topics. In the meantime, I observed the tone of respondents' voices to get the deeper meaning out of their answers. All the interviews were recorded for transcribing the data later on in order to avoid any missing out of data and noting down every detail that came up during the data collection process as an evidence and for the data analysis process later.

To come up with a comprehensible outcome, I have had to countify the data that I have received from the teachers to have a clear information of how many times each of them has mentioned about any particular method, teaching materials etc.

3.8 Role of a researcher:

For the first three years in my professional career, I have been a science teacher myself, teaching the primary students in an English medium school. However, I have been working as a Geography and History teacher for the last two years in secondary school in an English medium school for the last two years. Most of the respondents were my ex-colleagues with whom I have worked previously. This is why it was easy for me to get an access to the science teachers of this school. Moreover, I have a good rapport with the respondents and hence, it did not take much time to connect with the interviewees during the interviews. The participants were very comfortable and they could talk freely with the researcher and opened up with their opinions honestly.

It is found that, "in qualitative interviews, the quality of the data generated is built on the premise of the interviewer establishing a good rapport with the respondent. The difficulties inherent in face-to face interviewing are well documented" (Kvale, 1996). "But in the case of telephone interviewing, a new set of difficulties have to be considered and tackled. As first impressions are likely to be equally as important over the telephone as in face-to-face meetings, the introductory script was designed to sound professional yet friendly. The issue of respondents asking questions during the course of the interviews and the effects on rapport also had to be reflected on and dealt with" (Glogowska, 2010).

The role of a researcher is crucial not only in terms of collecting the data but it starts from the very beginning of the research. The role is very complex as the researcher has to be very cautious in terms of choosing the relevant data collection method and tools and then has to find out the appropriate themes under which the data needs to be categorized and finally the way the data is processed and presented. All of this is very important (Fink, 2000).

While interviewing the participants, I tried my best not to intervene or manipulate their answers by any sort of probing statements related to my past experience. There were times when, as a novice researcher, I resisted to maintain the focus as a researcher and not to retreat to the role of a science teacher that I used to be. Overall, the interview sessions were conducted very professionally and as unbiased as possible.

3.9 Data analysis process:

Since this is a qualitative research, all the data that are collected from interviews via telephone and zoom app, were transcribed, reviewed, organized and interpreted and finally the data were categorized according to different themes that cut across all of the data sources. As this is a qualitative research, all the information that is received during the interviews, all the side notes taken during the time of the data collection process is gathered, organized and analyzed inductively and deductively at the same time by moving back and forth due to having a better understanding of the participants' point of view by the researcher.

To achieve appropriate outcomes, the thematic analysis acted as a proper guideline towards achieving appropriate outcomes. The two main reasons to use thematic analysis are its accessibility and flexibility. According to Clarke (2012), for novice researchers who are new to qualitative research, thematic analysis provides a way into qualitative research that teaches the mechanics of coding and analyzing qualitative data systematically, which could eventually be linked to broader theoretical or conceptual issues.

"Thematic Analysis is a method for systematically identifying, organizing, and offering insight into patterns of meaning (themes) across a data set. Through focusing on meaning across a data set, TA allows the researcher to see and make sense of collective or shared meanings and experiences. Identifying unique and idiosyncratic meanings and experiences found only within a

single data item is not the focus of thematic analysis. This method, then, is a way of identifying what is common to the way a topic is talked or written about and of making sense of those commonalities" (Clarke, 2012). The purpose of analysis is to identify those data that answers a particular research question.

To be able to do thematic analysis well, I have followed the methodologies of Clarke (2012) through implementing the six phases of Thematic Analysis.

In phase-1, I adapted myself with the data. In phase-2, I generated initial codes from the collected data. In phase-3, I thoroughly went through the data and searched for themes. In pahes-4, I reviewed potential themes, defined and named those themes in phase-5 and finally in phase-6, I came up with the results and produced the report.

Unlike quantitative data, writing and analysis are completely intertwined in qualitative research. Starting from taking informal notes and memos to the more formal processes of analysis and writing reports on the same. The purpose of a qualitative report is to present a compelling story based on the collected data and its' analysis. Hence, while analyzing the collected data, I have countified the frequency of each points that were mentioned by the participants in order to eventually generate a graphical representation of the same. As a result, the themes were quantified after the thematic analysis.

While conducting the entire qualitative research, the researcher has to focus on the true meaning of information that is shared by the participants and avoid the meaning that the researcher brings to the research and the writers express in the literature. Finally, all the data are analyzed and through well and unbiased interpretation of the collected data the researcher comes to a conclusion.

3.10 Ethical Issues and Concerns:

Ethical issues are present in any kind of research. Ethics refer to doing good and avoiding maltreatment. Through the application of appropriate ethical principles, the researcher can prevent or reduce harm. Thus, the protection of human subjects or participants in any research study is overbearing (Orb, 2000).

The researchers are the eventual protector of the participants' privacy and information. The administrative burden of ethical reviews and procedures is balanced by the protection of participants. In qualitative studies, researchers rely heavily on collecting data through interviews, observations, written materials, and audiovisual material. While in the field, researchers should negotiate access to participants to collect data; thus, the quality of social interactions between researchers and the participants may facilitate or inhibit access to information. Once access to the field has been granted and the first steps of data collection

are taken, researchers may experience ethical dilemmas that may not have been anticipated in the research plan (Field & Morse, 1992; Orb, 2000).

During conducting this research, I have tried my best to take all the ethical concerns into account. Before the interviews have been scheduled a formal permission from the participants were taken via a short text message. Upon their consent, I have sent them emails asking for their formal consent in participating the research voluntarily. While recording the interviews they all have been clearly informed that the conversation will be recorded and preserved for the purpose of evidence and that I will not be revealing their names or any individual's name in particular, not even the organization's name during the interview. They were made comfortable. Even in the research papers the participants names are changed to protect their privacy.

Since I was interviewing the participants, who were my colleagues once upon a time, it was at times getting hard on my part not to act as their fellows. However, I have managed to act as a researcher solely during the interviews and tried my best not to ask any probing questions and kept the floor open for them to say what they felt should be talked about. Sometimes the questions were such that I could also relate to my own experience and talked about that during the discussion. Then I immediately realized this was not the right thing to do and I refrained myself from doing that further.

As a novice researcher, I slipped at certain points but tried my best to come up with the results as accurately as possible. All these difficulties that come up in a qualitative research can be alleviated by awareness and use of well-established ethical principles and to be more specific, sovereignty, generosity and justice can ensure proper protection of participants' privacy.

3.11 Credibility and Rigor:

"Qualitative research is often criticized as biased, small scale, anecdotal, and/or lacking rigor; however, when it is carried out properly it is unbiased, in-depth, valid, reliable, credible and rigorous. In qualitative research, there needs to be a way of assessing the extent to which claims are supported by convincing evidence'' (Anderson, 2010). Credibility is the confidence that can be placed in the research findings and through mentioning the exact sayings of the participants I have tried to maintain credibility in this research (Korstjens, 2018). Although the term reliability and validity traditionally have been associated with quantitative research, increasingly they are being seen as important concepts in qualitative research as well. Examining the data for reliability and validity assesses both the objectivity and credibility of the research. As a researcher, it is important that I express my experience and qualification to justify myself for carrying out this research and being credible.

To develop this whole study, I have outlined my interest area, I have given importance to the fact that whether I will have enough support of the literature or not. I considered the time that is available in my hand for the whole study and hence chose a research that could be carried out in the given span of time. I was consistent in using the methods over time and also provided the accurate population that I studied. This is how I maintained the rigor in this study.

3.12 Limitations of the study:

Even after several attempt, sometimes the participants are unreachable, unwilling and non-cooperative. This is when the participants' responses get influenced by their state of mind. For example, if the participant is unwilling to respond and is forced to do so, it is more likely that he or she is going to answer everything in brief and within very limited time and words. Moreover, all teachers are working from home during this pandemic and managing work and home simultaneously. Certainly, their state of mind is not the same as before. As a result, borrowing some valuable time from their busy schedule was very difficult and had to reschedule some of the interviews. This impacts the data collection process.

Considering the current pandemic situation, the data was collected through virtual means. As a result, the researcher was not able to observe the gesture, posture, eye-contact thoroughly and all those little details when each question is asked to the participants. This resulted in loss of many non-verbal data.

Since, the data collection method was based on virtual means, the two means of collecting data, both virtually and face to face are effective. However, in the face to face sessions, a lot of things can be controlled by the researcher, but in online sessions, the researcher is not in power at times. Hence, the researcher needs to be far more cautious while collecting data virtually trying to keep the participants focused on coming up with the best answers (Chase, 2000).

One major limitation of this study is that, it will not be ideal to generalize the research findings for all the English medium schools, since this is a qualitative research having very few research participants.

To mitigate the above-mentioned limitations, virtual platform could be considered to be an alternative solution and can be used in the best possible way. Hence, all the interviews were conducted over telephone and using Zoom app and were recorded. As a result, while analyzing the data I could go back and forth and listen to the interviews as many times needed and could interpret the received data as appropriately as possible. I could take notes of the ups and downs of the tone of the respondents so thus the emotions and how it varied with each question could also be observed and interpreted accordingly.

Chapter-4 Results

4.1 Introduction:

In order to find out the results for the research questions, a lot of data has been organized into separate themes and sub themes and analyzed to achieve the findings. There were 5 participants. They were all science teachers from an English Medium School in Gulshan. They all have a teaching experience of 4 years and more. The teachers are from different study backgrounds. 3 out of 5 teachers have completed their studies from Business administration, and one graduated from Pharmacy Department and one teacher from Environmental Science Department. All of them are here to teach science in primary school (Grade 1-4) due to their interest in the subject and their preference in teaching the children of age 8 to 11. During the interview, the major themes that came out were the mode of teaching Science to the children, the assessment criteria for the students in the subject, the kind of trainings they receive and their perspective on the trainings. All the data collected have been categorized into four broader themes. They are as follows:

- 4.2 Pedagogical practices in science classroom
- 4.3 Assessments
- 4.4 Teachers' training
- 4.5 Teaching-learning practices, assessments and trainings during the pandemic Covid-19 situation

All these themes have some sub themes under them which helps to explain the themes in detail.

4.2 Pedagogical practices in science classroom:

From the analysis of all the collected data, the findings are such that the science teachers in the school use different teaching-learning techniques, use multiple tools to teach different topics. Here, the responses of the participants were divided into the following sub themes:

4.2.1 Teaching-learning techniques:

All 5 participants agreed that they select their teaching techniques depending on the kind of topic they teach. The mentioned teaching techniques were: conducting group/pair work, using mind maps to judge the prior knowledge, Field trips, hands on activities such as experiments and Verbal explanation. All the teachers mentioned that their major concern remains in focusing on all the students' intellectual needs. However, 3 of the 5 teachers mentioned that the most common teaching technique that is used for most of the topics is displaying audio visuals and after the visuals are displayed, sometimes, they are assigned in group/pair work. They feel that the students can connect much better with visuals compared to that of lecture-based classes, according to the participants' responses.

T4 said that, "For the topics like- Plant and animals grow- we direct our students to practically grow a plant in the school and make them take care of it and water it every day and they watch it growing. These experiments really help the students as the knowledge provided through practical activities last much longer in students' mind" (Interview#4, 25/2/21).

All the teachers mentioned about field trips which they incorporate in their lesson plans related to the topic. T3 mentioned that they go to plant nursery, animal farms and sometimes visit the zoo for better understanding of their surrounding which have plants and animals in it. As a result, they are able to learn the texture, color of the plants and animals how they grow and how the animals behave and sound (Interview#3, 20/2/21).

4.2.2 Teaching Materials:

All the teachers have mentioned about demonstrating videos clips, documentaries, chart papers, flash cards, posters as different tools that are being used in the classroom in order to explain different topics. On the other hand, they also involve children in hands on activities, play games,

use flash cards for certain kind of topics said 4 of the 5 teachers. T5 said, "We also bring materials from home and sometimes tell the students to bring some materials from their home as well, such as, real vegetables and fruits when they are studying the topic 'Fruits and Vegetables'. This is because they touch the fruits and vegetables, feel the texture of it, cut through to see if they have got seeds in it etc. This is how we ensure long-term retention of knowledge within the students" (Interview#5, 9/3/21).

T2 mentioned, "In order to ensure long term retention of knowledge, we try to show at least one video or documentary relevant to each topic to the students. This is because they tend to relate and remember the information received from a visual more than verbal sources" (Interview#2, 16/2/21).

To understand the findings better, I have quantified the times 5 science teachers mentioned each teaching techniques during their interview. The information is represented graphically through a bar-chart below:

Figure:2
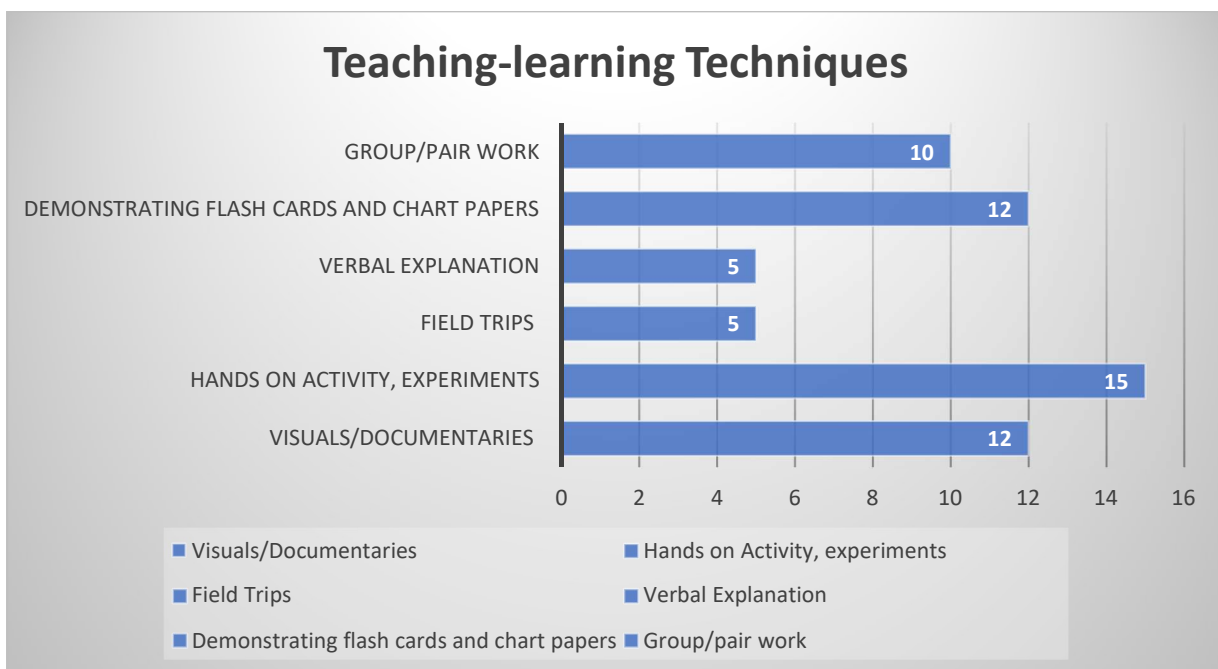
The figure above explains the various teaching techniques that are applied inside the classroom by the science teachers. The figure represents the numerical data to show the frequency of each type of teaching technique that are mentioned by the participants used in their classrooms. As we can see the most frequently used teaching techniques include hands on activities in the class and experiments on the science concepts, which is mentioned 15 times in total by all the 5 participants during the interviews. The second most frequently used teaching-technique is displaying visuals including relevant documentaries and flash cards and chart paper demonstrations. These two techniques have been mentioned 12 times in total by the participants during the interviews. Group/ pair work is the technique that comes third in terms of frequency of implementation and this was mentioned 10 times in total by all the 5 participants during the interviews. Finally, field trips and verbal explanation of the concepts by the teachers come in the end which was altogether mentioned 5 times each by all 5 participants during the interviews.

4.2.3 Addressing children with different learning styles:

Upon asking about whether the teachers have students with different learning style in their classroom or not, all the teachers have agreed that they do have students with different learning styles in their classes who are different than all the other students. So, for these children, the teachers need to plan the lesson in a manner that can benefit them as well. This is why, for every topic they incorporate one visual, one experiment, one written work, one oral quiz ensuring the learning of every single child in the classroom. This is because, one child may be a fast learner and can understand through simple verbal explanation from the teacher, but the other child might have to see a visual demonstration to understand the concept clearly and remember the information in a better way. According to them, by addressing all learning styles they bring inclusion in the science classroom.

4.2.4 Teachers' perception on students' reaction to the teaching techniques:

Almost all the participants were on the same page that their students enjoy doing science classes more than any other classes. On that note particularly T4 said that "Students enjoy science classes more than any other class, this is because the classes are full of activities and hands on experiments in which they get actively involved and as a result, they also do better particularly in those topics where they have been actively involved compared to the ones where they have probably just done a written work" (Interview#4, 25.2.21).

4.2.5 Parents' cooperation for science classes:

All the participants emphasized on the fact that the parents are highly cooperative, considering the immense interest of their children in the particular subject and they support with all the necessary resources required during the experiments and activities. "The students are sometimes seen to be prepared for the classes beforehand, even before the teacher has started the topic. This makes the teachers very delighted to see such enthusiastic students in the class" (Interview#4, 25/2/21).

4.3 Assessments:

4.3.1 General Assessments:

Regarding the assessment procedure, all 5 teachers mentioned that, they set question papers like any other schools, but the question papers include different types of questions like Multiple Choice Questions, Identification of pictures, Analytical questions, where they can be creative and use their acquired knowledge to comprehend the question and produce answers using their own language. All 5 teachers were highly aligned on the point that they appreciate the students more when they write applying what they have learned rather than the memorized words from the book. Thus, having different types of questions in the exam the teachers can address all types of learners in the

classroom, making it fair for all. Assessment policy also includes the classroom performance of the students. T1 mentioned, "We often check the prior knowledge of the students before delivering the lessons, and the students who respond to the class actively are taken into account to be given some extra marks for the active participation in the class. Regular submissions of homework and classwork also adds value to their class performance marks. This is to make the students understand the importance of every single thing they do in the school and that they don't take anything lightly" (Interview#1, 15/2/21).

3 out of 5 teachers mentioned about the group/pair work being marked for assessments where they observe the qualities and skills in each child and give them points accordingly. They further mentioned that through group/pair work they can identify the nature of the children some are introvert, some are cooperative, some have good leadership qualities and some are troublemakers.

4.3.2 Assessment for children with different learning styles:

As mentioned before, all 5 teachers have said that there are children in their classroom with different learning styles. Thus, all the teachers believe that, along with the lesson planning and delivering, assessment procedure also needs to focus on all the students as a whole including the students with different learning styles in the classroom. Hence, all 5 teachers mentioned that they generally prepare the questions in a manner that has an approach which addresses all types of learners. The questions focus on the students' understanding of the concepts and not how much the students could memorize and produce in the exam papers. However, 3 of the five teachers mentioned that, if required, the assessments of the children with different learning styles are done differently. Some require oral assessments for which they take the exams in the form of oral quiz. There they incorporate visual display that aids the students to relate to their learning according to their ability. From these visuals the students extract information related to the questions they are

being asked and get points, said T5, (Interview#5, 09/03/21). T4 said, "Sometimes children with different learning styles lag behind in their spellings and grammar accuracy. In that case we emphasize on the knowledge that they gained and not on the correct grammar or spellings" (Interview#4, 25/2/21). T3 mentioned in addition, "We give extra time during the assessments to those who have different learning styles upon their requirements" (Interview#3, 20/2/21). All these special arrangements are the evidences that the teachers prioritize the students' inclusion and their learning above all.

The Bar-chart below sums up the collected data in the form of numerical representation for better understanding of the findings.

Figure:3
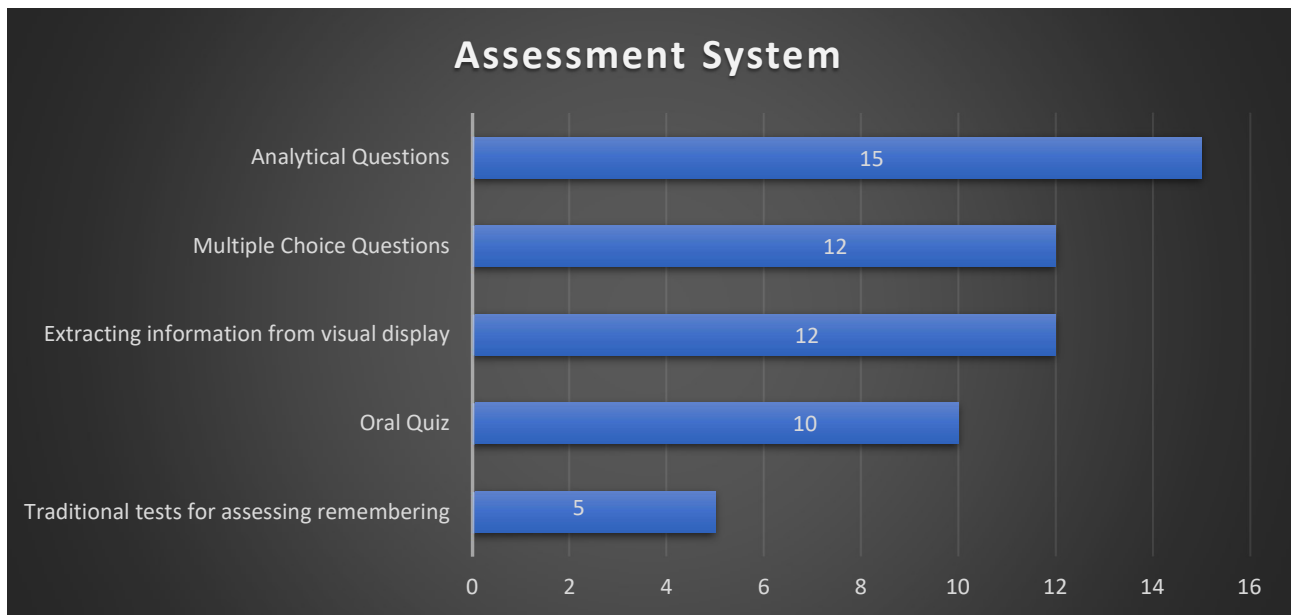
The figure above represents the various assessment tools applied in the assessment system of the school by the science teachers. So, the most frequently used assessment tools as mentioned by all the 5 teachers are giving the students analytical questions to solve using their gathered knowledge through various activities done in the class. 5 teachers mentioned about it 15 times in total during the interviews. Multiple Choice Questions and Information extraction from visual display are the

second most frequently used tools about which all the teachers mentioned 12 times altogether during the interviews. Oral Quiz was mentioned 10 times in total by 5 teachers and the least frequently used tool is the traditional tests to assess the remembering of information by the students, that was mentioned 5 times in total by all 5 teachers during interviews.

4.4 Teacher's Training:

According to Kind (2009), people often has a pre-dominant mindset that the good teachers are those who have the best educational qualifications and the best knowledge on the content. This is not true as Pedagogical content Knowledge (PCK) is important for the science teachers to possess. PCK enables the teachers to teach the students by creating different strategies for addressing different types of students who can have a better understanding of the concepts delivered to them. There are areas to improve in the teaching sectors and it is important that the teachers are highly adaptable to the changes to keep the graph of learning moving upward.

Kleickmann (2012) says, the educational research in recent decades, has given persuasive indication that the quality and excellence of the learning opportunities created by teachers impact students' learning and perception. Most importantly the content knowledge (CK) and pedagogical content knowledge (PCK) of the teachers, both have a great influence on the teachers' instructional practices along with students' learning.

All 5 teachers mentioned that they believe trainings are a crucial part of the development of the teachers. It is highly required by the teachers to upgrade them into a better version of themselves and nurture those learnings learned in the trainings. Based on the participants' responses the data have been divided into the following sub themes:

4.4.1 Frequency and types of trainings:

Upon asking about the frequency of the trainings, 4 of the 5 participants said that the school on an average provides 3 to 4 trainings every year to the teachers. Among which there is one big training that involves all the other English medium schools in Dhaka city. This training is called 'DISA training' (Dhaka International Schools Association) mentioned by T1 and T2. According to T2, "DISA is a great platform where they get an opportunity to share each other's knowledge and pedagogical practices that we implement in our classroom and learn from each other" (Interview#2, 16/2/21). T3 said that, "the teachers usually receive trainings on the topics such as, Active Learning, Differentiated Lesson Planning (that helps to include all kind s of students in the teaching learning process), Classroom Management and IT Trainings" (Interview#3, 20/2/21).

4.4.2 Effectiveness of the trainings:

 All 5 teachers who were interviewed believe; teachers' trainings are very important in all ways. It is not only necessary for the development of the teachers but also required for the development of the students through upgrading the teaching techniques. T3 said, "Sometimes the school provide need-based trainings for the teachers depending on the area the particular teacher needs to improve on. This is very effective" (Interview#3, 20/2/21). One of the most frequently mentioned trainings was the Alan Jervis Training that was held recently. All the 5 teachers mentioned highly about the training and the trainer of the training who was a British trainer having 30 years of experience as a trainer and 15 years of teaching. It was a 3-day long training and the teachers found it very productive. T4 expressed her gratitude towards Alan Jervis for the training she received from him saying, "the Alan Jervis training was so effective and the teachers learned so many ways to apply that the learning from this training is going to be enough for the next few years".

4.4.3 Teachers' Perspective on the trainings:

All 5 teachers emphasized on the effectiveness of the training and said that they are highly motivated to attend the different kinds of trainings that are provided to them every year. However, T4 said, "Sometimes there are repetition of trainings for the teachers who have been working in the school for more than 4 years. These trainings remain no longer effective for the experienced teachers, rather it is a waste of time. In such cases, the school can provide different and advance trainings for the experienced teachers which would help to benefit them further" (Interview#4, 25/2/21). Alan Jervis training, which was the highly mentioned training during the interview session has been told to be the most effective. T3 mentioned, 'It is one of those rare trainings, where we got to learn some very effective teaching techniques and methods which are absolutely relatable to most of the class levels and can be modified to use in almost all the subjects" (Interview#3, 20/2/21). "It has been observed that the children seem to enjoy the classes more after incorporating the techniques learned from Alan Jervis Training" (Interview#1, 15/2/21). T1 and T2 mentioned that they feel the evaluation of the teachers' learning after each training should be done more effectively and regularly in order to ensure better learning of the teachers.

4.4.4 Barriers to implement the learned techniques from the trainings:

Although most of the times, the trainings are very effective and useful, the teachers have discussed on some of the major barriers to implement the learned teaching techniques in the trainings. 3 of the 5 teachers believe that there is a shortage of resources in the school in order to implement the learned techniques from the trainings. Hence, very often the teachers use their personal resources in the classroom which they feel very discouraged about. T1 said that, "A lot of resources are required to conduct the classes effectively, which are not provided by the school. For example: shiny papers, accessories such as, fancy tapes to make better posters, different types of pens are

required which is not provided by the school and the teachers have to buy them to fulfil the need of an effective class. I strongly believe there should be a proper budget prepared by the school to meet all these requirements" (Interview#1, 15/2/21). However, two of the five teachers think that the school is very supportive and provides with necessary resources when required.

3 of the 5 teachers think that the time management is another barrier, since they have a class of 45 minutes where they can't do much when there is an activity going on and sometimes have to wrap up the class abruptly in the middle of the activity. T3 mentioned about the class size which is 1:25 at present. She said that "It is a challenge in implementing activities effectively with a class size of 1:25" (Interview#3, 20/2/21).

T2 came up with an interesting point that the sitting arrangement in their classroom is the traditional way where the students are facing the teachers and the white board. However, for the kind of teaching techniques they implement in the classroom, it would be even more effective if the sitting arrangement could be U-shaped where all the students could see each other's face and as well as the teacher and the white board (Interview#2, 16/2/21)

T1 mentioned that "the classrooms are not digitalized yet which is a challenge while giving visual demonstrations during delivering a lesson and takes a lot of time to arrange the setup every single time" (Interview#1, 15/2/21).

The Pie-chart below shows a graphical representation of the above findings.

Figure: 4
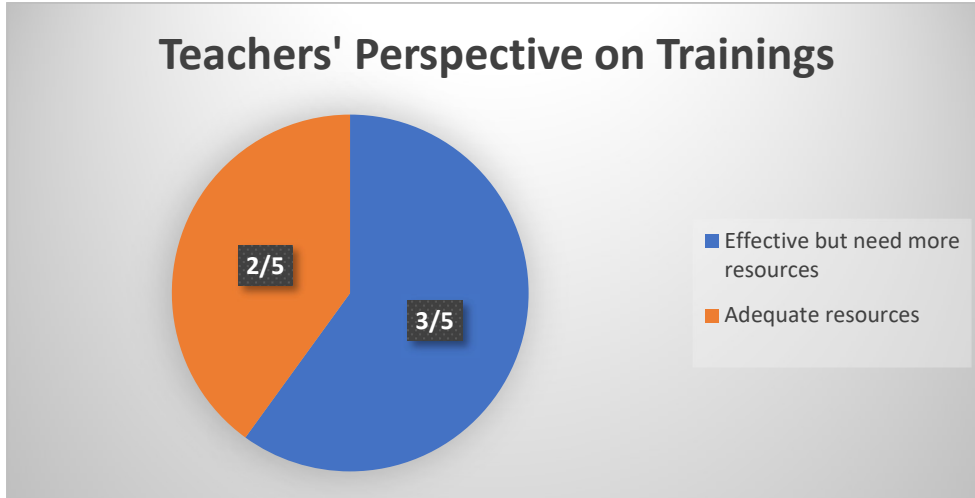
In the figure above as we can see that 3 out of 5 teachers feel that the trainings, they receive are very effective however, they said that they require more resources to facilitate the learned techniques in the classroom. On the other hand, 2 out of 5 teachers feel that the trainings are effective and the school provides sufficient resources to take the classes with application of the learned techniques from the trainings.

4.5 Teaching-learning practices, assessments and trainings during the pandemic Covid-19 situation:

During the interviews, all the participants mentioned few things that they are doing to adjust with the new normal in this pandemic situation. Now the teaching-learning has become fully online based. Whether it about delivering the contents or assessing the children or getting trainings, all are being conducted via online platforms. T1 mentioned that "the classes now have become a bit monotonous for the children as there is no real communication and physical touch to the environment. The students are often seen to be less involved in the class" (Interview#1, 15/2/21). T4 mentioned, "we are trying our best to make the classes as interesting as possible through

incorporating videos, picture, narration of the relevant stories to the lectures" (Interview#4, 25/2/21).

Upon asking about the online assessment system T3 mentioned, "we are taking online assessments using Google classroom where the papers are assigned to each student and they provide a particular time duration for the assessments. During the whole exam time the students remain in the Zoom meeting with their cameras being turned on. If any student fails to keep his camera on, he is penalized" (Interview#3, 20/2/21).

T5 mentioned, "there is a lot of limitations in terms of implementing creative ways to assess the children, and we are still exploring and learning to use the online platform at its best" (Interview#5, 9/3/21).

In this new technology-based classroom setup both teachers and students are adapting with the new normal. In the process a lot of technological tools and issues has to be learnt by the teachers to take the classes in the online platforms in a better way. Therefore, T1 said, "teachers training has become even more crucial now, since all the teachers are new to this online platform. Hence, we are receiving more and more trainings on the teaching materials that are available and usable in different online platforms" (Interview#1, 15/2/21).

T2 mentioned, "We are getting trainings from – Teachers without borders, Gamify lessons. All of them are trying to make lessons interesting in the online platforms and they are quite effective" (Interview#2, 16/2/21).

"Without the trainings that we are receiving in order to take the virtual classes effectively, it would have been very difficult to conduct the classes smoothly in this pandemic. Our students are eventually getting used to the new normal and also started to enjoy the classes with the new application and tools used during the class" said T5, (Interview#5, 9/3/21).

Therefore, according to the findings it can be said that the school is trying to provide a progressive education through the implementation of modern techniques to address all types of learners in the classroom. The teachers are also designing the assessment procedures in ways that support the teaching techniques used in the classroom. Finally, the school is also providing variety of relevant trainings to the teachers to facilitate the implementation of the teaching techniques inside the science classroom better.

Chapter-5 Discussion and Conclusion

5.1 Discussion:

In this chapter, the overall study is discussed in the light of the research questions and the findings from chapter-4. Since the school is trying to focus on the effective and innovative ways of teaching learning practices, therefore, to address that, understanding student's prior knowledge is always inspired by experts. According to Rosca (2012), a good way to empower cognitive development of the students is to make the students link up between the concepts that they already have and the concepts they newly achieve from the teachers. Hence, the science teachers of this school, implement this through evaluating the prior knowledge of the students before delivering each lesson to understand how much the students already know and from where they need to start.

From the analysis of the collected data, it can be said that the teachers of the school are using Visual displays, documentary, hands on activity, group/pair work, field trips, flash cards, poster presentations, carrying out experiments etc. depending on the topic they teach. According to Hinchcliffe (2000), these teaching methods are considered to be modern methods of instructions. The science teachers trying their best to engage every single student in the learning process through implementing various teaching techniques.

On a different note, Boumová (2008) described that a classroom with traditional techniques is often teacher centric, where the teacher is authoritative and sometimes humiliating as well. While applying the traditional method, students are considered to be empty books and the teacher is the one who has all the content to enrich the book. On the other hand, in a classroom with modern techniques, the teacher acts as a facilitator and organizer of the learning process which involves variety of teaching materials that are brought by the teachers. While applying the modern teaching techniques, the teacher aids the children to share the knowledge they already possess and then

further proceeds to deliver more content in relation to their prior knowledge. Boumová (2008) also mentioned that, the modern techniques enhance the student-teacher, parent-teacher, student-school and parent-school relationship.

For students' better engagement, parental involvement in day to day learning is very important. All the teachers stated that the classroom activities are also appreciated by the parents and they are very supportive in terms of providing resources when required. "The involvement of parents and other caregivers in their children's learning is crucial to their children's interest in and ability to learn science. Research shows that when parents play an active role, their children achieve greater success as learners, regardless of socioeconomic status, ethnic/racial background, or the parents' own level of education" (Henderson, 2002).

The assessment procedure of this school is also very progressive and not traditional. All the teachers mentioned that they have a good portion of marks for class participation and group/pair work. The students don't get the grades only based on their half yearly/final exam marks. Even the students get marks for the school attendance. As a result, each effort of the students matters to the teachers, which is extremely encouraging for the children.

5 out of 5 teachers have mentioned that they have students with different learning styles in the classroom. All of them have mentioned about students who are visual learners, some learn through personal experience which includes- experiments and field trips, group/pair work, hands on activities and some learn from listening to the teacher and the stories they share. Here, all 5 teachers mentioned that the question papers are also designed very creatively in order to address all types of learners. This kind of progressive assessment tools encourage all students to learn with fun and play and not for the sake of learning.

"The purpose of inclusive assessment should be to improve learning for all the students using the

methods and tools that enhance teaching and learning and act as an aid to the teachers at work. Inclusive assessment should have quite a range of assessment procedures in order to assess all types of students who have different learning styles" (Watkins , 2007).

Most teachers in this school are very enthusiastic and passionate about their profession as they all appreciate and look forward to receiving some good trainings and nurture their skills to achieve further. According to Kind (2009), a good teacher is the one who definitely should have knowledge about the content but most importantly, he/she must have the knowledge to deliver the content effectively and have the skills to engage the students in the class actively. Teachers' training is the key factor that plays role here.

Moreover, people often believe that the best teachers are those who have the best knowledge on the subject matter they teach, or the ones who are specialists on the content they deliver (Kind V. , 2009). However, we know that the teachers in this English Medium School who have been interviewed were not all from science background. Rather most of the teachers were from business background, but they are satisfied in providing content and knowledge to students and enjoying their career as science teachers in grade 1-4.

4 out of 5 teachers face many challenges while implementing the learned teaching techniques inside the classroom, especially when newly learned. If the trainings provided to them are effective and the teachers can be effectively evaluated after the trainings then it can support the teachers professionally through continuous addressing on the issues or challenges in the pedagogical practices. Acar (2014) says, that after providing the trainings to the teachers, the teachers should have a study group where they are going to discuss about what they learned in the trainings and their learnings shall be evaluated by providing fair opportunities to implement the learned techniques inside the classroom.

3 out of 5 teachers expressed that they have limited resources in the school to facilitate the teaching techniques they have learned in the trainings. As a result, they often use their personal resources in the classroom which often becomes costly for the teachers and they often get discouraged to perform in the expected way.

Learning and implementing that knowledge in real life scenario always have a gap in between. Since the reality is never constant. As a result, the teachers learn about classroom environment with time and shape up their mode of instructions continuously through taking classes in the real classroom environment by facing all those real-life challenges themselves and resolving them. But this is also true that additional aids and opportunities of trainings can surely make their teaching styles better as the teachers become more aware of the students' learning capacity and resources to be used in the classroom (Acar E. , 2014).

At present it is a different situation in the whole world due to the pandemic- Covid-19. Considering this very situation of Covid-19, the teachers had to completely shift to the virtual platforms in order to continue the education of the children. Both the students and the teachers are learning to cope with the new normal in the process, said T4, (Interview#4, 25/2/21).

To be able to conduct the classes virtually teachers need sufficient technological knowledge. "International Society for Technology and Education (ISTE) offers standards for educators and identifies 14 critical elements for using technology for learning. Using these guidelines and the suggestions for remote learning published after the spread of the coronavirus will help teachers use this approach to learning to minimize the effects school closings can have on academic progress. Some of the recommendations ISTE and Ed Surge suggest during coronavirus closures include implementing methods to ensure equity, communicating expectations clearly, and providing student-centered learning. Also included in these recent publications are

recommendations to use free online resources and to respond to the emotional toll a pandemic can have on students and teachers" (Morgan, 2020).

All the 5 teachers mentioned about using Zoom App for conducting classes online and they are using google classroom for all the classwrok, homework and assessments. With each passing day the teachers are learning new things and options to be used during the classes to make it more engaging and interesting. T3 talked about the breakout rooms in Zoom App where they can divide the class of 25 students into several groups and make them work on a given topic. According to T3, the students enjoy the group activities in breakout rooms as they can interact with their peers other than interacting with the teachers only (Interview#3, 20/2/21).

All 5 teachers have mentioned that eversince this pandemic started, they have been getting different types of trainings which they require to cope with the new normal. T1 and T3 said, they have received trainings on the uses of mobile apps in the virtual classes to make it interesting. They got trainings on incorporating games in the virtual classes, how to have an engaging class in a virtual setup, dealing with technological issues.

From the beginning of this pandemic, we have seen that the education sector is one of those sectors that could adapt with the changing situation very well making use of the flourishing Apps in the world of technology. "Since the effects of the coronavirus crisis on education systems first became apparent in South East Asia early in 2020, education companies and technology businesses have ramped up their marketing of products to support online learning considerably. Many companies, including video-conferencing and educational content providers, have offered up previously for-fee services for free for temporary periods, alongside celebrity figures posting live streaming educational content from workouts and dance classes to guest lessons and online Q&A sessions. To a significant extent, these charitable offers have provided many tools and resources to enable

educators to meet the high demands of switching to online teaching under extremely tense conditions and in tightly compressed timelines. Perhaps more importantly, they may help parents, now responsible for supporting their children's remote education, to keep their children occupied, active, and mentally stimulated during periods of population lockdown, isolation and quarantine" (Williamson, 2020).

3 out of 5 teachers mentioned that although they are using google classroom where they can get the assessments of the students done, there remains a huge doubt on the honesty of the children. Since everything is taking place in a virtual setup, it is almost impossible to actually know if the students have taken any sort of help from any external source or not during the assessments. T4 mentioned that they have received instructions from the higher authority of the school to be lenient on that matter considering the present situation. On the other hand, school authority is trying their best to make the parents aware of the situation, so that they also cooperate from home as much as possible to ensure the learning through online platform at its best (Intervie#4, 25/2/21). In order to address the students with different learning styles the teachers are trying their best even in the online platforms. Although they are currently taking general assessments for all the students but the paper contains a mixed pattern of questions that has objective type questions, picture identification and labelling and analytical questions.

The current situation is such that, to ensure that the education is being received effectively, all the stakeholders including teachers, students, parents and the school authority has to take their portion of responsibility honestly and with dedication, or else the students will suffer.

5.2 Conclusion:

After conducting the research, I am actually enlightened with a lot of new findings related to different pedagogical practices the school is implementing along with the execution of appropriate assessment procedures that suit best to the teaching techniques they use. The teachers are also getting suitable trainings provided by the school to support them for implementing the teaching techniques in the science classrooms effectively. Every student is different, so these progressive ways are really effective to address each of their learning styles in the best way possible. To come out of that traditional ways of conducting classes and assessments we should focus on learning the concept of the subject than on memorizing the theories. As educators, we should try and create enthusiastic learners in the school and not the ones who are bored and unwilling to act.

During the interviews, after talking to the teachers (participants), I got a very positive vibe about the environment of the school. The impression is such that due to the implementation of the innovative teaching techniques in the science classrooms by the teachers, the children in the school come and enjoy their classes, interact with the teachers fearlessly and learn at their own interest. They are here not just for the sake of getting some good grades in the end but to gain knowledge through this educational process.

In reference to (Boumová, 2008), we understand that the modern techniques are more effective and welcoming for the students compared to the traditional techniques. Hence, it is clear that since this English Medium School is using the modern techniques such as arranging Group/pair work, Demonstrating Flash cards and chart papers, Verbal explanation, Field trips, Hands on activity, Experiments and Visual displays and documentaries to teach science subject, it is very effective as it constantly ensures the quality of the education. They are trying to improve in pedagogy so that the learning can take place in the best possible way.

To have an effective teaching-learning environment, the assessment procedure also plays a very crucial role. The participants came up with variety of ways to assess their students in a very innovative way that includes, analytical questions, multiple choice questions, extracting information from visual display, Oral Quiz and not just through some traditional tests for assessing remembering. This is how they are ensuring a proper linkage between the kind of education they are providing and the ways they are assessing the students.

To keep up the proficiency and efficiency of the teachers, the teachers of the school are receiving several trainings every year which they find very effective for developing their professional skills and knowledge and benefit the students in the best possible manner. Even in this crisis situation of pandemic, the school is running as smoothly as possible, the classes are going on online, the assessments are being taken online and the necessary trainings on utilizing the online teaching tools and methodologies are also being provided to the teachers to cope with this changing situation. Thus, the school is trying its finest to ensure the education of the students at its best.

In order to improve the situation of the education sector of Bangladesh as whole, we must focus on the good pedagogical practices which are implemented by different schools, be it Private or Public schools. Because there is no boundary towards improvement. I believe, this research will help not only English Medium but Bangla Medium Schools as well, to learn how to incorporate fun in learning and make the class more interactive, effective and full of joy.

5.3 Recommendations:

From the above-mentioned analysis and research, I believe that there are some criteria which still needs a focus. From the participants' discussions and as per my own understanding, I would suggest the following:

➢ The class-time can be increased from 45 minutes to 1 hour at least for once in a week where the teachers can allocate the activities that they want for the particular topics. This would help both the teacher and the students to finish the activity with enough time in hand and learn better without interruptions.

➢ The teacher student ratio could be lessened in order to have an even more effective class, where the teachers can interact one-to-one and benefit the students in the best possible way.

➢ The teachers' trainings need to be more relevant to the kind of work they do and the school authority should not repeat the trainings for the same teachers instead train them on something fruitful.

➢ Whenever the schools are providing a certain training on teaching techniques to the teachers, it should immediately have the necessary resources in order to encourage the teachers to implement the techniques in their classrooms. Resources surely need to be ample.

Education in Bangladesh has become a luxury, especially the ones provided in the English Medium Schools. It is very important that the Government Public Schools and private Bangla Medium Schools also come on the same page as the English Medium schools in terms of their teaching techniques and assessments. Through this study, I intend to benefit the educators out there, both in English and Bangla Medium Schools who would research more on this particular

topic and gather knowledge actively to implement the best kind of teaching techniques and incorporate the best possible teaching-learning tools and methodologies in the curriculum. The educators should have a growth mindset through which they can have an open mind to learn throughout their professional career for betterment of themselves as well as to benefit all the stakeholders involved in the education sector.

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Appendices

Appendix-A:

Letter of consent:

Dear concern,

You are being asked to take part in a research study that I am conducting for my MEd Thesis. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. Please read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information.

The purpose of this study is to understand the teaching learning approaches that are used in the Science classroom in an English Medium School in Bangladesh and how these pedagogical practices are being executed among the children. Through this study the perception of the teachers towards implementing certain approaches will also be understood as well as how the teachers are being prepared through necessary trainings for implementing such methods.

Please fill up the consent form below to take part in the research:

☐ I…………………………………… voluntarily agree to participate in this research study.

☐ I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.

☐ I understand that I can withdraw permission to use data from my interview within two weeks after the interview, in which case the material will be deleted.

☐ I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.

☐ I understand that participation involves disclosing my personal feedback and opinion.

☐ I understand that I will not benefit directly from participating in this research.

☐ I agree to my interview being audio-recorded.

☐ I understand that all information I provide for this study will be treated confidentially.

☐ I understand that in any report on the results of this research my identity will remain anonymous. This will be done by changing my name and disguising any details of my interview which may reveal my identity or the identity of people I speak about.

☐ I understand that disguised extracts from my interview may be quoted in dissertation, conference presentation and published papers.

CONSENT

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Participant's signature _____ Date _____

Appendix B-

Semi- Structured Interview Guidelines for Teachers

1. What are the new progressive approaches and materials for teaching do you use in your science classroom?

2. Do you have special need children in your school?

3. How do you address the intellectual need of the special need students in your classroom?

4. How do you plan your lessons for benefitting all the students in the classroom?

5. How often do you change your teaching approach?

6. What support or contribution do you receive from the parents in terms of the readiness of the students?

7. What kind of trainings do you get?

8. How often do you receive trainings for the teaching techniques and lesson planning?

9. How effective these trainings are?

10. Do you need more support to implement the approaches effectively? If yes, how?

11. What are the major barriers to implementing the progressive approaches from your point of view?