

Teacher's Understanding of Educational Technology (EdTech) in the
Teaching and Learning Process at GPS in Chattogram

By

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fulfillment of the requirements for the degree of
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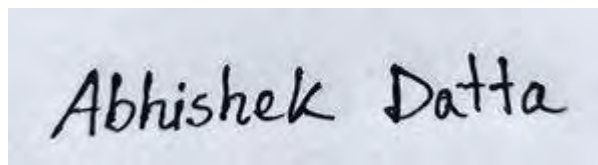
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Declaration

It is hereby declared that

1. The thesis submitted is my 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.

Student's Full Name & Signature:

A photograph of a handwritten signature in black ink on a light-colored background. The signature reads "Abhishek Datta" in a cursive, slightly slanted font.

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Approval

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Ethics Statement

I, Abhishek Datta, hereby solemnly affirm that for the manuscript titled “Teachers' Understanding of Educational Technology (EdTech) in the Teaching and Learning Process at GPS in Chattogram,” the following conditions are met:

- This work is my original creation and has not been previously published or submitted elsewhere.
- All sources utilized in this manuscript are properly acknowledged and cited. Text that is directly quoted is identified with quotation marks and appropriate references.
- All participants in this research willingly agreed to participate.
- The identities of the participants in this research are kept confidential, protected, and will not be disclosed at any time.
- The findings are appropriately contextualized with respect to both previous and current research.

Abstract

This study explores the integration of educational technology (EdTech) in government primary schools (GPS) in Chattogram, focusing on teachers' perceptions, current practices, and the support and challenges they face. Through in-depth interviews with six primary school teachers and headteachers, complemented by two classroom observations, this research highlights the impact of EdTech tools on student engagement and learning outcomes. Teachers reported increased student interest, improved comprehension through multimedia content, and alignment with diverse learning styles. Despite these benefits, challenges such as lack of training, insufficient resources, and heavy workloads hinder effective implementation. The findings provide valuable insights into the role of EdTech in enhancing educational experiences and inform future strategies for effective technology integration in primary education. Further research is recommended to explore longitudinal impacts and comparative analyses across different regions.

Keywords: Educational Technology (EdTech); Government Primary Schools (GPS);

Teacher Perceptions

Dedication

To all the government primary teachers who are thinking outside the box and bringing innovation to their classrooms, ensuring quality education despite numerous challenges.

Acknowledgement

I would like to express my heartfelt gratitude to my supervisor, Nazmin Sultana, for her insightful guidance and invaluable feedback. Her sincere support and expertise have been instrumental in shaping this research. Additionally, I extend my thanks to all the participants who generously dedicated their time and shared their experiences during the interviews, making this study possible.

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List of Acronyms

Acronyms:

1. EdTech - Educational Technology
2. GPS - Government Primary Schools
3. ICT - Information and Communication Technology
4. HT - Head Teacher
5. RQs - Research Questions

Chapter 1

1.1 Introduction

Background

Incorporating Educational Technologies (EdTech) into the teaching-learning process has become a significant global trend, substantially enhancing students' performance and fundamental skills. The integration of technology into educational methods by teachers has demonstrated notable improvements in students' critical thinking and problem-solving abilities through interactive and hands-on activities (Bhasin, 2012). EdTech provides various opportunities for students to engage in real-world scenarios, fostering the development of advanced cognitive skills such as analytical thinking and problem-solving (Oliver et al., 2012). However, the effectiveness of these technological integrations relies heavily on teachers' perceptions and their preparedness to seamlessly incorporate EdTech into subject-specific teaching techniques (Oliver et al., 2012). Understanding educators' views on using EdTech is crucial for successful implementation and maximizing its potential to enhance learning.

1.2 Research Topic

The research title of this thesis is “Teachers' Understanding of Educational Technology (EdTech) in the Teaching and Learning Process at GPS in Chattogram.” The research explores the teacher’s understanding of practices, challenges and scopes of Educational Technology in the field of primary education.

1.3 Statement of the Problem

The goal of Bangladesh's policy makers has been to improve both the availability and quality of education since 1990, driven by international conventions such as the Education for All and Sustainable Development Goals. In the Jomtien convention of 1990, the importance was given

to not just getting basic education, but also to the quality of education and the real results of learning (United Nations, 2010). In the declaration of SDG Goals, it is stated in goal no 4 that, we must ensure inclusive and quality education for all, from early childhood to adulthood, including gender equality, skills development, and promoting sustainable development, while improving learning environments and increasing access to education in developing countries (The UN Bangladesh, 2023).

According to a report from BANBEIS, the Net Enrollment Ratio in the Government Primary sector is 97.5 %, including 51% of them being female students. The student teacher ratio is 1:33. Internet used for pedagogical purpose in the formal education sector is 56.09% (BANBEIS, 2023).

Due to the global spread of the COVID-19 pandemic, the education of approximately 85% of children across the world (which accounts for more than 1.6 billion students altogether) faced disruption. Consequently, there was a significant loss of learning (World Bank, 2020).

An immediate evaluation of the students' reading and math abilities in a study during the Covid 19 pandemic, revealed a drop in the childrens' capacity to grasp the fundamental four numerical skills (numeric interpretation, numerical differentiation, addition, and recognizing and finishing patterns) at 25.8%, a decrease from 27.9% in 2019, with no evident shift in their reading aptitudes. The proportion of children possessing fundamental reading skills remains extremely low (UNICEF, 2022).

Over a prolonged period, this disruption is expected to result in reduced development of 'human capital' and fewer economic prospects. The extensive closure of schools prompted numerous educational systems to adopt 'distance learning' through radio, TV, online platforms, and mobile devices. This greatly accelerated a long-standing tendency to implement technology in

education (referred to as 'EdTech') on a large scale, which had been gradually progressing for many years (World Bank, 2020).

As a result, we can see that there are resources accessible for integrating educational technology into the Primary education teaching and learning process. However, few of the existing facilities have been used or accessed by the teachers and school. The primary goal of this research is to understand how teachers view the potential applications and obstacles of educational technology and understanding of teacher's perception on usage of EdTech as well.

1.4 Research Questions

This study is guided by three research questions which intend to explore the Teachers' Perceptions of Educational Technology (EdTech) in the Teaching and Learning Process at GPS-

1. How do GPS teachers perceive the EdTech in the teaching-learning process?
2. How are EdTech tools currently being used in the teaching-learning process?
3. What are the supports and challenges of implementing EdTech in the classroom?

1.5 Purpose of the Study

Bangladesh has roughly 10.75 million primary school students, the majority of whom live in poverty, according to the Education Ministry (Rafe,2020). Despite the massive number of students, Bangladesh's primary education system is still managed traditionally, using only textbooks and centralized resources, provided by the government and board. Because of this, the majority of elementary school children are unfamiliar with the contemporary educational system (Alam, 2020),

According to the Covid 19 Response and recovery plan of Bangladesh Government, aligning with the long-term plan and vision 2041, involves incorporating remote learning into regular schooling using a blended approach, utilizing methods like e-tutorials and e-lectures, to ensure smooth transitions to distance learning, facilitated by educational technology, when necessary, with a focus on minimizing learning gaps and including all types of learners, including those in non-formal education and out-of-school settings. Additionally, low-tech methods like radio, SMS, and offline apps will be explored for marginalized groups. The aim is to create a sustainable Remote Learning Platform by developing necessary support systems, such as content creators, teacher ICT training, and improving ICT infrastructure in primary education (MoPME, 2020).

The above study will explore the existing and potential support system of educational technology used by the teachers in the GPS in the Chattogram. The study will also look into the challenges that teachers face “while using educational technology in the teaching and learning process”. For exploring the perception of the teachers on edtech.

1.6 Significance of the Study

The vision of SMART Bangladesh revolves around building SMART citizens who will be innovative, creative, and critical thinkers. To ensure SMART education for them, the World Economic Forum reported six elements to accelerate education for SMART Bangladesh. It highlighted the importance of developing and coordinating digital content to ensure inclusivity and personalization in education (Moni, Chowdhury, & Ahmed, 2023).

A study's conclusions showed that educational technology has, for the most part, had a beneficial influence on teaching and learning in Bangladesh. However, a significant portion of the outcomes from this research were based on tiny samples. Furthermore, it is challenging to

determine whether improved teaching techniques have been maintained over time due to the dearth of data on the initiatives' longer-term effects (Zubairi et al., 2021).

The government has introduced ICT-related subjects in the GPS and if we consider Bangladesh's future priorities of incorporating technology into education, then the research study around the usage of educational technology is of prime importance.

As the study will explore different existing scopes and challenges from teachers' perspectives, this will help the policymakers to fix the issues in incorporating ed tech in the teaching-learning process, especially in the Government's Primary sector. As such research is limited in the Primary sector on this issue, this will add value in further research and making data-driven decisions.

1.7 Summary

The introduction of Educational Technologies (EdTech) worldwide is reshaping education, impacting student performance through technology-infused teaching methods. EdTech holds the potential to enhance core skills via interactive activities, fostering advanced cognitive abilities such as analytical thinking and real-world problem-solving. Teachers play a pivotal role in this transformation, requiring preparation to seamlessly integrate technology into subject-specific teaching techniques.

The research's focus is on "Understanding Teachers' Perceptions of EdTech in the Teaching and Learning Process at GPS in Chattogram." It explores EdTech practices, challenges, and opportunities in primary education, employing a qualitative approach with participants primarily from the Chattogram district.

The COVID-19 pandemic disrupted education for millions globally, accelerating the adoption of distance learning and EdTech on a large scale. Bangladesh's commitment to improving education quality aligns with international conventions and Sustainable Development Goals.

The study's significance lies in its potential to inform policy decisions and further research in the primary education sector. While EdTech has shown promise in Bangladesh, more extensive and long-term research is needed to gauge its sustained impact. The research is a critical step towards harnessing EdTech's potential in the teaching and learning process, particularly in government primary schools, where such studies are scarce. Ultimately, it seeks to facilitate data-driven decisions and improvements in education quality.

Chapter 2

Literature Review and Conceptual Framework

2.1 Overview

In this chapter, I looked at different sources of information like books, articles, and documents about Educational Technology. I carefully studied what teachers think about using technology in teaching and how it's used in classrooms. I studied theories relevant to EdTech and its implications. I went through these materials to help with my ongoing research, where I'm analyzing the resources, creating a guide for interviews, and writing a discussion. I've organized this chapter into different parts with a clear structure: Educational Technology (EdTech), Relationship between Edtech and Teaching Learning process, existing Support of Edtech and teaching-learning process, Challenges of Edtech and teaching-learning process and conceptual framework.

2.2 Educational Technology

The goal of educational technology is to specify and provide an interactive environment for learners' activities for their quick, simple, long-lasting education and learning in line with their preferences and traits (Ahmadigol, 2016).

According to the 'World Bank edtech approach paper', EdTech, which stands for educational technology, involves the utilization of hardware, software, digital materials, data, and systems for information in the realm of education. It aids and enhances both teaching and learning processes while also elevating the management and provision of education (World Bank, 2020).

Educational technology, often includes hardware such as computers, tablets, and webcams, as well as software like simulations, Learning Management Systems (LMS), and cutting-edge technologies such as augmented reality (AR) and virtual reality (VR) environments. The development of these technologies is grounded in educational theories related to behavior, cognition, and knowledge construction, which are applied throughout the technology development process (Bouchrika,2024).

2.3 EdTech and Teaching Learning Process

EdTech has positive impacts on the teaching and learning process as it improves personalized learning and creates a learner-centered learning environment, where students can learn based on their interests and individual needs. Personalized learning is the process through which technology facilitates or promotes learning based on specific traits that are relevant to or significant to learners (Major et al., 2020).

There is an immense importance of visual models, scaffolding, and peer collaboration as effective practices in educational technology, both in traditional and online learning environments. The focus is on communication, group projects, and collaborative tools that enhance student engagement, retention, and knowledge in technology-enhanced environments (Icard, 2014).

Google Docs and Google Drive are effective tools for student collaboration on group projects and assignments, fostering academic success (Icard, 2014).

Game-based learning involves active play through digital games, promoting critical thinking skills and engagement. It integrates content with gameplay, aiding the brain in processing information from short- to long-term memory. Tools like KaHoot, a web-based game, enhance student participation and competition in both online and traditional learning environments (Icard, 2014).

The use of audiovisual content in the classroom helped to foster learner-centered environments where it was able to observe students' behavior and thought processes while pointing at how technology can be adjusted to the needs of each individual student (Parvin et al., 2015).

Edtech can support learner-centered learning by encouraging connection between students and initiating peer learning, where teachers also build effective relationships with students (Shrestha, 2013).

The government of Bangladesh arranged a technology-enabled teacher professional development (TPD) initiative as part of Bangladesh's national curriculum reform. The Government of Bangladesh, with support from international partners, has introduced online orientation courses for teachers to supplement face-to-face training. This effort aims to reduce high-stakes exam pressure and enhance teaching practices through experiential learning and interdisciplinary approaches (Ahmed et al., 2023).

2.4 Support of EdTech

There is Edtech support in Bangladesh, as evidenced by the analysis of the Covid-19 distant learning process and the use of technology to improve educational access in Bangladesh at that time. In reaction to the closure of schools, the government started broadcasting regular classes for students of high school in March 2020 on 'Sangsad TV'. In addition to the Sangsad TV classes, these courses were also available on YouTube and on Konnect. Konnect is an online portal run by a2i which also provides electronic textbooks, life skills videos, and other educational resources (Beam et al., 2021).

Findings indicated that, during COVID 19, 36.7% of kids had the chance of having a tool in their household for remote learning, with 29% able to use it regularly or occasionally. In general, the time dedicated to studying (at home, school, or with a tutor) decreased from 363 minutes (6 hours) before COVID-19 to 123 minutes (2 hours) after school closure. To mitigate

the risk of learning setbacks, households took specific measures (Involving a home tutor 38.9%, Children engaging in self-learning 44%), and schools implemented strategies (Assignments by teachers 71.7%, homework 20%, phone-based monitoring 20.3%) (UNICEF, 2022).

One of the prime goals of Bangladesh's National Education Policy is to train all of the country's teachers in information technology so that they can promote extensive student use of IT. The policy also focuses on digital data collection and analysis methods (MoE, 2010).

ICT systems that collect data are gradually becoming more common. Scope of training on technology for teachers, online data gathering methods e.g. "Geographic Information System school mapping," and "the establishment of ICT centers in 125 upazilas" have opened up new doors for incorporating EdTech in the Primary education system of Bangladesh (GPE, 2020)

There is a significant program going on in the field of Educational Technology in Bangladesh named A2i, which is patronized by UNDP and USAID. A2i's goal is to prioritize ICT-led innovation in education so that teachers can share and co-create content while also making learning more fun, accessible, and available (a2i., 2022). It is centered on four topics.

These are:

1. Classrooms with multimedia capabilities: to use technology to improve the learning environment.
2. Teachers' Portal: Create a website where teachers may upload, share, retrieve, and discuss digital learning content.
3. "Muktapaath": To facilitate learning anytime, irrespective of distance, a "national e-learning portal" is being created.

4. Multimedia talking books: will make sure that all people with visual impairment may access educational material (a2i, 2022).

Innovative teaching methods can improve education when incorporating technology. For example, a randomized study in South African schools found that Virtual mentoring allowed a single mentor to achieve what three mentors did in traditional in-person coaching. Therefore, virtual mentoring shows real potential in addressing the issue of finding many high-quality mentors in struggling education systems (Evans, 2018).

2.5 Challenges of EdTech

The implications of Edtech in “the teaching and learning process” is a critical one. The minimal evidence indicates that implementing learner-centered learning using technology is not simple. To ensure a reliable evaluation of long-term technology-based education, the teaching and learning process should be examined through a longer period of time, “at least three years or more,” (Sharmin et al, 2011).

According to a survey conducted among 48 OECD countries, only 56% of the teachers received ICT training to effectively integrate educational technology, while more than 20% admitted that they are highly in need of professional development training to teach with technology. (Atlantis Group, 2019)

Insufficient infrastructure in poorer countries leads to many schools not having access to electricity and, in some cases, even basic internet connectivity. Additionally, teachers often lack the required tools and resources to make effective use of educational technologies (Atlantis Group, 2019).

2.6 Theories Related to EdTech

To dig deep into the perception of using educational technology in the GPS, I have explained two relevant theories- Connectivism and TPACK.

2.6.1 Connectivism

Connectivism, an educational theory, views learning as a networked result shaped by the intersection of technology and social interaction (Siemens, 2005). Within Connectivism, educational technology promotes critical thinking and problem-solving, enhancing learning outcomes (Herlo, 2017). In today's technological era, Connectivism, or distributed learning, offers a relevant framework. It allows for the active engagement with external information before knowledge becomes solely machine-driven, as noted by Siemens (2005), who stated that "learning can also occur in non-human entities" (Anderson et al., 2011). Siemens described the principles of Connectivism in a subsequent manner (Siemens, 2005):

Knowledge and learning depend on diverse viewpoints.

- Learning connects specialized nodes or information sources.
 - Learning can occur in non-human entities.
 - Acquiring new knowledge is more important than current knowledge.
 - Building and maintaining connections is crucial for continuous learning.
 - Recognizing connections between different domains, ideas, and concepts is a key skill.
- Obtaining accurate, real-time knowledge is the goal of connectivist learning.
- Decision-making is a form of learning process.

“Knowledge”:

Connectivism emerged in the age of information networks (Siemens, 2005), emphasizing the accessibility of networked technologies from any location. In this framework, learning focuses

on creating flexible connections relevant to both present and future contexts. According to connectivism, knowledge is limitless, and learners are tasked not with memorization or complete understanding, but with the ability to access and use information as needed (Siemens, 2005). Connectivism suggests that knowledge and learning are spread out, not confined to one place. They are made up of complex networks formed through experiences and interactions between people, societies, institutions, and technologies. Knowledge is conceptualized as a dynamic, fluid process coursing through these human and artifact networks. As it traverses and becomes integrated into the network, it is open to multiple interpretations and evolution. Knowledge resides within networks, free from any single possessor, with the capability of being stored in various digital formats (Siemens, 2005).

Downes (2006) explains the emergence of knowledge as the summation of four elements:

Context - the localization of information sources within a network.

Salience - the repetition of a pattern within the network. If a signal triggers the activation of previously engaged connections, it is deemed salient.

Emergence - the evolution of patterns within the network. When a pattern becomes salient to an observer, it emerges within the network.

Memory - the persistence of connectivity patterns arising from and related to salient signals or perceptions. Given the constant evolution of information, its relevance evolves with new contributions to the field.

“Learning Community”:

In connectivism, learning begins when knowledge is applied by learners in engagement with a learning community. These communities are characterized as clusters of similar interests where interaction, sharing, dialogue, and collective thinking occur (Siemens, 2005). Active

participation fosters interactions among learners and community members, including those with more expertise. In the context of the web 2.0 era, these interactions involve not only text but also visual elements like video and multimedia.

“Nodes”:

The connectivist model characterizes the learning community as a node, embedded within a larger interconnected network.

Nodes appear at different points within a network and can include institutions, libraries, websites, periodicals, databases, or other information sources (Siemens, 2005). Networks link two or more nodes to share resources. The size and strength of networks vary based on the amount of information and the number of people using a given node (Downes, 2012). Effective networks are typified by the following attributes (Downes S., 2012):

Diversity - encompassing a broad spectrum of viewpoints.

Openness - mechanisms enabling the inclusion of various perspectives.

Connectivity - fostering connections among its nodes.

Learners can connect with networks that are small and local or large and global. They may explore various knowledge areas, as the boundaries between these areas are flexible. This allows learners to access a wide range of resources, created by both experts and the community, along with technology (Downes S., 2012).

“Networks:”

Learning happens when people create and navigate networks. By participating in these networks, connections are formed, changed, or removed. Learning involves recognizing meaningful patterns within these connections, which emerge through interactions both within

individuals and with their external environment, shaping understanding collectively (Downes S., 2012)

2.6.2 TPACK Framework

For understanding the perception of teachers' approach towards educational technology, let's consider the theory TPACK framework, which was developed by educational researchers Punya Mishra and Matthew Koehler in 2006 and has since become a widely recognized model for guiding technology integration in education.

According to the TPACK framework, key to effective teaching with technology rely on three fundamental elements: “Content, Pedagogy and technology” itself, along with the connections that interlink them. Equally vital are the intersections among these domains, denoted as PCK, TCK (technological content knowledge), TPK (technological pedagogical knowledge), and TPACK (Mishra et al., 2006).

For the sake of this paper, I will focus on TK, TPK, TCK and TPACK as the focus of this research is to identify the concept and intersections of the learning process with Technology.

TK: In the context of digital tools, this encompasses comprehension of operating systems and computer hardware, coupled with the adept use of standard software tools, such as text editors, spreadsheets, web browsers, and electronic messaging systems. TK encompasses proficiency in installing and uninstalling peripheral devices, software applications, and the creation and archiving of documents (Mishra et al., 2006).

TPK: TPK involves awareness of the existence, components, and capabilities of various technologies as applied in educational settings, as well as an understanding of how pedagogy may transform through the utilization of specific technologies. Understanding how technology can be used in different situations and for various purposes is a key part of TPK (Mishra et al., 2006).

TCK: TCK involves knowing how technology and content interact. Although technology sets limits on possible representations, modern technologies often provide new and diverse ways to represent things, making it easier to work with these representations (Mishra et al., 2006).

TPACK: TPACK is the core of successful tech-enhanced teaching, requiring an understanding of using technology to explain concepts, using it effectively for teaching, being aware of factors that make concepts easy or hard to learn and how tech can help, recognizing students' prior knowledge and theories of learning, and knowing how tech can build on existing knowledge or strengthen existing ideas (Mishra et al., 2006).

Effective utilization of technology in teaching cannot be achieved by simply introducing new technology into existing structures. To teach effectively with technology, there must be a transformation in the existing pedagogical and content knowledge (Koehler et al., 2013).

The TPACK framework underscores the significance of the context in which teaching and learning occur. Ignoring this context leads to generic solutions to teaching challenges. Teaching is inherently tied to its context, and teachers with well-developed TPACK use technology to create customized learning experiences tailored to specific teaching approaches, subject matter, and learning environments (Koehler et al., 2013).

As each teaching context is unique, with diverse interactions among technology, pedagogy, and content, there is no universal or one-size-fits-all solution to teaching. This diversity of possible responses shows the need for teachers to be active agents and designers of their own curricula (Koehler et al., 2013).

"teachers as designers"

The complex and dynamic nature of teaching with technology leads to the concept of "teachers as designers." Teachers are constantly engaged in the creative and iterative process of problem

identification and resolution. This design process doesn't stop when they create something; it continues as they adjust and use their designs in different situations (Koehler et al., 2013).

Various methods have been proposed for developing TPACK, but the emphasis on how teachers integrate technology is more crucial than what they integrate. In the following sections, I will describe two distinct approaches: learning technology through design and through activity types (Koehler et al., 2013).

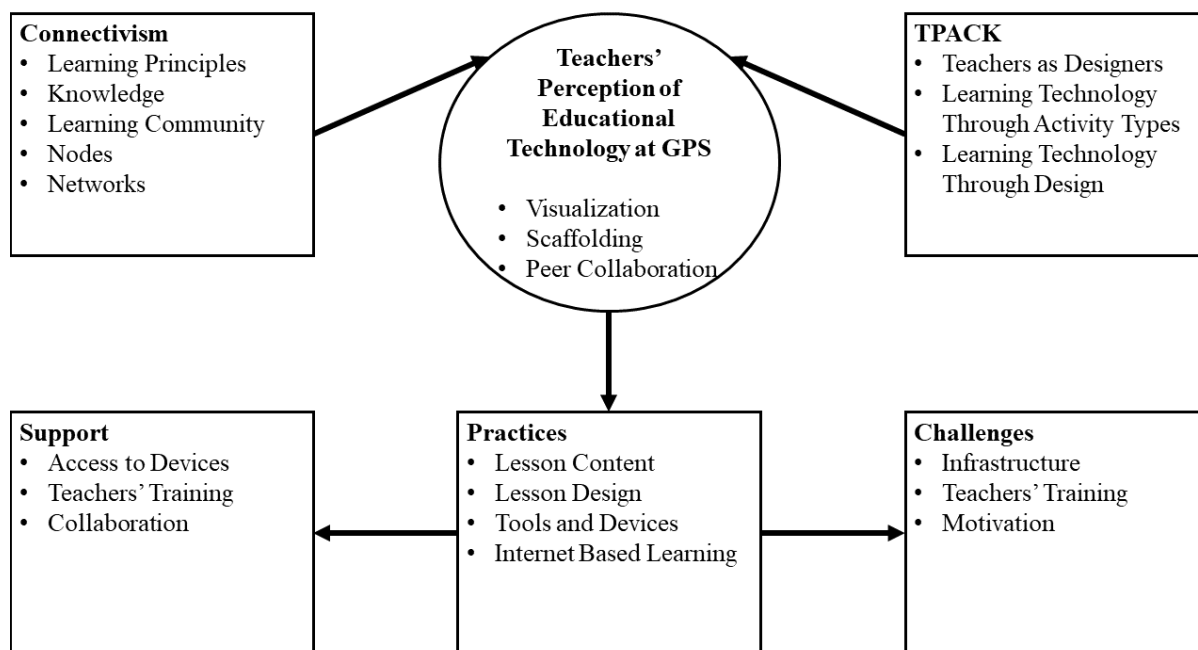
The learning technology through activity types:

The activity types approach builds on teachers' existing knowledge by aligning learning goals with domain-specific activities. Teachers start by setting learning goals, choose activities that fit these goals, and then select technologies that support these activities. This method guides teachers in making thoughtful decisions about integrating technology (Koehler et al., 2013).

The learning technology through design:

The learning technology through design approach has students create educational technology as part of their coursework. Working in groups, students start with challenging problems, which they gradually solve, feeling more engaged and accomplished in their studies. The instructor supports them as a facilitator throughout the process (Koehler et al., 2013).

Teacher educators should acknowledge that all technologies have unique strengths. Developing Technological Pedagogical Content Knowledge (TPACK) should start with familiar technologies and advance to more complex ones. Pre-service teachers should first learn familiar technologies and gradually face real teaching challenges. Understanding TPACK equips educators to teach effectively with technology in various contexts (Koehler et al., 2013).



2.7 Summary

Chapter 2 discusses Educational Technology (EdTech), which serves as the backbone for the whole research, encompassing research planning, interview guidelines, and discussion frameworks. The chapter meticulously dissects EdTech, emphasizing its broad scope, encompassing hardware, software, digital resources, data, and systems. EdTech's mission is to elevate both teaching and learning by enhancing educational management and delivery. Beyond usage of computers, EdTech includes tools like videoconferencing, multimedia projectors, and more. The narrative advances to discuss the relationship between EdTech and the teaching-learning process, highlighting how it fosters personalized and learner-centric education through audiovisual content and peer learning. Furthermore, the chapter spotlights the scope of EdTech in Bangladesh, especially during the COVID-19 pandemic, with initiatives like televised classes and ICT training for teachers. Challenges in implementing learner-centered learning using technology are acknowledged. The chapter concludes with an overview of two relevant theories: Connectivism and the TPACK framework. Connectivism views learning as a networked outcome influenced by technology and social interaction. It

emphasizes critical thinking and problem-solving. The TPACK framework focuses on the intersection of content, pedagogy, and technology in teaching. It highlights the importance of context and teachers as designers of their own curricula.

Chapter 3

Methodology

3.1 Overview

Chapter 3 discusses the methodological aspects of the research, providing an overview of the approach adopted to investigate teachers' perceptions and practices of Educational Technology (EdTech) in Government Primary Schools (GPS). The chapter explains the data collection methods employed, encompassing semi-structured interviews and classroom observation. Additionally, the data collection process, outlining the steps taken to ensure ethical concern and participant consent. In my research, I ensured credibility and rigor by employing varied methodologies, gathering data from multiple sources, seeking peer feedback, verifying data with participants, and maintaining documentation and analysis throughout the study. The chapter ends with a picture of the data analysis process, describing the thematic analysis approach.

3.2 Research Approach

Qualitative research involves in-depth analysis and justification of various social phenomena. When researchers aim to explore deeply into a nuanced and intensive comprehension of a topic, they opt for a qualitative methodology (Creswell & Poth, 2018). As for its characteristics, it unfolds in a natural environment, where I directly engage with participants to gather data. Instead of relying on a single format, I utilized various tools to collect data, ensuring a comprehensive approach (Rossman & Rallis, 2017).

In my study at GPS, I engaged myself in understanding how teachers perceive and use Educational Technology (Edtech) in their teaching methods. To grasp the participants'

perspectives effectively within our specific context, I had to meticulously examine their viewpoints (Rossman & Rallis, 2017). Given the diverse experiences and opinions on Edtech adoption across different settings, I chose to employ a Qualitative Approach for my research. This method entails systematically collecting, analyzing, and interpreting non-numerical data, which is characteristic of qualitative research.

3.3 Research Site

I engaged diverse participants related to the Government Primary Schools because the goal of this research was to investigate the perception of educational technology in “teaching and learning processes” in GPS. I selected Government Primary Schools in the Panchlaish and Chandgaon thanas of Chattogram as the research site for their diverse accessibility and potential resources. The goal was to explore perceptions of educational technology in "teaching and learning processes" within GPS. These schools were strategically chosen to include factors such as resource availability, socioeconomic disparities in the use of EdTech, and teachers’ perception from diverse demographic features. This site was particularly appropriate due to its accessibility, diverse participant pool, and potential to provide insights into the research questions.

3.4 Sampling and Sampling Procedure:

The research participants were purposefully selected. Purposive sampling is employed in qualitative research to find and choose participants in order to make the best possible use of scarce resources (Palinkas et al., 2013).

Purposive sampling allows researchers to strategically choose a relatively small sample of participants with specific characteristics that are most informative for their research question.

This method prioritizes in-depth understanding on the research topic. Researchers use their judgment to identify participants who can provide rich data, making it ideal for qualitative studies where exploring a topic in depth is key (Merriam & Grenier, 2019).

I needed the perception of the school's head teachers and teachers in order to investigate the problem. They might hold different perspectives, which was useful for the investigation.

In this investigation, a total of six participants were interviewed, comprising four assistant teachers from government primary schools and two Head Teachers. Additionally, two classrooms were observed on two separate occasions.

Table 3.1. *Distribution of Participants by Thana, Designation, and Gender*

Thana	Designation	Male	Female	Total
Panchlaish	Assistant Teacher	1	1	2
	Head Teacher	1	-	1
Chandgaon	Assistant Teacher	1	1	2
	Head Teacher	-	1	1
Total		3	3	6

Note: A dash (-) indicates zero participants in that category.

3.5 Data Collection Methods

I used two kinds of data collection methods for this study:

1. In depth Interview
2. Classroom Observation

In qualitative research, we use different sources of information to find common themes. We keep checking these themes to make sure they are derived from ‘Inductive Reasoning’ (Creswell & Poth, 2018). In this study, I interviewed assistant teachers and Head Teachers and observed some classes where EdTech has been used. I wanted to understand how teachers experience using EdTech in the teaching process, and what support they receive and challenges they face with it.

3.5.1 In-depth interviews with teachers and Primary teachers’ training instructors

Individual interviews were conducted face-to-face to gather data through interpersonal engagement with the participants. During these interviews, participants shared their real-life experiences, allowing researchers to gain insight into their perspectives and the significance they attribute to these experiences (Creswell & Ploth, 2018). This is why I opted for in-person individual interviews. I explored the perceptions and viewpoints of government primary teachers regarding educational technology in the teaching process, drawing from their classroom practices. Through these one-on-one interviews, I aimed to understand their perception on Edtech, how they articulate their support for and challenges with educational technology based on their classroom experiences. Four government primary teachers engaged in these phone interviews, their classrooms also being observed. To facilitate this, I crafted an interview guide tailored for in-depth discussions. The guide for teachers’ interviews comprised two sections: Part A focusing on teachers’ demographic information and Part B containing open-ended questions concerning their perceptions, classroom practices, support, and challenges related to educational technology. The questions were structured around three key areas:

(i) inquiries about teachers’ perceptions of educational technology in the teaching process, including queries such as "What are your thoughts on educational technology?" and "What

tools do you utilize, such as projectors, digital learning materials, presentation slides, and visuals, in your teaching and learning process?";

(ii) Exploring the implementation of educational technology in primary classrooms, with questions like "How does the integration of educational technology in the learning process impact students' overall learning experience?" and "What skills do you focus on while incorporating educational technology in the teaching and learning process?"; and

(iii) exploration of opportunities and challenges associated with educational technology, with examples including "What challenges did you encounter during distance learning?" and "What strategies do you envision to overcome these challenges?"

Furthermore, additional probing questions were asked to extract detailed insights, such as "Can you provide an example?" and "Could you elaborate further?"

3.5.2 Classroom observation

Observation of classrooms serves as a primary method for gathering qualitative data, driven by the research objectives and inquiries. Through this method, researchers explore the physical environment, participants, and their interactions (Creswell & Ploth, 2018). In this investigation, I employed classroom observation to address two significant research questions: How are EdTech tools currently being used in the classroom-based teaching-learning process?

What are the support and challenges of implementing EdTech tools in the classroom?

The observation sought to explore the integration process of EdTech within teaching practices. The average class size consisted of approximately 30 students. Two classes, each taught by different teachers, were observed across two distinct government primary schools. The teaching of two subjects provided insight into the implementation process and teachers'

perception of EdTech. To guide the observation process, I kept an observation protocol focusing on the integration of EdTech tools, as well as their support and challenges. Examples of checklist items included: identification of EdTech tools employed in the classroom, examination of how tool designs were integrated into lesson plans, and classroom management strategies, including student engagement and behavior. Additionally, I took some extra notes if needed.

Table 3.2 *Data Collection Methods*

Research Questions	Tools	Data Source	Nature of Method
What is the perception of teachers on EdTech in their classroom?	Semi Structured Interviews	Teachers, HT	Qualitative
How are EdTech tools currently being used in the classroom-based teaching-learning process?	Semi Structured Interviews, Observation	Teachers, HT	Qualitative
What are the supports and challenges of implementing EdTech in the classroom?	Semi Structured Interviews, Observation	Teachers, HT	Qualitative

3.6 Data Collection Process:

Prior to starting the data collection, I obtained consent from the selected participants. Subsequently, I arranged interview times that suited both parties, clearly outlining the study's objectives. Prior to each interview, I sought participants' permission and informed them of the recording for future reference.

Before initiating interviews with teachers, I scheduled appointments and provided consent forms. During the interviews, I explained the process and purpose of the research, while also inquiring about their well-being to establish rapport. Following an informal approach, I posed questions regarding educational technology, aiming for a natural and conversational interview. For instance, I asked, "What's your understanding of EdTech? What tools do you typically use?" rather than the more formal "What's your opinion on Educational Technology? Do you utilize EdTech tools such as projectors, digital learning materials, presentation slides, and visuals in your teaching? If so, which tools?" The duration of each interview was 15 minutes on an average, maintaining consistency for both groups of participants- assistant teachers and the head teachers.

For the purpose of classroom observations, I communicated with the HT of the school and took the appointment of the class from the teacher with a verbal permission from the HT. I kept the observation protocol with me and silently observed the whole class from lesson planning to students engagements and classroom strategies. I pointed out the students behavior, classroom performance and teacher instructions in my notebook to observe the class from a holistic perspective.

3.7 Data Analysis Process:

I have used the 'Thematic Analysis' procedure for the received data from the interviews and Classroom observation. In a qualitative data set, thematic analysis looks for patterns of meaning. A thematic analysis combines groups of data (in case of vast data) into categories based on commonalities, or themes. These themes assist us in understanding the information and deriving its significance (Creswell ,2014).

I adhered to the procedures outlined by Braun and Clarke (2006) for identifying themes.

1. *Acquaintance with the data*: Initially, I engaged in comprehensive examination of the transcriptions, immersing myself in the data. Furthermore, I iteratively listened to the recordings to capture the inherent message and took relevant notes.

2. *Generating primary codes*: During this stage, I meticulously arranged the data. I employed color-coded annotations to categorize discrete segments of information from the transcripts, aligning them with my research inquiries. This process involved utilizing color distinctions on physical copies of the transcriptions and organizing them according to specific codes.

Table 3.3 *Generate Initial Quotes*

Interview Extracts	Codes
Yes, certainly. When I teach students, I certainly take different support from educational technology such as audio devices. Sometimes to increase the attention of the students, I share videos or slides to the students. (T1)	Audio Devices Slides
When we take classes using these tools, we can relate students with reality. If a student has not seen tigers in real life, we can just show a video regarding this and make him/her recognize the animal through it. In this process, we can lead students from the imagined world to the real world. (T2)	Connection with the real world Use of materials
When I bring any sort of technology in the classroom, they shout in joy. That means they have an interest here. Therefore, their attention and interest is superior when technology is used. My lesson execution is becoming easier and structured. (T3)	Practices in lesson Designing
the amount of time and mental preparation the teachers require, they cannot afford them. Such as, a teacher has to manage the tasks of maintaining student stipend (Upobritti). For managing stipend, the teachers need to collect various information from the students. Sometimes we see election responsibilities are also given to the teachers. (T3)	Experiences of the teachers Workload Motivation
All of the materials that we use in our traditional classrooms such as images, stories, drama etc are more effective in nature when we use these	

materials through a digital tool. Instead of just telling about shapes, circles, when we can demonstrate them with real visuals, it becomes clearer to the students. (HT 1)

HT support
Support in
School

Anytime. I always keep my door open. They are even set up in the classes, so that they can use it easily. (HT1)

The salary is not enough to live a good life. In foreign countries, the most talented people come to the primary sector, as it is the root of education. Then if our primary sector remains neglected in such a way, all of the interventions become ineffective. If we want to develop the country holistically, we need to invest in the Primary sector. (T4)

Our school provides wifi, which many schools don't have. During the Covid pandemic, we had to work on different apps such as google meet, zoom etc. We created a whatsapp group, shared the schedule and link to join the classes.

3. *Exploration of sub-themes:* I partitioned the codes into overarching subcategories. Through meticulous examination, I allocated the codes to their respective sub-themes. For instance-

Codes	Subthemes
<ul style="list-style-type: none"> • Audio Devices • Slides 	<ul style="list-style-type: none"> -Integration of laptops and digital screens - Utilization of audio devices for enhanced learning
<ul style="list-style-type: none"> • Connection with the real world • Use of materials 	Improved comprehension through multimedia content
<ul style="list-style-type: none"> • Practices in lesson Designing • Experiences of the teachers 	Enhanced efficiency in lesson delivery
<ul style="list-style-type: none"> • Workload • Motivation 	Time constraints and heavy workloads
<ul style="list-style-type: none"> • HT support • Support in School 	Institutional support and resources

4. *Evaluating the sub-themes:* I meticulously recorded all data related to specific sub-categories to ensure accurate representation. Subsequently, I integrated them into broader themes. During this process, I revisited each sub-theme to align them with themes relevant to the research questions. For Instance-

Codes	Sub themes	Themes
<ul style="list-style-type: none"> • Connection with the real world • Use of materials 	Improved comprehension through multimedia content	Teachers' perception on the impact of EdTech tools

5. *Clarifying themes:* I refined themes to ensure precise representation. For example, upon reviewing the themes “Teachers’ perceptions of EdTech tools” and “Current practices in the classroom”, I thought of dividing the themes into several aspects such as from the impacts on teachers and students separately so that I can get a better understanding of the perception on teaching and learning side of the process.

6. *Documentation:* Lastly, I incorporated the developed themes into the results and analysis sections of the report.

3.8 Ethical issues and Concern:

The researcher must take informed consent from the participants, consent of parents or guardians in case of minors. The participants will also be granted immunity to any kind of psychological or physical harm and the option to withdraw themselves from the research at any point of time (Johnson, B., & Christensen, L, 2004).

I took consent of the participants before conducting any interviews or arranging group discussions for them. Their information was kept confidential, and pseudonyms were used if required. In the case of minor participants, consent was obtained from their guardians. No biased perceptions or inputs were provided during or after the data collection process, nor during the interpretation of the collected data.

3.9 Credibility and Rigor:

Credibility in research refers to the expectation that all the results of the study are trustworthy and accurate to the readers. On the other hand, Rigor is something where “the researcher is being thorough, responsible, reasonable, and accurate (Williams & Kimmons, 2022).” Credibility and rigor can be achieved through “Prolonged engagement, Triangulation, Peer Debriefing and Member Checking.” Investing enough time and effort during field works and data analysis processes can ensure prolonged engagement. Using different methods and data sources can form a strong format of triangulation. Peer debriefing can be helpful while constructing research tools. The member checking can allow the participants to suggest any correction or explanation if necessary (Williams & Kimmons, 2022).

In my research, I ensured credibility through utilizing varied methodologies, seeking feedback, verifying data, and maintaining a clear record.

Triangulation- I gathered data from different sources and through various means. This encompassed interactions with government primary teachers teaching classes, HTs perception regarding the topic and classroom observations. Employing both individual interviews and classroom observations, I delved into teachers' views on integrating Edtech in the teaching process.

Validation - I engaged in discussions with a colleague who serves as a research staff, reviewing the alignment of data collection methods with research objectives and preliminary interpretation of findings. Furthermore, oversight and feedback were provided by my academic supervisor.

Verification - I shared interview recordings and observation records with participating teachers to ensure that the study accurately captured their perspectives.

Documentation - Prior to initiating my thesis, I conducted an extensive literature review to identify research gaps. This involved scrutinizing numerous scholarly works and documents. Drawing from this review, I formulated methodologies, such as interviews to explore teachers' perspectives and classroom observations to assess their practices. Pilot interviews were conducted to refine data collection tools based on participant feedback. Subsequently, data analysis involved thorough examination to extract key themes and sub-themes. Finally, in the discussion chapter, I contextualized my findings with existing literature, extracting points of alignment and non alignment while considering all of the data.

3.10 Limitations of the study

I've already taken several steps to enhance the credibility and trustworthiness of the study. However, there are still some additional measures that could further strengthen my research:

1. Mixed-Methods Approach: Integrating quantitative data, such as surveys or standardized test scores, alongside qualitative data from interviews and observations could provide a more comprehensive exploration of the use of EdTech and teachers' perspective on it in regard to student engagement and learning outcomes.

2. Peer Review: Seeking feedback from external experts or peer reviewers on the research design, data collection methods, and analysis procedures could help identify blind spots or areas for improvement, enhancing the rigor and validity of the study.

3.11 Summary

This chapter explains research approach, research site, sampling procedure, data collection methods, and thematic analysis process. The chapter explores the qualitative nature of the

study, emphasizing the depth and richness of information. Through purposive sampling, diverse perspectives of teachers and headteachers from Government Primary Schools were derived, contributing to a understanding of EdTech utilization in GPS. The employment of semi-structured interviews and classroom observation facilitated the gathering of rich data, to answer the research questions. Ethical considerations were meticulously addressed, ensuring participant consent and confidentiality. Overall, Chapter 3 serves as a methodological exploration, guiding the research journey towards the generation of nuanced insights into teachers' perceptions and practices concerning EdTech in GPS.

Chapter 4

Results

4.1 Overview

The results chapter focuses on key themes related to GPS teachers' perceptions of educational technology (EdTech) tools, their current practices, and associated support and challenges. I did a thematic analysis of the data on the institutional support they receive, and their perceptions of educational technology through the lenses of challenges and opportunities.

Table 4.1: *Themes and Subthemes:*

Perception of Teachers on EdTech	Teachers' practices and experiences with EdTech	Challenges for effective implementation	Support for the Teachers
- Increased student interest and participation	- Usage of EdTech tools	- Lack of teacher training and skills	- Access to EdTech Tools
- Improved comprehension through multimedia content	- Importance of Wi-Fi access	- Insufficient technology resources and large classrooms	- Ongoing Training Programs and Peer Support
- Alignment with diverse learning styles	- Enhanced efficiency in lesson delivery	- Time constraints and heavy workloads	
	- Reduction in content preparation time		
	- Improved teaching effectiveness		

4.2 Perception of Teachers on EdTech:

4.2.1 Increased student interest and participation: EdTech tools captivate students' attention and foster active engagement in the learning process. Teacher 4 observed, *"They feel a lot of amusement. When they can see the visuals slide by slide, it becomes easy"* (Interview 4).

Teacher 3 provides insight into this approach, stating, *"In case of using technology, I can see that the students are more attentive."*

Teacher 5 highlights this aspect, stating, *"Students receive the learning very easily. While taking traditional classes without preparing content (digital), it becomes difficult for us to make the students understand the topic."*

From the classroom observation, students were seemed to be very captivated about the digital contents that demonstrated to them. In one of the grade 2 class, students were very joyous while chanting poems alongside a video that was playing in the audio device.

4.2.2 Improved comprehension through multimedia content: Visual and auditory elements in EdTech tools facilitate better understanding and retention of educational material. Teacher 2 noted, *"The students receive the learning very easily"* (Interview 2).

Moreover, the integration of interactive elements, such as videos, colorful images, and audio clips, facilitates deeper understanding and retention of concepts. Teacher 4 provides an illustrative example, stating, *"For example, when I was teaching a poem on Rainbow, I prepared the letters based on 7 colors of the rainbow. It created a lot of interest among the students."* By leveraging EdTech tools, teachers bridge the gap between abstract ideas and real-world applications, thereby enhancing student comprehension and engagement.

4.2.3 Alignment with diverse learning styles: EdTech tools cater to varying learning preferences, accommodating visual, auditory, and kinesthetic learners effectively. Head

Teacher 1 highlighted, *"All of the materials that we use in our traditional classrooms such as images, stories, drama etc are more effective in nature when we use these materials through a digital tool"* (Interview 5).

Teacher 2 expressed that *"It is significantly beneficial to the students who have a learning gap. The remedial intervention can be covered easily for the lagged behind students."*

Teacher 1 stated, *"When I use technology even the inattentive students become spontaneous and attentive. By this process I believe I can easily achieve the learning outcome."*

Furthermore, teachers utilize a variety of digital resources, including videos, audio clips, and online platforms, to augment traditional teaching materials. Teacher 6 elaborates on this practice, mentioning, *"Generally, I use video contents for teaching the content."* This multifaceted approach not only caters to diverse learning styles but also cultivates an immersive learning environment that promotes active student participation and collaboration.

4.3 Teachers' practices and experiences with EdTech:

4.3.1 Usage of Educational Technology:

Teachers across interviews emphasized the extensive use of multimedia projectors in delivering educational content. Teacher 2 mentioned, *"In the case of technology, we use multimedia (projector) predominantly"* (Interview 2).

Teacher 4 describes the positive impact of multimedia content, noting, *"Students can easily get the learning through visuals from the screen through a projector."*

Laptops and digital screens complement traditional teaching methods, offering dynamic visual aids. Teacher 4 highlighted, *"Then came the laptop, sound box and digital screen"* (Interview 4).

Audio devices are employed to ensure clear audio transmission during multimedia presentations, contributing to improved comprehension. Head Teacher 1 stated, *"We have 3 projectors, 4-5 audio devices..."* (Interview 5).

Wi-Fi access facilitates the incorporation of online resources and communication tools, enriching the teaching-learning process. Head Teacher 2 noted, *"For including technology, we must need wi-fi"* (Interview 6)

4.3.2 Enhanced efficiency in lesson delivery: Multimedia tools enable teachers to cover curriculum content more efficiently, leading to better time management and increased productivity. Teacher 4 mentioned, *"If I need to finish a lesson within 7 days, I can finish the lesson in 2 days if I use technology"* (Interview 4).

Teacher 2 said, *"If I have prepared a lesson and executed it in the classroom (with technology), the teacher has to talk less and it gets easier to make the students understand easily."*

From classroom observation, it was found that classroom management was efficient because of using edtech tools. In the grade 5 classroom, a group work on identifying healthy foods from images was conducted smoothly in a large classroom of above 45 students.

4.3.3 Reduction in content preparation time: Despite initial preparation requirements, teaching with technology often results in shorter lesson delivery times and smoother classroom experiences. Teacher 3 noted, *"My task is becoming easy and I am turning into more productive. The outcome or result of the class is way better than the normal classes."* (Interview 3).

Teachers also get support from government online resources, from where they can prepare their classroom lessons. Teacher 1 described, *“There is a teacher ID in the online platform called ‘Shikhhok Batayon’, in which the lessons are organized and demonstrations are given. So, even if we don’t prepare the lesson, we can watch or download the videos from that site.”*

However, different perspective about the online resources came from another HT. As while talking about the existing digital content support for the teachers, HT 1 pointed out, *“There are lots of contents in our “Shikhhok Batayon” (an online portal), but the contents are not in an organized manner. If we could structure the lessons based on chapters and lessons, we could use them easily.”*

4.3.4 Improved teaching effectiveness: Teachers perceive EdTech tools as effective aids in content delivery, resulting in more engaging and impactful teaching practices. Teacher 3 stated, *“My lesson execution is becoming easier and structured” (Interview 3).*

Head teacher 2 noted, *“When I take traditional classes I can achieve the learning outcome for only 80% of the students. But when I use digital content I can achieve the learning outcome for 100% of the students.” (Interview 6)*

4.4 Challenges for Implementation

4.4.1 Lack of teacher training and skills: Many teachers lack the necessary skills and training to effectively integrate EdTech tools into their teaching practices, hindering implementation efforts. Teacher 3 mentioned, *“As far as I know, no one has received any training on ICT till now. I don’t know if anyone has received any training such as ICT training to my knowledge.” (Interview 3).*

He also added, *"The private sector can help here with the training. If I want to take the training from the government it will be very late."*

Teacher 2 emphasizes the importance of building confidence in using technology, stating, *"There is a fear of trying out new things."*

Teacher 1 mentioned, *"We need to identify the challenges of using technology in the classroom. We need to come forward with government and non-governmental initiatives"* (Interview 5).

Teachers require thorough and continuous training on computer literacy and EdTech tools to enhance their skills and confidence in using technology in the classroom. Head Teacher 2 stated, *"To me, for taking such classes a teacher must have a good skill in browsing the internet"* (Interview 6).

Teacher 5 emphasizes the significance of training, stating, *"The teachers will be able to contribute a lot if they are provided with training on technology."*

4.4.2 Insufficient technology resources and large classrooms: Schools often face challenges in providing adequate access to technology tools, limiting the use of EdTech in classrooms. Teacher 2 noted, *"We have at least six classrooms in our school, but there is only one multimedia projector"* (Interview 2).

There is a need for better maintenance and updating of technological tools, as Head Teacher 1 pointed out, *"But due to school closure and less use during the Covid 19 pandemic, the board expired. The use of technology has decreased since."*

Teachers face difficulties to utilize EdTech in their classroom effectively due to the large number of students. Teacher 3 said, *"In a standard scenario, the student teacher ratio should be 30:1. But in our primary schools, we have 70 to 80 students in one classroom. So it becomes*

difficult to cover all of the students. In such a situation, it is not possible to engage all of the students using a projector.”

Teacher 4 also pointed out the same issue, *“The main challenge is the excessive number of students. On the other hand, I need a fair amount of time to prepare the content. For this, I need a gap. But we cannot afford the gap due to lack of enough Teachers. So we need more Teachers. If we can have a gap, we will be able to perform more spontaneously.”*

In the classroom observation, it was identified that the sound of the audio from the device was not clear to the whole classroom resulting in chaos and confusion.

4.4.3 Time constraints and heavy workloads: Teachers struggle to find time for content preparation and training amidst heavy workloads and teaching schedules, impacting the effective implementation of EdTech initiatives. Teacher 3 highlighted, *“For managing stipend, the teachers need to collect various information from the students” (Interview 3).*

Head teacher 1 identified the challenge of time management, noting, *“The main challenge for teaching government primary teachers here is the abundance of classes for a single teacher It is difficult to manage time to prepare such contents.”* Moreover, Head Teacher 1 underscores the need for organizational support, stating, *“It would have been better if we could give teachers some free spaces before a class, more tools for them.”*

4.5 Support for the Teachers:

4.5.1 Access to EdTech Tools:

Most teachers mentioned having access to multimedia projectors. Teacher 4 noted, *“From the government, in the case of tools, we received a multimedia projector at first.”*

Head Teacher 1 told, *“In our school we have a projector, audio device and multimedia digital board. I used to enjoy using the multimedia digital board in my classroom. But due to school closure and less use during the Covid 19 pandemic, the board expired. The use of technology has decreased since.”*

These tools are available to facilitate the preparation and delivery of digital content. Teacher 4 highlighted, *“Then came the laptop, sound box, and digital screen. These four tools are there for us to use.”*

Teacher 4 emphasized the importance of having access to school Wi-Fi, noting, *“For including technology, we must need Wi-Fi. Our school provides Wi-Fi, which many schools don't have.”*

Head Teacher 1 indicated that teachers have open access to technological tools, saying, *“Anytime. I always keep my door open. They are even set up in the classes, so that they can use it easily.”*

4.5.2 Ongoing Training Programs and Peer Support:

Teachers received specific training on Information and Communication Technology (ICT). Teacher 4 shared, *“For creating the contents I got a 12-day training on PowerPoint. I keep that learning with me dearly and try to apply it in my teaching.”*

Head Teacher 2 came up with this point, *“As there are several schools in a certain thana, all of the teachers don't receive training at the same time. Only three of our teachers have been included in the thana ICT training. So all of us are not trained and a sense of inertia persists when we take such classes.”*

Teachers' also mentioned holding Cluster-Based Retraining Opportunities that they received previously. Head Teacher 1 mentioned the importance of ongoing training, stating, *“We have to arrange retraining opportunities for them on a cluster basis, as we previously had.”*

Teachers often help each other with technology use. Head Teacher 2 observed, "*As there is a lack of skills, teachers face challenges and have to take the help of other teachers who have the skill and knowledge.*"

4.6 Summary:

The chapter explores GPS teachers' perceptions and experiences with educational technology (EdTech), highlighting increased student engagement, improved comprehension, and alignment with diverse learning styles. Teachers benefit from using multimedia tools for efficient lesson delivery and enhanced teaching effectiveness but face challenges such as inadequate training, insufficient technology resources, and time constraints. Despite these challenges, access to EdTech tools and ongoing training programs provide crucial support, underlining the need for continued professional development and institutional backing to optimize EdTech integration in education.

Chapter 5

Discussion and Conclusion

5.1 Introduction

The aim of this chapter is to analyze the findings associated with the research questions. This chapter includes a discussion of GPS teachers' perceptions of EdTech, their current classroom practices, and the support and challenges associated with implementing these technologies. Furthermore, the chapter provides recommendations based on the analysis to enhance the effective integration of EdTech in the teaching-learning process.

5.2 Discussion

GPS teachers recognize the great impact of EdTech tools on student engagement and learning outcomes. By embracing innovative approaches to teaching and leveraging digital resources effectively, educators can create dynamic and inclusive learning environments that empower students to thrive in the digital age. Through targeted support and a commitment to overcoming challenges, GPS schools can harness the full potential of technology to enrich the educational experiences of all students.

Research Question 1: How do GPS teachers perceive the EdTech in the teaching-learning process?

GPS teachers generally perceive EdTech tools positively in the teaching-learning process. They observe that EdTech significantly increases student interest and participation, making lessons more engaging. According to Keengwe et al. (2008), teachers noted that incorporating digital tools like multimedia projectors and laptops in classrooms greatly enhanced student

engagement and participation. They found that visual and auditory components helped students understand and remember the material more effectively. (Keengwe, Onchwari, & Wachira, 2008).

Teachers reported that visual and auditory elements facilitate better understanding and as EdTech tools cater to various learning preferences, and help them to prepare their lessons with activity-based contents. These tools enable teachers to create more dynamic and interactive lessons that appeal to a broader range of students, and effectively achieve the learning outcomes. Ruggiero and Mong (2015) found that Teachers who integrated technology into their classrooms observed increased student interest and participation. Utilizing EdTech tools enabled a more interactive and dynamic approach to lesson delivery, thereby enriching student learning experiences (Ruggiero & Mong, 2015).

Research Question 2: How are EdTech tools currently being used in the classroom-based teaching-learning process?

Teachers are actively incorporating EdTech tools into their teaching practices in several ways. They predominantly use multimedia projectors, laptops, and digital screens to deliver educational content, which helps in presenting dynamic visual aids that complement traditional teaching methods. A study by Keengwe and Onchwari (2009) highlighted that Teachers employ projectors, laptops, and digital screens to present content, thereby fostering interactive and captivating lessons. The incorporation of these tools has aided in the efficient management of class time and the thorough coverage of curriculum content (Keengwe & Onchwari, 2009).

The use of audio devices for recitation of poems or demonstrating relevant images, visuals through presentation slides ensures experiential learning for the students. Teachers also utilize school Wi-Fi to incorporate online resources and communication tools, enriching the teaching-learning process. Teachers also take help from digital contents available to them from government website or resources. The research by Batane and Ngwako (2017) indicated that the utilization of online resources by educators enhances the teaching-learning process, providing access to a broad array of educational materials and tools (Batane & Ngwako, 2016).

EdTech tools have improved lesson delivery efficiency, enabling teachers to cover curriculum content more quickly and manage their time more effectively. The study by Hsu (2016) found that Integrating EdTech tools such as multimedia projectors and digital screens enhanced lesson delivery and enabled teachers to streamline their time management in the classroom effectively. Consequently, this led to smoother and more productive classroom experiences (Hsu, 2016).

Research Question 3: What are the supports and challenges of implementing EdTech in the classroom?

Teachers generally have access to essential EdTech tools like multimedia projectors, laptops, digital screens, and Wi-Fi. These tools are provided to facilitate the preparation and delivery of digital content. Furthermore, teachers receive limited and specific ICT training and participate in cluster-based retraining opportunities, which help them develop the necessary skills to use technology effectively. Peer support also plays a significant role, with teachers assisting each other in overcoming technological challenges. The research by Atabek (2019) underscores the importance of peer support and continuous professional development to help

teachers overcome technological challenges and effectively integrate EdTech into their teaching practices (Atabek, 2019).

Despite the support, there are notable challenges. Many teachers lack the necessary training and skills to effectively integrate EdTech into their teaching practices, which can hinder implementation efforts. Schools often face difficulties in providing sufficient technology resources, limiting the extent to which EdTech can be utilized in classrooms. There is a large number of students in each classroom, and the devices are not enough to cover all of the classes or students at the same time. According to Keengwe et al. (2008), while teachers generally have access to essential EdTech tools, many lack adequate training and support to effectively integrate these technologies into their teaching practices (Keengwe, Onchwari, & Wachira, 2008).

Dinc (2019) highlighted that schools frequently face difficulties in providing sufficient technology resources, which limits the extent to which EdTech can be utilized in classrooms according to the number of students. The study emphasized the need for ongoing professional development and institutional support to overcome these challenges (Dinc, 2019).

Additionally, teachers struggle with time constraints and heavy workloads, making it challenging to find time for content preparation and professional development. Ruggiero and Mong (2015) identified time constraints and heavy workloads as significant barriers to effective EdTech integration. Teachers often find it challenging to allocate sufficient time for content preparation and professional development (Ruggiero & Mong, 2015).

These challenges highlight the need for ongoing professional development and institutional support to optimize the integration of EdTech in education.

5.3 Conclusion

In conclusion, the integration of EdTech tools in GPS classrooms has shown significant potential to enhance student engagement, comprehension, and accommodate diverse learning styles. While teachers have positively embraced these tools, recognizing their benefits in making lessons more interactive and efficient, challenges such as inadequate training, limited resources, and time constraints remain. Addressing these challenges through comprehensive training, better resource allocation, and ongoing support is crucial for optimizing the use of educational technology in enhancing teaching and learning outcomes. The recommendations aim to support teachers in overcoming these hurdles and fully harnessing the potential of EdTech in education.

5.4 Recommendations

Based on the findings and discussion, following recommendations have been made:

1. Comprehensive Training Programs for Teachers:

Hands-on sessions on technology integration, including multimedia projectors, digital content creation, and online resource utilization, should be provided on a cluster basis. Ongoing professional development should be offered to keep teachers updated with emerging technologies and pedagogical practices.

2. Enhanced Access to Technology Resources:

Sufficient resources, such as multimedia projectors, laptops, audio devices, and Wi-Fi connectivity, should be allocated to schools. Equitable distribution, especially in underserved areas, should be ensured to address disparities and promote digital inclusion. Additionally,

digital equipment should be allocated according to the size of classrooms in large schools, and proper maintenance should be carried out at regular intervals.

3. Promotion of Collaboration and Positive Mindset:

The formation of teacher communities or professional learning networks should be facilitated to enable the exchange of ideas, best practices, and resources. A positive mindset towards EdTech integration should be promoted by addressing fears, misconceptions, and resistance to change through targeted professional development.

4. Optimizing Teacher Workloads for Enhanced Educational Efficiency:

reduce teacher workloads by ensuring an adequate number of teachers relative to the student population and minimizing the need for extra classes. The administrative workload should be managed efficiently so that teachers can get enough time for their content preparation.

5.5 Scope for further study:

1. Further studies should properly evaluate the current training needs in EdTech to enhance targeted and effective professional development for teachers.
2. Investigating the state of infrastructure quality in GPS schools is crucial for identifying gaps and prioritizing improvements needed to support the effective implementation of educational technology.
3. The implementation of government policies on EdTech in GPS should be rigorously studied to promote standardized and equitable access to technological resources and learning opportunities.

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Appendices

Appendix A. Consent Letter

Research title: Teacher's Understanding of Educational Technology (Edtech) in the Teaching and Learning Process at GPS in Chattogram

Dear Respondent,

Greetings! I am Abhishek Datta, here with you for my thesis purpose and seek your cooperation. My thesis title is "Teacher's Understanding of Educational Technology (Edtech) in the Teaching And Learning Process At GPS In Chattogram". I am a M.Ed. student at BRAC University. In partial fulfillment of my Master's degree, I must prepare a research paper. The above study will explore the existing and potential scopes of educational technology used by the teachers in the GPS in the Chattogram. The study will also look into the challenges that teachers face while using educational technology in the teaching and learning process. In this respect, I seek your generous co-operation, and you are cordially requested to take part in this interview session. Note that all the information provided by you will be strictly confidential and your answers will not be published under any circumstances. Every effort will be made to respect participants' anonymity. The data will be analyzed by the researcher alone. Participants' actual names will be protected and will use pseudonyms if direct references are required. The researcher will hold interview notes and/or transcripts and store them securely.

Your kind response will be used only for this academic research, and this monograph report will not be published in the future. If you feel uncomfortable answering any questions, feel free to communicate with the interviewer. But you are requested to share your authentic reflection on the questions you are asked.

I would really appreciate it if I could take 35-40 minutes of your valuable time.

Thanks in advance.

Do you agree? (Put tick)

1. Yes

2. No

Signature

Appendix B. Interview Guide

1. How do you perceive Educational Technology (EdTech) in the context of your teaching?
2. What do you think are the primary benefits of integrating EdTech into the classroom?
3. Do you currently use EdTech tools such as projectors, digital learning content, presentation slides, and visuals in your teaching process? If yes, what specific tools do you use regularly?
4. How frequently do you use these tools, and in which subjects or activities do you find them most useful?
5. How does the use of EdTech impact your students' interest and participation in the learning process?
6. Can you describe any changes in student comprehension and retention since you started using EdTech tools?
7. How do EdTech tools cater to the diverse learning styles of your students?
8. What has been your overall experience with using EdTech in the classroom?
9. In what ways has EdTech improved your lesson delivery and teaching effectiveness?
10. What skills do you think are essential for effectively incorporating EdTech into teaching?
11. Have you received any training on using EdTech tools? If so, what type of training was most helpful?
12. What challenges have you encountered in integrating EdTech into your teaching practices?
13. Are there specific technical issues, resource limitations, or time constraints that hinder your use of EdTech?

14. What kind of support do you receive from your school or institution for using EdTech (e.g., access to tools, training programs, peer support)?
15. How accessible are the necessary technological resources, such as Wi-Fi and multimedia projectors, in your school?
16. What strategies or approaches do you think could help overcome the challenges associated with EdTech integration?
17. Are there any additional resources or support systems that would facilitate better use of EdTech in your teaching?
18. How do you envision the future role of EdTech in education, especially in your school?
19. What further improvements or innovations in EdTech would you like to see implemented?
20. Is there anything else you would like to share about your experience with EdTech or any additional thoughts on its impact on education?

Appendix C Classroom Observation Protocol

Subject	
Grade	
Learning Outcome	

Section	Teacher's Action	Student's Action
Teaching Learning process		
Learning environment		
Nature of Interactions		
Challenges		
Scopes		