

EXPLORING THE INTEGRATION OF TECHNOLOGY AS A PEDAGOGICAL TOOL AMONG GOVERNMENT PRIMARY SCHOOL TEACHERS IN BANGLADESH

By

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Declaration

It is hereby declared that.

1. The thesis submitted is my/our 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 that 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.

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Ethics Statement

Ethical approval for the study was obtained from the Med Research Ethics Committee of BRAC Institute of Educational Development (BRAC IED), BRAC University. Permission was taken from the school authorities to collect data. Before data collection, each participant was provided with an overview of the study's objectives and informed written/verbal consent was obtained.

Abstract

This study examines the integration of technology as a pedagogical tool among government primary school teachers in Bangladesh using the Technological Pedagogical Content Knowledge (TPACK) framework. It explores teachers' knowledge, practices, and challenges in adopting digital tools for classroom instruction. A qualitative approach was used, including semi-structured interviews and classroom observations with teachers from Dhaka and Chattogram. Findings reveal that while teachers recognize the benefits of technology for student engagement, they face barriers such as inadequate training, limited resources, and lack of institutional support. Additionally, a digital divide exists between urban and rural schools, affecting equitable access to technology. This study contributes to discussions on educational technology in Bangladesh, highlighting the need for policy reforms, improved professional development, and enhanced infrastructure to support effective technology integration in primary education.

Keywords: Educational Technology; TPCK; ICT Integration, Teacher Training; Government Primary Schools; Qualitative Research.

Dedication

This thesis is dedicated to my students from Bangladesh Mohila Somity Primary School, Teach
For Bangladesh, my teachers from BRAC IED, my family, and my husband,

Acknowledgment

I would like to express my sincere appreciation to my supervisor, Md. Mokarram Hossain, Lecturer at BRAC IED, for his generous support and guidance throughout the study. He was very present throughout the journey, and I thank him for this learning experience.

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Chapter 1

Introduction and Background

1.1 Introduction

The government has taken significant steps to incorporate technology in education, but its effective implementation at the primary school level remains a major concern. This study aims to investigate the knowledge levels and practices of government primary school teachers in Bangladesh regarding using technology as a pedagogical tool.

This study is rooted in the researcher's two years of experience as a primary school teacher and confidently explores the knowledge and use of technology among government primary school teachers.

The Technological Pedagogical Content Knowledge (TPACK) framework, introduced by Mishra and Koehler in 2006, serves as a theoretical basis for understanding the intersection of technology, pedagogy, and content knowledge (Mishra & Koehler, 2006, p. 1019). One of the key concepts of this framework is the use of technology as a tool for education. Technology should be used as a tool in the regular teaching-learning process. The main concept of this framework comes from Shulman's pedagogical content knowledge (Mishra & Koehler, 2006). Teachers require a certain level of knowledge to incorporate technology into their teaching. The main idea is to incorporate technology at pedagogical, theoretical, and methodological levels.

According to the National Education Policy 2010 (Ministry of Education, 2010), one of the major objectives of the government is to incorporate substantial knowledge of information and technology, math, science, and English. On page 13 of the National Education Policy 2010, under the section of Curricula and Syllabi, it was stated that along with other subjects,

“...Science and Information Technology are to be there in the syllabus as compulsory subjects for all students of diverse streams of primary education” (Ministry of Education, 2010, p. 13).

The TPACK framework underlines the complex interplay between technological knowledge, pedagogical techniques, and content knowledge. Existing studies in Bangladesh, such as those by Islam et al. (2023), Khan and Hasan (2013), and Islam (2020), highlight the transformative potential of ICT in teacher education. These studies emphasize the need for curriculum innovations, improved infrastructure, and targeted training for effective ICT integration. However, challenges such as insufficient infrastructure and limited training opportunities persist. This study aims to build upon these works by specifically focusing on government primary school teachers and their integration of technology using the TPACK framework.

1.2 Research Topic

This study explores the current level of knowledge that teachers have regarding technology. To incorporate technology as a tool in their regular teaching-learning method and the challenges they have. The participants of this study are government primary school teachers who will be selected from different geographical areas to maintain the data triangulation process and provide diversified knowledge.

This study also explores both familiar and unfamiliar causes and barriers to incorporating technology in the classroom, as well as to understand teachers' mindsets regarding the use of technology inside their classrooms.

1.3 Statement of the Problem

Despite commendable government efforts to infuse technology into education, implementing these initiatives effectively at the primary school level has emerged as a pressing concern. This

study aims to analyze the knowledge levels and instructional practices of government primary school teachers in Bangladesh regarding the incorporation of technology as a pedagogical tool.

The limited use of technology in primary education (Obaydullah & Rahim, 2019) has hindered the government's objective of providing extensive knowledge of information and technology, math, science, and English to students in Bangladesh. This problem is particularly evident in government primary schools where teachers have not fully integrated technology into their teaching practices. The COVID-19 pandemic has highlighted the need for a more vigorous technological framework in primary education with the shift to remote learning.

Traditional teaching methods persist in primary education due to the inadequate incorporation of technology, which may impact the effectiveness of the learning process (Obaydullah & Rahim, 2019). Additionally, students may face limitations in engaging with educational content if their teachers are not adept at utilizing technology as a teaching tool (Zhao, 2003). The inconsistency in resource availability among government primary schools aggravates these challenges.

Teachers' reliance on traditional teaching methods limits their ability to adapt to evolving educational needs (Mishra & Koehler, 2006; Zhao, 2003). The gap in technological knowledge may impact their capacity to incorporate technology effectively into their teaching methodologies (Mishra & Koehler, 2006). This insufficient integration of technology in primary education affects the overall structure of the educational process. It also interrupts the alignment with contemporary educational models that emphasize the connection of technology, pedagogy, and content knowledge (Obaydullah & Rahim, 2019).

To address these issues, this study explores the knowledge and practices of government primary school teachers, using the Technological Pedagogical Content Knowledge (TPACK) framework as a theoretical lens. The study seeks to explore the extent of technology adoption

and utilization in primary education, intending to contribute valuable insights to inform strategies for enhancing technology integration in primary education. Ultimately, it aims to support and foster a more responsive and effective educational system in Bangladesh.

1.4 Research Questions

This study examines how primary school teachers in Bangladesh integrate technology into their teaching practices, particularly in the post-COVID era. The study aims to comprehend teachers' perceptions, practices, challenges, and the impact of geographical variations on technology integration.

Research Question:

1. How do primary school teachers use technology in their everyday teaching?

Sub-questions:

- a) What are teachers' attitudes toward the integration of technology in their teaching practices?
- b) How do teachers incorporate technology to enhance student engagement and learning experiences?
- c) What types of technological tools do teachers commonly use in their classrooms?
- d) In what ways do teachers integrate technology to facilitate content delivery and student interaction?

2. What challenges do government primary school teachers face in integrating technology?

Sub-questions:

- a) Do primary school teachers have adequate knowledge and ideas to use technology inside the classroom?

- b) What barriers do teachers encounter in terms of infrastructure and resource availability?
 - c) How do teachers overcome or adapt to challenges in utilizing technology in resource-constrained environments?
3. How do geographical variations impact teachers' utilization of technology?

Sub-questions:

- a) How does the availability of resources and tools differ across various geographical areas?
- b) How does the geographical context influence teachers' strategies for incorporating technology?

The following text outlines a research study that aims to examine how government primary school teachers use technology as a tool for teaching and learning and what factors influence their practices. The study is guided by two key questions that are broken down into several sub-questions:

The study will provide insights into the perceptions, attitudes, and practices of government primary school teachers regarding the use of technology in their classrooms. It will also explore the challenges and influencing factors that affect their ability to integrate technology into their teaching methods.

1.5 Purpose of the Study

The study aims to evaluate how government primary school teachers in Bangladesh integrate technology into their teaching practices. It will collect teachers' views on technology, analyze how technology is used, identify challenges, and explore differences based on location.

The research seeks to understand teachers' knowledge and beliefs regarding the value of technology. It will also explore their comfort levels and willingness to use new tools. It will

examine the types of technology commonly used in classrooms and how teachers use these tools for instruction and student engagement. Also, the study will identify challenges related to infrastructure and resources, especially in low-resource environments. It will explore how teachers navigate these obstacles. The study aligns with the National Education Policy 2010, which emphasizes the need for technology knowledge at all levels of education.

1.6 Significance of the Study

The research on the integration of technology as a pedagogical tool among government primary school teachers in Bangladesh holds great significance due to several key aspects. Firstly, the study addresses a pressing issue in the education system of Bangladesh, which is the limited integration of technology in primary school teaching. The COVID-19 pandemic has further emphasized the need for effective technological tools in education, and this research aims to understand and overcome the challenges faced by government primary school teachers in incorporating technology.

Secondly, the research is aligned with the objectives outlined in the National Education Policy 2010 of Bangladesh, which emphasizes the need for substantial knowledge of information and technology, math, science, and English. The study aims to contribute to the fulfillment of these objectives by investigating the current state of technology integration in primary schools.

Thirdly, the findings of the research have the potential to influence policy decisions related to technology integration in primary education. By exploring the challenges faced by teachers and understanding the influencing factors, the research will provide valuable insights for policymakers to develop targeted interventions and strategies to enhance technology use in classrooms.

Fourthly, the study builds upon existing research on the transformative potential of ICT in teacher education in Bangladesh. Focusing specifically on government primary school teachers

and using the TPACK framework, it contributes to the academic discourse on technology integration, addressing gaps in knowledge, practices, and challenges at the primary education level.

Fifthly, the insights gained from the research can inform teacher training programs. Understanding teachers' perceptions, utilization patterns, and challenges can help in designing more effective training modules that equip educators with the necessary skills and knowledge to integrate technology seamlessly into their teaching practices.

Sixthly, the study's focus on how teachers incorporate technology to enhance student engagement and learning experiences directly speaks to the quality of education. By identifying effective strategies and challenges, the research aims to contribute to the improvement of the learning process in government primary schools.

Lastly, the consideration of geographical variations adds a nuanced layer to the study. Understanding how resource availability differs across regions and how teachers adapt to these differences can inform targeted interventions to address disparities and promote more equitable access to technology in education.

Overall, the study on the integration of technology in primary education in Bangladesh is highly significant because of its potential impact on teaching method and practices, educational practices, policy decisions, teachers' mindset, students' learning impact, and outcomes.

Chapter 2

Literature Review and Conceptual Framework

Previous research on technology in education and the use of technology as a pedagogical tool provides the basis for this study. The use of technology in education has been a common practice at every level of study worldwide. Like other countries, after the COVID-19 pandemic, the use of technology in education has increased in Bangladesh. For this study, previous research on the impact of technology on education has been selected. The selection criteria for the research papers are peer-reviewed and well-cited.

2. ICT and Technology Pedagogical Content Knowledge (TPCK)

2.1 TPCK Framework

The concept of Technological Pedagogical and Content Knowledge (TPACK) evolved from Shulman's (1986) Pedagogical Content Knowledge (PCK) framework. TPACK integrates technological knowledge with content and pedagogical knowledge. Studies by Angeli and Valanides (2009), Cox and Graham (2009), and Mishra and Koehler (2006, 2009) have explored this integration, emphasizing that teachers need to develop PCK before effectively integrating technology (Pamuk, 2012).

Koehler and Mishra (2006) proposed a TPACK framework that includes three core knowledge types: content knowledge (CK), pedagogy knowledge (PK), and technology knowledge (TK). Additionally, it encompasses four interrelated types: PCK, technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPCK). Researchers like Grossman (1990) and Tamir (1988) stress the importance of contextualized knowledge, including students' prior knowledge and learning difficulties.

2.2 Challenges of the TPCK Framework

Angeli and Valanides (2009) expand on the TPCK (Technological Pedagogical Content Knowledge) framework. They focus on how teachers develop TPCK to use technology in education. Their study explains that ICT-TPCK is a skill set that helps teachers combine technology with teaching methods and subject knowledge. Technology is always changing; teachers must learn how to use digital resources and also learn how to apply them in the classroom. The study highlights the challenges teachers face in integrating technology and suggests ways to improve ICT training and assessment.

One key finding is that many teachers do not receive proper training (Angeli & Valanides, 2009). They may know how to use basic technology, but they struggle to connect it with their teaching. Most training programs focus only on subject content, not on how to use technology to improve teaching and learning. This gap makes it hard for teachers to use technology in a meaningful way. The study also points out that measuring ICT-TPCK is difficult (Angeli & Valanides, 2009). Schools often test teachers' technical skills but do not assess how well they integrate technology into their lessons.

This study on technology integration in government primary schools in Bangladesh faces similar challenges. Many teachers have access to digital resources but lack proper training on how to use them in teaching. The Bangladeshi government has introduced digital education initiatives, but most teacher training programs focus more on traditional teaching methods than on how to integrate technology into lessons.

Greene and Jones (2020) reviewed how the TPCK (Technological Pedagogical Content Knowledge) framework is used in English as a Second Language (ESL) education. Their study found that technology can improve student engagement and learning when teachers effectively combine technology with teaching methods and subject content. They emphasized that teachers

need proper training to use technology in a way that supports language learning and helps students understand lessons better.

Just like in ESL education, teachers in Bangladesh need the right skills to combine technology with their teaching methods. However, many teachers lack proper training and support, making it difficult for them to apply technology in the classroom.

2.3 Extension of the TPCK Framework

Thyssen et al. (2023) expand the TPACK framework by adding digital culture and ethics, creating the DPACK (Digitality-Related Pedagogical and Content Knowledge) model. This model focuses on helping teachers. Make the teachers understand the responsible use of technology in education. It highlights that they must also teach students how to use it wisely and ethically.

The DPACK model can help teachers of government primary schools of Bangladesh to improve their ICT skills and also guide students in using technology and safety. Bangladesh is working toward a technology-driven education system under its 'Digital Bangladesh' initiative. To support this, teachers need proper training in both technology use and ethical awareness so they can prepare students for the challenges of the digital world.

Many government schools, especially in rural areas, do not have enough ICT resources or proper teacher training. Without these, teachers struggle to develop their skills and cannot teach students. The current study will explore the challenges of using technology and digital ethics and the way of building awareness for all by using insights from Thyssen et al. (2023).

Rodrigues et al. (2003) explored how teachers can develop ICT skills in science education through continuous professional development (CPD). They emphasized that teachers need both subject knowledge and ICT skills to integrate technology effectively into their lessons. Their

study highlights that training programs focus on practical applications of ICT so that teachers gain confidence and improve their teaching methods.

Rodrigues et al. (2003) proposed a CPD model that encourages teachers to collaborate and share experiences. This approach helps teachers to learn from each other and develop better ideas for using technology in classrooms. By working together, they can overcome challenges and become more confident in using ICT for student learning. Many teachers lack proper ICT training, making it difficult for them to use technology effectively in their lessons. Implementing a CPD-based training program in Bangladesh could help teachers develop the skills and confidence needed to integrate ICT into primary education.

2.4 Technology Integration in Education

McFarlane and Sakellariou (2002) emphasize that ICT plays an important role in enhancing science education. It supports both hands-on learning and virtual simulations. The authors said that technology works best when it has clear educational goals. It should also help students with scientific inquiry and reasoning.

In the context of Bangladesh's government primary schools, ICT can serve as a bridge between theoretical knowledge and practical application, helping teachers move beyond traditional rote learning. However, the successful use of technology depends on teachers' knowledge, training, and access to digital resources (McFarlane & Sakellariou, 2002). Just as McFarlane and Sakellariou (2002) highlight the need for aligning ICT with learning objectives in science education, the current study will work to find that teachers in Bangladesh are equipped with the skills and resources needed to integrate ICT effectively into their classrooms.

In another study, La Velle et al. (2003) highlight that ICT can transform teaching and learning by making lessons more engaging and interactive. Their study emphasizes that computer-based strategies capture students' interest and improve their understanding of complex topics. When

teachers use ICT in their lessons, students feel more connected and included in the learning process. This is a different approach from the traditional method. Technology also helps students to understand and visualize concepts through multimedia, simulations, and interaction. These strategies create a more stimulating learning environment where students are actively involved in knowledge construction.

In Bangladesh, ICT has the potential to improve lesson planning and instructional quality. Also, ICT can increase student engagement in government primary schools. In many classrooms, teachers follow traditional methods and a one-way lesson delivery system. This limits opportunities for critical thinking and problem-solving. By combining ICT, teachers can present lessons more visually and interactively. This allows students to be more creative. Digital resources such as videos and online learning platforms can make abstract topics more visual and understandable to students.

The current study aims to explore the realities of ICT integration as pedagogical tools in Bangladesh's education programs. While La Velle et al. (2003) emphasize the benefits of ICT, this study will examine whether teachers in Bangladesh have the skills, resources, and necessary training to use technology effectively. The success of ICT in education depends on how well teachers understand and utilize it in their classrooms.

Akter (2024) studied the digitalization of education in rural schools in Bangladesh. The research focused on how schools access and use digital resources and how digitalization impacts education. The findings show that digital technology can improve education in rural areas, but several challenges limit that. Many schools lack access to digital resources, have poor infrastructure, and do not have enough trained teachers. Another issue is that digital resources are not well integrated into the curriculum. Thus, it becomes difficult for teachers to use them effectively in lessons. The study also highlights that for digital education to be

successful, schools need better infrastructure, proper teacher training, and structured curriculum integration. Akter's (2024) findings show that ICT integration in schools will be ineffective without addressing these challenges.

Bicalho and Machado (2022) studied how teachers in a Brazilian primary school integrate ICT into their teaching and the challenges they face. Their study found that teachers mostly use technology to improve traditional teaching methods. Rather than completely transforming their approach. This aligns with the Augmentation and Modification levels of the SAMR model, where ICT is used to enhance lesson delivery without fully redefining how teaching happens.

However, the study also highlighted several barriers to effective ICT integration. Many teachers struggle with a lack of resources, limited training, and less confidence to use technology in the classroom. These issues make it difficult for them to fully explore the potential of digital resources. Without proper support and guidance, teachers often stick to familiar teaching methods rather than experimenting (Bicalho & Machado, 2022). Like in the Brazilian school, teachers in Bangladesh face similar challenges.

Ghavifekr and Rosdy (2015) explained how ICT integration impacts teaching and learning in Malaysian schools. Their study found that when teachers have access to digital resources and proper training, both teaching quality and student learning improve. They also emphasized that professional development programs play a key role in helping teachers use technology effectively in the classroom.

The Bangladeshi government is working to introduce multimedia classrooms in all schools under the 'Digital Bangladesh' initiative. The findings from this study highlight that successful ICT integration depends on providing teachers with proper digital resources, ongoing training, and strong institutional support.

2.5 Challenges for Integrating Technology in Education

Pelgrum (2001) explored the challenges that prevent schools from effectively integrating ICT into education. The study found that one of the biggest challenges was the lack of ICT resources. Many schools did not have enough computers or gadgets, making it difficult for teachers to use technology in their classrooms. Without proper access to these resources, schools could not fully implement ICT-based teaching methods.

Another major issue was the lack of teacher training (Pelgrum, 2001). Many teachers were not given the support they needed. As a result, even when ICT resources were available, teachers often did not know how to integrate them effectively. The study also pointed out that if teachers encountered technical issues, there was often no one available to help them, leading to discouragement.

Beyond these practical challenges, many teachers were not confident in their skills (Pelgrum, 2001). Some preferred the traditional teaching methods, while others were hesitant to change their approach. Without support and encouragement, teachers found it difficult to adopt new ways of teaching with technology.

Just like in Pelgrum's (2001) study, many teachers in Bangladesh face similar barriers, such as a lack of digital resources, insufficient training, and limited support. In rural areas especially, schools often do not have enough ICT resources, and teachers struggle to use technology in their classrooms.

Obaydullah and Rahim (2019) state that the Bangladeshi government has introduced digital resources in schools by providing laptops and multimedia equipment. Despite these efforts, teachers face many difficulties in using technology effectively in the classroom.

One major challenge is the lack of proper training for teachers (Obaydullah & Rahim, 2019). Many teachers do not have the skills or confidence to integrate ICT into their lessons. As a result, even when digital resources are available, they are often unused. Another issue is the shortage of technical support and learning resources. Teachers struggle to solve ICT-related problems and make full use of technology in their teaching. This study is on technology integration among government primary school teachers in Bangladesh. Like in Obaydullah and Rahim's study, teachers need proper training and ongoing support to use ICT.

Mia and Haque (2013) studied how primary school teachers in Bangladesh perceive and use ICT in their teaching. Their study found that many teachers have a positive attitude toward technology, but they often lack the necessary training to use it effectively. As a result, the use of ICT in classrooms remains low, even when digital resources are available.

The study also revealed that existing ICT programs in primary schools are very basic and do not provide enough support for teachers. Regardless of factors like age, gender, or school type, most teachers struggle to integrate ICT into their lessons. The researchers emphasized that teachers need more structured and practical training to develop confidence in using digital resources. To improve ICT use in education, the study suggested introducing specialized ICT training for teachers, setting up computer labs in schools, integrating ICT courses into teacher education programs, and making internet access and digital devices more affordable.

This study aims to investigate how ICT is being integrated into primary education in Bangladesh and what barriers teachers face. By exploring teacher experiences, resource availability, and professional development opportunities, this research contributes to the ongoing discussion on how digital learning can be improved in Bangladesh's primary schools. Ensuring that teachers receive continuous support, training, and access to technology will be essential for making ICT a meaningful part of education in the country.

2.6 Teacher Training and Professional Development in ICT

Khan and Hasan (2013) examined the challenges of introducing ICT in teacher-training programs in Bangladesh. Their study found that many obstacles make it difficult for teachers to learn and use technology. One of the biggest problems is the lack of digital equipment. Many teacher-training institutions do not have enough computers, software, or Internet access, which makes it hard for teachers to develop ICT skills. Without resources, both trainers and trainee teachers struggle to use technology in their lessons.

Another major issue is the lack of ICT training (Khan & Hasan, 2013). Many teachers do not receive enough guidance on how to integrate technology into their teaching. As a result, they often feel unprepared to use digital resources in the classroom. Khan and Hasan (2013) also found that many teachers are not motivated to use ICT. Some do not see the value of technology in education, many feel uncomfortable using new tools. Just like in Khan and Hasan's (2013) study, many primary school teachers in Bangladesh face similar challenges, such as a lack of training, limited resources, and low confidence in using ICT. Though digital resources are introduced in schools, teachers often do not receive enough support to use them.

Islam (2020) explored teachers' confidence in using ICT in government primary schools in Bangladesh. The study found that teachers' ability to integrate technology depends on their access to digital resources, proper training, and continuous support. Teachers who had access to ICT and received training felt more comfortable using technology in their classrooms. On the other hand, teachers who lacked these resources struggled to use ICT effectively. Just like in Islam's findings, many teachers do not feel confident using ICT because they do not receive enough training and support. Even when digital resources are available, teachers need proper guidance to use them effectively in their lessons.

2.7 Importance of Professional Training

Fernandes et al. (2020) explained that professional development programs support science teachers in using digital technologies. Their study reviewed 76 research papers to understand the effectiveness of these programs. They found that many training programs do not provide enough practical support, making it difficult for teachers to apply digital resources in their lessons. Many teachers in Bangladesh struggle to use ICT because of inadequate training programs. A well-structured training will make teachers feel confident or prepared to integrate technology into their teaching.

Lawless and Pellegrino (2007) explored how professional development programs help teachers integrate technology into their teaching. They found that many training programs do not consider teachers' prior knowledge and do not set clear goals, which makes it difficult for teachers to apply their knowledge in real classrooms. The study also pointed out that most training programs are too short and do not provide ongoing support. Many teachers attend workshops where they are introduced to digital resources, but after the training ends, they do not receive enough follow-up assistance. Thus, teachers often feel unsure about how to integrate technology into their lessons. The research emphasized that successful ICT integration requires continuous learning, hands-on practice, and long-term support to help teachers gain confidence and skills. In Bangladesh, many teachers receive limited ICT training, and when they do, it is often brief and lacks follow-up support. Even when schools introduce digital resources, teachers do not always receive enough guidance on how to use them effectively.

Aslan and Zhu (2016) explored the factors that influence how pre-service teachers in Turkey integrate ICT into their teaching. Their study found that three key elements shape teachers' ability to use technology: pedagogical knowledge, ICT-related training, and confidence in

using digital tools. Teachers who receive proper training, develop strong teaching skills, and feel confident with technology are more likely to integrate ICT into their lessons. However, when these factors are missing, teachers struggle to use technology in meaningful ways.

The study also revealed that these factors together accounted for 17% of the differences in how teachers use ICT. This suggests that teacher education programs need to focus on developing ICT skills and improving teachers' confidence in using digital resources. Without proper training and ongoing support, teachers may not feel prepared or may avoid using technology altogether.

Just like in Turkey, many teachers in Bangladesh face challenges with ICT integration because they lack proper training, struggle with pedagogical knowledge, and do not feel confident using digital tools in the classroom. Even when schools provide technology, teachers may not always know how to use it effectively to enhance student learning.

Archambault and Barnett (2010) studied the connection between teachers' use of technology and their confidence in teaching. Their study found that teachers who regularly use digital resources in their classrooms tend to feel more confident in their teaching abilities. The study also highlighted that teachers gain confidence in technology through experience and continuous training. When schools provide ongoing support and opportunities for teachers to practice using ICT, they are more likely to integrate technology into their lessons. Without proper guidance and ongoing assistance, teachers may avoid using ICT or use it ineffectively.

2.8 Digital Education and Online Learning in Bangladesh

Das (2021) explored the challenges and opportunities of online education in Bangladesh during the COVID-19 pandemic. The study highlighted that while digital learning allowed education to continue during school closures, it also exposed major difficulties. Many teachers and students struggled with weak internet connections, a lack of proper devices, and limited

experience with technology. Teachers found it difficult to adapt to virtual teaching because most had no formal training in conducting online classes. The study also emphasizes that students in rural areas face greater challenges due to poor internet access and financial constraints. Das (2021) stated that improved infrastructure, trained teachers, and equal access to technology are important for positive outcomes.

In Bangladesh, students and teachers in rural areas face difficulties due to weak infrastructure and limited resources. Das (2021) also discussed student engagement. Students find it difficult to focus because of the weak infrastructure.

The BRAC (2016) report, *Primary Education in Bangladesh Goes Digital*, examines how technology is being introduced in primary schools to improve teaching and learning. The report highlights that multimedia classrooms and interactive digital content have made lessons more engaging for students. However, it also points out challenges such as lack of teacher training, poor infrastructure, and unequal access to technology between urban and rural schools.

A key connection to this study is the introduction of digital tools in classrooms. BRAC found that multimedia classrooms help teachers present lessons more interactively. However, teachers need proper training and ongoing support to use technology effectively. This connects with this study's focus on how well-prepared Bangladeshi primary school teachers are to use ICT in their classrooms. Without proper guidance, teachers may struggle to integrate technology in a way that enhances student learning.

The report also emphasizes the need to expand digital education so that all students have access to quality learning experiences. This study explores how government policies and programs support or limit the use of technology in primary schools, contributing to the discussion on how digital learning can be improved across Bangladesh.

UNICEF Bangladesh, Grameenphone, and Telenor (2023) examine how digital literacy and ethical technology use can be improved for children in Bangladesh. The report highlights that as technology becomes more common in education, children must learn how to use it safely and responsibly. Digital literacy goes beyond knowing how to use devices—it includes critical thinking, online privacy protection, and responsible digital behavior. The study argues that teaching digital literacy from an early age helps children become responsible digital citizens.

A key finding is that while many children in Bangladesh have access to technology, they do not always know how to use it properly. Some face risks such as cyberbullying, exposure to harmful content, and privacy issues. The report stated that teachers play an important role in helping students use technology responsibly. However, many teachers lack training in digital literacy education.

Lim et al. (2020) examined ICT integration in education in Bangladesh and Nepal. The study highlights that technology can improve learning by making education more engaging and accessible. However, success depends on teacher training, infrastructure, and government policies. Though digital tools have created new learning opportunities, many schools struggle to implement them effectively. Limited resources, lack of teacher training, and unequal access to technology, particularly in rural areas, are the reasons behind it.

Another major challenge is unequal access to technology. Rural schools often lack computers, stable internet, and technical support, making it difficult for teachers to integrate digital tools into their lessons. Lim et al. argue that strong government policies and investment in teacher training are necessary for ICT programs to succeed.

The findings reinforce that ICT should not just be used for simple instructional tasks but should be integrated into teaching in meaningful ways. This study builds on these insights by exploring

how teachers in different regions adapt to varying levels of digital infrastructure and what solutions can bridge the digital divide.

Islam et al. (2023) examine how ICT can be better integrated into teaching through curriculum changes in Bangladesh. The study highlights that technology can improve education, but it must be properly embedded in the curriculum. Teachers need clear guidance on how to use technology. Also, ICT should be seen as a core part of teaching rather than just an additional tool.

Islam et al. (2023) found that many teachers struggle to use ICT because the curriculum does not provide clear instructions on how to use technology into their lessons. Even when digital tools are available, they are often underutilized due to lack of training and resources. The study suggested that curriculum changes should focus on making ICT more practical. Also, it is recommended that teachers have both technical skills and instructional strategies to use technology effectively. Islam et al.(2023) stated that teachers may have access to technology but struggle to use it effectively if they lack training. The current study examines whether primary school teachers in Bangladesh receive the support they need to confidently integrate ICT into their lessons.

Islam et al. (2023) also highlight that infrastructure and government policies play a major role in ICT use. Without strong policies and investment in digital tools, it will be difficult to make ICT-based learning successful across all schools. The findings reinforce that successful ICT integration requires clear curriculum support, well-trained teachers, and better infrastructure.

2.9 Challenges in ICT Implementation in Schools

Hew and Brush (2006) examine how technology is integrated into K-12 education and the factors that influence its success or failure. The study highlights that technology can improve learning, but teachers need proper training, resources, and support to use it effectively.

Providing technology to the teachers is not. Teachers must understand how to use them in ways that align with their teaching goals. Successful ICT integration also requires a clear link between technology and the curriculum. When teachers see how digital resources enhance student learning, they are more likely to use them meaningfully. Schools should provide regular training, technical support, and structured lesson plans to help teachers integrate technology into their classrooms.

One of the key challenges in ICT implementation is teacher training. Hew and Brush (2006) found that many teachers struggle with technology because they do not receive proper training on how to use it effectively. This issue is relevant to the study on ICT use in primary education in Bangladesh. Some teachers may have access to digital resources but lack the skills to integrate them into their teaching. Understanding the role of training can help identify ways to improve teacher education programs so that they provide structured guidance on ICT use.

Another major challenge is access to resources and technical support. Teachers who do not have enough computers, internet access, or digital content struggle to integrate technology effectively. Hew and Brush (2006) emphasize that ongoing support is crucial. One-time training is not enough to help teachers fully adopt ICT in their classrooms.

Tondeur et al. (2017) explore how teachers' beliefs about teaching influence their use of technology. The study found that teachers who support student-centered learning are more likely to use technology in interactive ways. The teachers who follow traditional teaching methods tend to use it only for basic tasks like presenting information. Even when schools provide technologies, teachers may not use them effectively. if they do not believe in the benefits of technology.

A key finding from Tondeur et al. (2017) is that professional development should not only focus on digital skills but also help teachers adopt more student-centered teaching methods.

Teachers who see technology as a tool for engaging students and encouraging active learning are more likely to integrate it into their lessons. This connects with the study on ICT use in primary education in Bangladesh, where many teachers may need guidance on how to use technology in ways that support interactive learning.

The study also highlights the importance of teacher confidence in ICT use. Teachers who feel comfortable using digital tools and believe in their benefits are more likely to use them creatively. Tondeur et al. (2017) emphasized that continuous support is necessary to help teachers shift their teaching beliefs and integrate technology effectively.

Barak (2007) examined how teaching changes when shifting from traditional methods to ICT-enhanced learning in undergraduate chemistry courses. The study highlights that technology can make learning more engaging and interactive. However, its success depends on how teachers use it. Digital resources such as simulations, multimedia, and online tools help students understand complex concepts better. However, teachers need to adapt their teaching strategies to fully utilize these tools.

One of the main findings from Barak (2007) is that teachers need proper training and support when transitioning to ICT-based teaching. Some teachers hesitate to use technology because they are unfamiliar with it or doubt its effectiveness. Barak (2007) argues that successful ICT integration requires teachers to take on new roles as facilitators rather than just information providers. Professional development programs should help teachers learn how to integrate technology effectively and encourage them to create interactive learning experiences.

A significant challenge identified in the study is teacher resistance to technology. Some teachers hesitate to adopt digital tools. They use traditional teaching methods and are unsure about the benefits of technology in education. Teachers who believe that ICT improves learning are more likely to use it in meaningful ways.

The findings from Barak (2007) connect with the study on ICT integration in Bangladesh, particularly in understanding how teachers transition from traditional teaching to ICT-enhanced learning. Many teachers may have access to technology but lack the training or confidence to use it effectively. Investigating how professional development programs can support this transition is essential.

In summary, the research from Hew and Brush (2006), Tondeur et al. (2017), and Barak (2007) highlights that successful ICT integration depends on teacher training, access to resources, teaching beliefs, and ongoing support. These factors are also relevant to the challenges faced by primary school teachers in Bangladesh.

2.10 Assessment, Data Collection, and Research Methods

Creswell and Creswell (2018) provide a detailed discussion on research design, explaining qualitative, quantitative, and mixed-methods approaches. Their work serves as a guide for researchers in selecting the most suitable methodology based on the nature of their study. They emphasize that research design should align with research questions, data collection methods, and analysis strategies.

Qualitative research focuses on exploring experiences and understanding social phenomena in depth (Creswell & Creswell, 2018). It relies on methods such as interviews, observations, and document analysis to gather rich, descriptive data. This approach is particularly useful for capturing participants' perspectives within a specific context. In contrast, quantitative research involves structured surveys, experiments, and statistical analysis to measure relationships between variables and identify patterns (Creswell & Creswell, 2018). It is commonly used for testing hypotheses and making generalizable claims.

The principles outlined by Creswell and Creswell (2018) are highly relevant to this study. Since this study explores teachers' perceptions, experiences, and challenges in using technology,

qualitative methods provide a valuable approach. Interviews allow for a deeper understanding of how teachers engage with ICT in their classrooms. The Technological Pedagogical Content Knowledge (TPCK) model serves as the theoretical framework for this study, aligning with the qualitative approach by examining how teachers perceive and apply ICT in their teaching practices.

Ethical considerations are also central to the research process. Creswell and Creswell (2018) stated the importance of obtaining informed consent, maintaining participant confidentiality, and ensuring ethical integrity throughout the study. Given that this research involves government primary school teachers, it is essential to create an environment where participants feel comfortable sharing their experiences without fear of repercussions.

Tracy (2019) expands on qualitative research methods, emphasizing the importance of depth, reflexivity, and ethical considerations. She highlights that qualitative research is particularly effective in capturing emotions, perspectives, and social interactions—elements that numerical data cannot fully convey. Tracy outlines various qualitative methods, including ethnography, narrative research, grounded theory, case studies, and phenomenology, each offering unique insights into human experiences

A key contribution of Tracy's work is her eight criteria for high-quality qualitative research. These are meaningful research topics, methodological rigor, sincerity, credibility, resonance, significant contribution, ethical responsibility, and coherence. She states that qualitative research should be structured, contextually grounded, and ethically sound. Reflexivity plays a crucial role, requiring researchers to reflect on how their perspectives, biases, and experiences influence the study. This ensures transparency and a balanced interpretation of data.

Data collection is another critical aspect of Tracy's framework. She discusses interviews, observations, focus groups, and document analysis as essential tools for gathering rich

qualitative data. She also highlights the importance of thick description, meaning detailed and meaningful accounts of participants' experiences within their social and cultural contexts. This strengthens credibility by allowing readers to fully grasp the complexity of the findings.

Tracy's approach is particularly relevant to this study. By using qualitative methods, this study aims to understand teachers' lived experiences, the factors that support or hold back technological use, and the strategies they develop in response to these challenges. Following Tracy's emphasis on rigor, this research includes teachers from diverse geographical locations to capture a more comprehensive perspective on ICT use in primary schools.

Reflexivity is also essential in this study, as the researcher has prior experience as a primary school teacher. Tracy emphasizes that researchers should engage in continuous self-reflection to recognize personal biases. Memo writing and reflective documentation will help maintain objectivity and ensure that findings are presented in a balanced way.

Ethical considerations, another key focus of Tracy's work, are carefully addressed in this study. Since the research involves government school teachers, confidentiality, informed consent, and voluntary participation are prioritized to ensure a safe and open environment for participants. Adhering to ethical guidelines fosters trust between the researcher and participants, ensuring that their voices are represented accurately and without risk.

Tracy also highlights the concept of resonance in qualitative research, referring to a study's ability to connect with and impact relevant audiences. This study aims to contribute valuable insights not only to researchers and educators but also to policymakers looking to enhance technology integration in primary education. By documenting teachers' experiences, challenges, and strategies, the findings can help shape professional development programs and infrastructure improvements that support technology use in classrooms.

Tracy's approach to qualitative research provides a strong foundation for this study's methodology. Her emphasis on rigor, reflexivity, and ethical responsibility ensures that the research is well-structured and meaningful. By incorporating these principles, this study aims to produce a rich and insightful analysis of how technology is integrated into primary education in Bangladesh

2.11 Role of ICT in Science Education

Jang (2009) explores how integrating web-based technology into science education enhances student creativity and engagement. The study highlights that digital resources, interactive platforms, and online tools encourage students to think critically, solve problems, and develop innovative ideas. Jang (2009) argued that technology transforms students from passive learners into active participants by allowing them to experiment, visualize abstract concepts, and collaborate with peers.

Students demonstrate higher levels of creativity when they have access to digital tools that promote exploration and collaboration (Jang, 2009). Interactive simulations and virtual labs help students engage in inquiry-based learning. However, Jang (2009) also emphasizes that technology alone does not improve learning—teachers play a central role in making ICT integration effective. Teachers must integrate technology in ways that support content understanding and problem-solving skills, which makes teacher training essential.

Just as Jang found that web-based tools enhance creativity and engagement in science education, this study explores how Bangladeshi teachers perceive and implement technology in their classrooms. The emphasis on teacher knowledge and instructional strategies is particularly relevant. This study investigates how prepared government primary school teachers are to integrate technology into their teaching.

The study also highlights the importance of teacher training, which is a major challenge in Bangladesh. If teachers lack the necessary skills and confidence to use ICT, its impact on student learning remains limited. This study, using the TPACK framework, similarly examines how teachers balance technological, pedagogical, and content knowledge in digital learning environments. Professional development is a common theme in both studies, reinforcing the need for structured training programs that support teachers in using technology effectively.

Jang (2009) acknowledges that technology has the potential to improve student creativity and learning outcomes, but access to high-quality digital resources and reliable internet remains a challenge. This is particularly relevant in Bangladesh, where technological infrastructure varies significantly across urban and rural areas. The findings from Jang's research support the argument that equitable access to digital resources is essential for meaningful technology integration in education.

Jang (2009) also emphasizes that technology should not replace traditional teaching methods but should enhance them. By examining how teachers incorporate ICT into their classrooms, this research contributes to the broader discussion on effective digital learning strategies and professional development in education.

Similarly, Sorensen et al. (2007) explore how the internet is used in science education. Sorensen et al. (2007) focus on both its benefits and the challenges teachers face in integrating it into their teaching. Their study highlights that the Internet provides access to a wide range of educational resources, supports inquiry-based learning, and allows for interactive teaching methods. Teachers can use online materials to demonstrate scientific concepts, offer real-world examples, and encourage students to conduct independent research. However, effective use of the internet depends on teachers' digital literacy, access to technology, and their ability to evaluate online content critically.

Sorensen et al. (2007) find that while teachers recognize the benefits of using the internet for science education, they also face significant barriers. These include lack of training, limited access to computers and internet connectivity, and concerns about the accuracy of online information. Many teachers struggle to find reliable sources, integrate digital content into lesson plans, and manage time effectively when using internet-based resources. The study emphasizes that professional development and institutional support are necessary to help teachers use the Internet as an effective teaching tool. Without proper training, teachers may struggle to integrate digital resources into their teaching in ways that enhance student learning.

Another common challenge is resource availability. Sorensen et al. (2007) found that the ability to use the internet in classrooms depends on access to computers, stable internet connections, and technical support. In Bangladesh, technology infrastructure varies widely between urban and rural schools, which affects how teachers use digital resources. This study builds on their findings by exploring how teachers in different regions adapt to these challenges and develop solutions to overcome resource limitations.

The study also emphasizes that teacher confidence and instructional strategies play a key role in integrating technology. Sorensen et al. (2007) note that even when teachers have access to the internet, many lack the confidence or training to use it effectively. This aligns with this study's examination of how prepared Bangladeshi teachers are to use technology and how their technological, pedagogical, and content knowledge (TPCK) influences their teaching.

The OECD (2015) report, *Students, Computers, and Learning: Making the Connection*, examines how technology affects student learning outcomes. It finds that simply having access to computers and digital resources does not automatically improve learning. Instead, the way technology is used in classrooms plays a key role in its effectiveness. Students benefit the most when technology is integrated into teaching in a structured and meaningful way. However, if

used without a clear purpose, it can become a distraction and negatively impact academic performance.

The report also highlights that teachers play a crucial role in guiding technology use. Without proper training, even well-equipped classrooms may not improve student learning. Another key issue discussed in the report is inequality in access to technology. Students from wealthier backgrounds often have better access to computers and the internet. Those from disadvantaged backgrounds struggle to develop digital skills, creating further educational inequalities.

The findings from the OECD report closely relate to this study's examination of technology integration in primary education in Bangladesh. Just as the report states that technology alone does not improve learning, this study investigates whether teachers in Bangladesh use ICT in ways that enhance student engagement and understanding. Both studies emphasize that teacher training and instructional strategies are critical for effective technology use.

The report also highlights technology access. This is a major issue in Bangladesh. Many rural schools lack computers, stable internet connections, and other digital resources, making it difficult for teachers to integrate technology into their lessons. This study builds on these findings by exploring how teachers in different regions adapt to these challenges and modify their teaching methods based on resource availability.

Poth (2023) explores the importance of developing students' digital citizenship skills and how educators can help students use technology responsibly. As digital resources become more common in classrooms, students need to learn how to navigate online spaces safely and critically. Digital citizenship includes responsible online behavior, critical thinking about digital content, ethical communication, and understanding digital footprints. Poth (2023) argues that schools should integrate digital citizenship into the curriculum, ensuring that

students not only develop technical skills but also learn how their online actions impact themselves and others.

Poth emphasizes that teachers play a key role in teaching digital citizenship, guiding students in using technology in meaningful and responsible ways. However, many teachers lack training and confidence in teaching digital literacy. Professional development programs should focus on helping teachers integrate digital citizenship into their everyday teaching, as students who lack guidance may misuse technology or struggle to differentiate between reliable information and misinformation.

Poth's study connects with this research on technology integration in primary education in Bangladesh, particularly in understanding how teachers help students engage with digital tools responsibly. Just as Poth (2023) highlights the importance of digital citizenship, this study examines how teachers in Bangladesh integrate technology and guide students in using digital content critically. Both studies emphasize that technology should support learning while also fostering critical thinking and ethical digital practices.

2.12 Policy and Future Directions in ICT Integration

Technology integration in education has become a key focus of modern educational reform. One of the most significant initiatives in this area is the Education Through Technology Act of 2001 (EETT), introduced by the U.S. Department of Education. This policy aimed to improve education through technology by focusing on teacher training, equitable access to digital resources, and innovative teaching methods. While Bangladesh has taken similar steps, particularly after COVID-19 increased reliance on technology, the reality is different. Many teachers lack proper training and confidence in using digital tools, and rural schools struggle with slow internet and limited resources. Even though the government has introduced multimedia classrooms and online teacher training programs, their impact remains unclear.

Like in the U.S. under EETT, measuring the real effect of technology on student learning remains a challenge.

Lim et al. (2013) examine how technology is used in schools and the trends shaping digital learning. They highlight that successful technology integration depends on teacher training, school infrastructure, curriculum alignment, and policy support. While many schools introduce digital resources, their impact on student learning varies depending on how well teachers use them. The study stresses that technology alone does not improve education—its success depends on how effectively teachers integrate it into their lessons.

Lim et al. (2013) also find that teachers' beliefs, skills, and attitudes toward technology influence how they use it in the classroom. Many teachers recognize the benefits of digital tools but struggle due to a lack of training, limited resources, and resistance to change. Another major issue is the digital divide. Schools with better infrastructure can integrate technology more easily, while those with fewer resources face significant challenges. The study also discusses emerging trends, such as the shift toward student-centered learning, the rise of online platforms, and the increasing focus on digital literacy. However, it emphasizes that successful technology use requires ongoing teacher training, continuous support, and clear implementation strategies.

These insights align with this study's focus on technology integration in primary education in Bangladesh. Like Lim et al. (2013), this research examines how teachers use technology, the barriers they face, and the factors that influence successful implementation. A key connection is teacher training and beliefs. Some teachers in Bangladesh understand the benefits of digital tools, but they may not have the skills or confidence to use them effectively. Also, schools in different regions have unequal access to computers, the internet, and digital content, which affects how teachers use ICT in their lessons. Finally, the study emphasizes that teachers need ongoing professional development and policy support to integrate technology effectively,

reinforcing the idea that successful technology integration requires more than just access to digital tools.

Zhao (2003) explores what teachers need to know about technology to use it effectively in classrooms. He argues that technology alone does not improve learning, it depends on how well teachers understand and apply it. Zhao (2003) highlights three key areas of teacher knowledge: technological knowledge (how to use digital tools), pedagogical knowledge (how to teach effectively with technology), and contextual knowledge (understanding the school environment and student needs). Without these skills, teachers may struggle to integrate technology in a meaningful way.

One of the key findings is that teachers' confidence and attitudes toward technology influence how they use it in their teaching. Many educators feel exhausted by rapid technological changes and hesitate to adopt new tools. If they do not receive proper training and support, they may avoid using technology or use it in ways that do not enhance learning. Zhao states that professional development is essential for building teachers' skills.

Zhao's findings closely align with this study's focus on technology integration in primary education in Bangladesh. Just as Zhao highlights the importance of both technological and pedagogical knowledge, this study examines how prepared government primary school teachers in Bangladesh are to integrate ICT into their classrooms.

Zhao (2003) notes that teachers' ability to use technology depends on infrastructure, policies, and institutional support. This is particularly relevant in Bangladesh, where many schools lack computers, stable internet, and technical assistance for teachers. Finally, Zhao emphasizes that technology should not replace traditional teaching but should support and enhance it, aligning with this study's goal of understanding how Bangladeshi teachers use digital resources to improve learning rather than as a substitute for face-to-face instruction.

Theodorio et al. (2024) examine the challenges faced by teacher education in the post-pandemic era. They highlight that COVID-19 sped up the need for technology in education, but many teachers were not prepared for this transition. The study discusses gaps in digital skills, unequal access to technology, and the need for more structured training programs to help teachers adapt to digital learning environments.

Theodorio et al. (2024) found that many teacher education programs were not designed to equip educators with digital competencies. As a result, teachers struggled to use online tools, manage virtual classrooms, and engage students in remote learning. The study also highlights inequalities in access to digital resources, with teachers in underprivileged areas facing greater challenges in using technology effectively. Theodorio et al. (2024) argue that teacher training programs must be redesigned to focus more on digital pedagogy, technological literacy, and blended learning strategies.

Like Theodorio et al. (2024), this study examines whether teachers in Bangladesh have received sufficient training to integrate technology effectively. A key connection is the issue of digital skill gaps among teachers. Many teachers struggle with technology due to a lack of training and confidence. Another important connection is the inequality in access to digital resources. Rural schools in Bangladesh lack computers, reliable internet, and digital teaching materials, making it harder for teachers to integrate technology into their lessons.

The study also reinforces the need for redesigning teacher training programs to include digital pedagogy. Theodorio et al. (2024) stress that technology training should be a core part of teacher education, not just an optional addition. This aligns with this study's focus on how professional development for Bangladeshi teachers can be improved to enhance their ability to use digital tools effectively. Finally, Theodorio et al. (2024) emphasize that technology should be integrated into everyday teaching, not just during emergencies like the pandemic. This study

examines whether Bangladeshi teachers are using technology regularly in their classrooms or if digital resources are only used in specific situations.

2.13 Future Research and Technological Advances in Education

Greene and Jones (2020) explore how the TPCK framework is applied in ESL education, highlighting that effective technology use in classrooms requires a balance between digital tools, teaching strategies, and subject knowledge. The study examines how teachers develop TPCK skills, the challenges they face, and the factors influencing successful ICT integration.

One of the key findings is that many ESL teachers struggle with technology due to a lack of training and limited resources. While they recognize the benefits of multimedia content, online platforms, and language-learning applications, they often find it difficult to adapt these tools to their teaching methods. Teachers with strong TPACK skills use technology effectively and confidently, while those with weaker skills tend to rely on traditional methods. The authors stress that teacher training programs should focus on not just introducing digital tools but also building teachers' confidence in using them.

These findings closely relate to this study's focus on technology integration in primary education in Bangladesh. Just as ESL teachers face challenges in using technology effectively, this study examines how government primary school teachers in Bangladesh develop and apply TPCK in their classrooms. A key connection is teacher training—teachers who lack training struggle to integrate technology meaningfully. This study builds on Greene and Jones's work by exploring how training programs can be improved to strengthen TPCK knowledge in primary education.

Another important issue is access to digital resources. Greene and Jones (2020) highlight that teachers in under-resourced schools face difficulties using technology, which is also a major issue in Bangladesh. Many rural schools lack computers, stable internet, and digital learning

materials, making ICT integration challenging. This study explores how teachers in different regions adapt to these limitations and develop strategies to make the most of the resources available.

Teachers with strong TPACK knowledge create more interactive learning experiences using multimedia, online collaboration tools, and digital assessments. This aligns with this study's focus on how primary school teachers in Bangladesh use technology to make lessons more engaging. By examining teachers' perspectives, challenges, and strategies, this study contributes to the discussion on effective digital learning practices in primary education.

2.14 Training and Confidence in ICT Integration

Aslan and Zhu (2016) examine how pre-service teachers learn to integrate ICT into their teaching and what factors influence their ability to use digital tools effectively. The study highlights that teachers' confidence, knowledge, and attitudes toward technology significantly impact their classroom practices. The authors emphasize that ICT integration is not just about technical skills—it is also about understanding how technology supports teaching and subject content.

Aslan and Zhu (2016) found that many pre-service teachers struggle with ICT integration because they do not have hands-on training. While most understand the benefits of technology, they often feel unprepared to use digital tools in real classroom settings. The study stresses that teacher education programs must provide practical ICT training so that teachers develop the confidence and skills needed before they start teaching. Without this preparation, many teachers hesitate to use technology or use it in a very limited way.

These findings align with this study's exploration of ICT training for government primary school teachers in Bangladesh. A key connection is teacher confidence in using technology—teachers who lack confidence in their ICT skills often avoid digital tools or use them only for

basic tasks. This study examines how confident Bangladeshi teachers feel about using technology in their classrooms and whether their level of preparedness impacts their teaching methods.

Another important connection is the focus of ICT training. Aslan and Zhu (2016) emphasize that training should go beyond technical skills and teach teachers how to integrate technology meaningfully. This aligns with this study's goal of understanding whether Bangladeshi teachers are effectively using digital tools in their lessons or if they require more support. The study also explores whether teachers in Bangladesh receive practical, hands-on ICT training or if their exposure to technology remains mostly theoretical.

2.15 Expanding TPACK to DPACK: Digital Pedagogy and Data-Driven Teaching

Thyssen et al. (2023) examine how the TPACK framework has evolved into DPACK (Digital Pedagogical Content Knowledge) to address the increasing use of digital learning environments, online collaboration, and data-driven teaching. The study explains that teachers need more than just basic ICT skills. They must learn how to manage digital classrooms, track student progress using digital tools, and create interactive online learning experiences.

Thyssen et al. (2023) find that many teachers still use technology in limited ways, mainly as a substitute for traditional methods rather than as a tool for transforming learning. Teachers need structured training to develop DPACK skills, including designing interactive digital lessons, using real-time student data for assessment, and fostering student collaboration online. Schools and policymakers should support teachers in moving beyond basic ICT use and helping them develop expertise in digital pedagogy.

These findings align with this study's focus on technology integration in primary education in Bangladesh, particularly in how teachers develop digital teaching skills. A key connection is

how teachers use technology in the classroom. Many teachers use digital resources as a direct replacement for traditional methods rather than to enhance student engagement and interaction. This study examines whether Bangladeshi primary school teachers use technology to encourage active learning or if it remains a passive tool for delivering content.

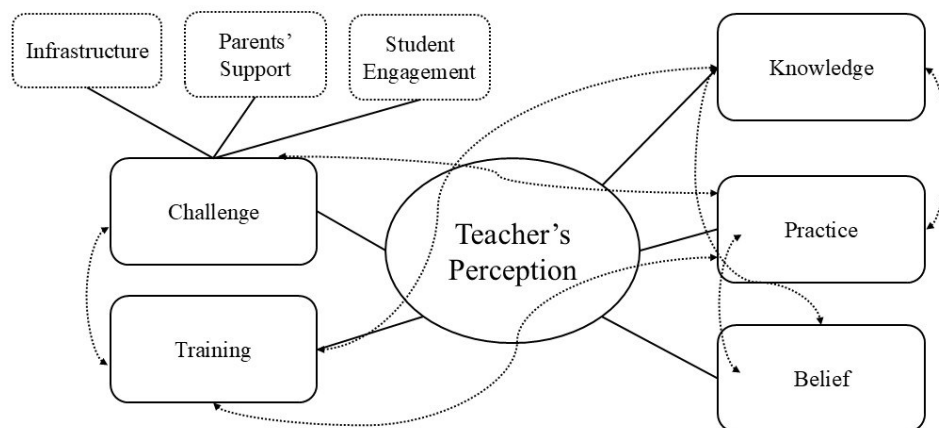
Another important connection is the role of professional development. Thyssen et al. (2023) state that teachers need structured training to build their digital teaching skills. This is also a major issue in Bangladesh. Many teachers may not have received adequate training on how to use digital tools beyond basic ICT skills. This study explores whether teacher training programs in Bangladesh are focusing on digital pedagogy and how they can be improved to align with the DPACK framework.

The study also highlights the importance of online collaboration and data-driven teaching, which are becoming essential in modern classrooms. Thyssen et al. (2023) mention that teachers should learn to use digital platforms to engage students, facilitate discussions, and assess student progress effectively. This aligns with this study's focus on whether teachers in Bangladesh are prepared to use these advanced digital strategies or if technology remains limited to simple instructional tasks.

Finally, Thyssen et al. (2023) emphasize that education policies should support teachers in transitioning from TPACK to DPACK by providing the right training and resources. This study also examines how government policies in Bangladesh support or limit teachers' ability to use technology effectively in their classrooms. By exploring teachers' experiences, challenges, and training needs, this study contributes to the larger discussion on how digital learning can be improved in primary education.

2.16 Conceptual Framework

This study is about the integration of technology as a tool inside the classroom by government primary school teachers.



This study will explore the teacher's perception of using technology in their classrooms to enhance teaching and learning. There is no linear connection between the components. Using technology in the classroom depends on training, knowledge, and belief. Knowledge refers to an educator's understanding of how technology can be leveraged to support learning objectives. Practice is the tangible application of this knowledge, demonstrating how teachers bring their technological expertise into real-world classroom scenarios. Belief is perhaps the most foundational component. It reflects a teacher's attitude toward the effectiveness of technology—whether they perceive it as a valuable asset or an unnecessary challenge.

A teacher may believe in the benefits of technology, but without proper training and knowledge, they may find it difficult to put their belief into practice. Similarly, even if a teacher is highly trained and knowledgeable, external challenges like lack of infrastructure or poor

student engagement could create obstacles that limit technology's impact. The interwoven connections between these elements highlight the complex, non-linear nature of technology adoption in education.

Research Method and Data Analysis Approach

A qualitative research method will be used to collect and analyze data. The study area will be selected by convenient sampling. Participants will be selected through purposive sampling. The data collection method will be Interview and observation. The interview will be a semi-structured, open-ended interview with questions. There will be two observation sessions for each participant after their interview.

The thematic data analysis method will be used for data analysis. The key theme is focused on the TPACK Framework, and there will be multiple categories to explain the findings and results. The key categories will be the current state of integrating technology inside the classroom, the challenges behind integrating technology inside the classroom, teachers' mindsets and the role of administrations, parents' mindsets, and the difference in rural and urban area schools to integrate technology inside the classroom.

This Conceptual Framework is a guide for the study, connecting the research questions, theories, methods, and data analysis. By using the TPACK Framework, this study will explore how government primary school teachers use technology in their classrooms and the difficulties they face. It will also help to understand how these challenges vary based on geography, comparing schools in urban and rural areas. This framework provides a strong foundation for analyzing the role of technology in education and the factors that influence its integration. The factors mentioned below are also a guide for categorizing themes and sub-themes. The proposed pathways will show the logical connection among literature, theories, methodology, limitations, analysis, and future scope of improvements.

Factors

TPCK Components	External Factors	Contextual Factors (Geographic Setting)	Impact Variables
Technology Knowledge Pedagogical Knowledge Content Knowledge	Teacher Mindset and Attitudes Administrative Support and Leadership Parental Mindset and Engagement Student engagement and learning outcomes	Urban Schools Rural Schools Differences in infrastructure, resources, and accessibility	Teacher proficiency ICT training Government ininitatives Infrastructure Resource availability Equitable access to education technology

Chapter 3

Methodology

3.1 Research Approach

Qualitative research is a method employed to explore and understand the meanings that individuals or groups assign to social or human problems. This approach involves a process where emerging questions and procedures guide data collection, typically occurring in the participant's natural setting. Data analysis in qualitative research is flexible, building from specific observations to broader general themes, and the researcher plays a crucial role in interpreting the data's meaning (Creswell & Creswell, 2018; Grbich, 2013). The final written report is flexible in structure, reflecting an inductive style, a focus on individual meaning, and the importance of presenting the complexity of a situation (Creswell & Creswell, 2018).

3.1.2 Distinction from Quantitative Research

Qualitative research differs from quantitative research in several key aspects. While qualitative methods encompass interviews, participant observations, and textual analysis, quantitative methods transform various forms of data into numerical formats for statistical analysis. In qualitative research, the researcher is an integral part of the data collection process, necessitating self-reflexivity about their goals, interests, and biases. In contrast, quantitative research relies on distinct and separate instruments for data collection, such as surveys or measurement tools (Tracy, 2019). Additionally, qualitative research methodologies often integrate the journey of access and interaction with participants into the narrative, unlike the more segmented approach of quantitative studies (Bansal & Corley, 2012).

3.1.3 Strengths of Qualitative Research

Qualitative research offers numerous strengths, including its ability to provide rich, holistic insights and a deep understanding of sustained processes and lived experiences within their contexts. This approach values subjectivity, acknowledging and incorporating both the participants' and the researchers' perspectives as valid data. Furthermore, qualitative research excels in exploring areas such as culture, phenomena, structural processes, and historical changes. It can uncover salient issues that may be overlooked by more structured methods and often foster close, trusting relationships that facilitate deeper disclosure and understanding (Grbich, 2013).

Qualitative research methods are versatile and beneficial for achieving various research goals, whether independently or in combination with other methods. These methods emphasize the complexity of human experiences, honoring the local meanings and lived realities of participants while providing insights that can inform and enrich quantitative data (Creswell & Creswell, 2018).

3.1.4 Rationale for Using Qualitative Methods

Given the multifaceted objectives of the study, qualitative research methods are well-suited to address the complex and nuanced questions posed. The research aims to evaluate current practices, understand teacher perceptions, analyze utilization patterns, identify challenges, explore geographical variations, and contribute to educational enhancement. Qualitative methods are particularly effective in achieving these goals for several reasons:

1. Exploring Perceptions and Beliefs

Qualitative research is adept at exploring and understanding the meanings individuals or groups assign to various phenomena (Creswell & Creswell, 2018). This study aims to investigate government primary school teachers' perceptions of technology as a pedagogical tool. Qualitative methods, such as in-depth interviews and focus groups, allow for a comprehensive

exploration of teachers' beliefs, comfort levels, and openness to adopting technological tools. These methods facilitate a deeper understanding of how teachers perceive and integrate technology into their teaching practices, capturing the subtleties and complexities of their experiences.

2. Contextual Understanding

The study seeks to analyze the utilization of technology in regular teaching methods and the challenges faced by teachers in resource-constrained environments. Qualitative research, with its emphasis on context and holistic understanding, is particularly suited to this task (Tracy, 2019). Through participant observation and interviews, researchers can gather rich, detailed data about the specific strategies teachers employ, the types of technological tools used, and the contextual factors influencing their practices. This approach ensures that the research captures the lived experiences of teachers and the real-world challenges they face.

3. Addressing Geographical Variations

Understanding the impact of geographical context on technology integration requires a nuanced approach. Qualitative methods allow researchers to explore how the availability of resources and tools differs across various regions in Bangladesh. By conducting fieldwork in different geographical areas, researchers can gather insights into how location influences teachers' strategies for incorporating technology. This in-depth, context-specific data is crucial for developing a comprehensive understanding of the variability in technology integration practices.

4. Uncovering Salient Issues

Qualitative research excels at uncovering issues that may be overlooked by more structured methods (Grbich, 2013). The study aims to identify challenges related to infrastructure, resource availability, and other barriers to technology integration. Through qualitative methods, researchers can explore these challenges in depth, gaining insight into how teachers

adapt to and overcome obstacles. This approach allows for the identification of both explicit and tacit issues, providing a more complete picture of the factors influencing technology integration.

5. Enhancing Educational Strategies

Ultimately, the study aims to contribute valuable insights that can inform strategies for enhancing the integration of technology in primary education in Bangladesh. Qualitative research methods, with their emphasis on participant perspectives and contextual understanding, are well-positioned to generate actionable recommendations. By capturing the voices of teachers and understanding their experiences, the research can provide nuanced, context-sensitive guidance for policymakers and educators, aligning with the broader educational goals outlined in the National Education Policy 2010.

In summary, qualitative research methods are essential for this study due to their ability to provide rich, holistic insights into teachers' perceptions, contextual practices, and the challenges they face. These methods support a detailed and nuanced exploration of the complex factors influencing technology integration in primary education, ultimately contributing to more effective and responsive educational strategies.

3.2 Research Site

The research focused on Government Primary schools in Dhaka and Chottogram, two of the most densely populated areas in Bangladesh. Four primary schools were selected from each city. Dhaka serves as the political capital, while Chottogram is the business capital. The establishment of these schools in the 1970s and 1980s, combined with the dense population, made them ideal for data triangulation. Additionally, the cultural, linguistic, and geographical differences between the two areas provided diverse data for the study. The schools in these areas face challenges due to limited resources, serving students from underserved communities with low-income parents. These factors were central to the study, as the data collected will

inform plans for integrating technology into classroom teaching and learning in these challenging contexts.

3.3 Research Participants

The study involved government primary school teachers as research participants. Gender diversity was maintained, with an equal number of male and female participants totaling eight.

Area	Dhaka	Chottogram	Total
No. of Schools	2	2	4
No. of Participants	4	4	8
No. of Interviews	4	4	8
Classroom observations	8	8	16
No. of male participants	2	2	4
No. of female participants	2	2	4

Four of the participants were from Dhaka, and the other four from Chottogram, all being native citizens of their respective areas. Their deep understanding of the local culture, as well as the perspectives of parents and students, proved invaluable during the in-depth interviews. Additionally, each participant had more than 3 to 5 years of teaching experience, offering valuable insights into their experiences both during and after the COVID-19 pandemic.

3.4 Sampling Procedure

The sampling procedure utilized in this study was convenient sampling. Convenient sampling is a non-probability sampling method where participants are selected based on their availability, ease of access, or proximity to the researcher (Given, 2008; Lohr, 2021). It is called “convenient” because it is quick, easy, and cost-effective to implement, requiring minimal resources compared to more rigorous sampling methods.

In this study specifically, four government schools were selected from both the north and south parts of the Dhaka Metropolis, while an additional four schools were chosen from Chattogram. These schools were selected by convenient sampling.

Purposive sampling was used to select schools based on specific criteria. Purposive sampling is a non-probability sampling method where samples are selected for inclusion in the sample based on the judgment of the researcher (Lohr, 2021). This technique is often used when the study is on a specific subject of a population that possesses particular characteristics.

Some interview questions required sensitive answers, and participants' identities were guaranteed to remain confidential throughout the study. Only those participants who felt comfortable and willing to share were selected for interviews, which helped elicit spontaneous and authentic responses. They were selected through purposive sampling.

3.5 Data Collection Methods

The data collection method involved interviews and observations. A crucial aspect of this study is gaining insight into government primary school teachers' ideas, mindsets, and experiences. A semi-structured, open-ended interview question is prepared based on the research question and the main idea. The participants were asked open-ended interview questions and were well-informed about confidentiality. They provided full consent to have their information recorded.

3.5.1 Interview and Observation

I conducted online interviews with participants over the phone. Every participant interview was based on a semi-structured, open-ended question. I informed them about the topic and scheduled online meetings at their convenience. During the meetings, I asked interview questions and recorded their responses. Each interview durations 30 to 40 minutes. Every participant is informed about the main idea and the purpose of the study. After each

conversation, I transcribed the data and maintained a log to note the key points of similarities and differences in their responses to the same questions.

After the interview, I also went for classroom observations and school visits. Observations of the sites guided me to verify the given information and helped me to understand any other underlying reasons. I visited each participant 2 times. I observed every class they conducted in a day and their workplaces. I made 8 visits to Dhaka and 8 visits to Chottogram in total, with 16 visits. Each visit's durations were 4.5 to 5 hours.

3.6 Role of the Researcher

I began my career as a primary school teacher in 2018. I spent over two years working at a low-resource government primary school in Bangladesh, and these experiences have greatly influenced my thoughts on this study. As a teacher, I encountered challenges, but my interviews with participants have helped me understand the scope, opportunities, and challenges within the government primary education sector in Bangladesh. I made a conscious effort to prevent my personal experiences from influencing the thoughts of the participants, as the main aim of this study is to understand their perspectives. As a novice researcher, I did my best to maintain objectivity.

3.7 Data Analysis

The thematic data analysis method will be used for the data analysis process. Thematic analysis is a qualitative research method used to identify, analyze, and interpret themes within textual or qualitative data (Grbich, 2013). It involves systematically examining data to uncover repeated ideas, meanings, or concepts related to the research question.

The major reason behind using this method is to understand the in-depth meaning and perspectives of the participants. As a beginner researcher, I aim to go beyond the numbers and

study the ideas, behavior, situations, and perspectives of the participants. Thematic analysis is simple and systematic, helps to understand human emotions and perspectives, and provides rich insights.

The key feature of thematic analysis is flexibility. In this, there is a flexibility to adapt data from different angles, and it also helps the data triangulation process. Another feature of this method is pattern identification. In this step, it is important to focus on the idea of the research and the viewpoint of the data. The next step is categorization. After collecting all the data, the data was divided into themes and sub-themes. The last step is the interpretation of the meaning. In this step, understanding the underlying insight and describing the ideas with an in-depth perspective based on the research question are important.

In thematic analysis, it is very important to familiarize yourself with the data. Data transcription is the best way to do that. After reading and re-reading the data for the initial understanding, making important statements, taking and recurring patterns help the next steps.

The next step is to break the statements into short segments, find the keywords, and initiate codes. Similar codes go under a broader theme; based on analysis under one theme, there can be several sub-themes. In the final stage, it is very important to review the themes. Naming, defining every theme, and explaining every theme based on the evidence from the data.

3.8 Ethical Issues and Concerns

In my role as a school teacher, I encountered both advantages and disadvantages with my participation in the research. My previous experience as a teacher made it easier for me to build rapport with the participants. However, during the data collection process, the participants often sought my opinion on their responses or asked me counter questions. It was challenging to communicate to them that their responses should not be influenced by my experiences or opinions and that it was irrelevant to the study.

Another challenge was to ensure that the participants felt confident and comfortable. It was only after 2 or 3 phone conversations, where the participants felt secure that their identity would remain confidential, that they agreed to share their true challenges or experiences. These were the major concerns and challenges I faced during the data collection process for this study.

3.9 Credibility and Rigor

The concept for this study was heavily influenced by my prior teaching experiences. I taught in traditional classrooms as well as online during the COVID-19 pandemic. Bangladesh, a country frequently affected by natural disasters, often experiences school closures, which hinder students' educational progress. Integrating technology both inside and outside the classroom has proven to be beneficial for students, especially during challenging times like the recent heat wave.

I aim to pursue further studies in education policy and eventually focus on the policymaking process. With the rapid advancements in global education and technology, such as AI, I aspire to explore how technology can be effectively integrated into our education system.

3.10 Limitations of the Study

Limited Sample Size and Geographic Scope

The study focuses on a small group of government primary school teachers from Dhaka and Chattogram, limiting the generalizability of the findings. The experiences of teachers from rural and less-developed regions may differ significantly from those in urban areas.

Time Constraints

The research was conducted within a limited timeframe, restricting the possibility of longitudinal analysis to track changes in teachers' technology integration practices over time.

Self-Reported Data

The study relies on semi-structured interviews, which may introduce biases as teachers may provide socially desirable responses rather than fully candid insights about their challenges and practices.

Limited Classroom Observations

Although classroom observations were conducted, their short duration may not fully capture teachers' daily technology usage patterns or long-term integration efforts.

Infrastructure and Policy Gaps

The study does not extensively analyze government policies, budget allocations, or ICT infrastructure development, which are crucial factors influencing technology integration in primary education.

Chapter 4

Results

This chapter presents the findings from the qualitative data collected from teachers across research sites. The data were obtained through interviews and classroom observation. Eight participants shared their experiences and perspectives on technology integration in their schools. The findings are organized under several key categories that link to the research questions and the overall purpose of the study to understand the barriers and facilitators of technology integration in teaching and learning. Each category is presented with a brief description and supported by direct participant quotations.

The major categories are-

1. Equity and Sustainability in Educational Technology Integration
2. Teacher Training in Technology Integration
3. The Generation Gap Among Teachers
4. Lack of Institutional Support
5. Student Engagement and Learning Outcomes
6. Parents' Support and their limitations
7. The COVID-19 Aftermath
8. Reduced Overall Effectiveness of ICT Integration
9. Infrastructure and Maintenance Problems
10. The Influence of School Leadership
11. The Gap Between Government Initiatives and Classroom Practice

Note: All participant quotations are cited as (Interview #, Date) for confidentiality and consistency.

1. Equity and Sustainability in Educational Technology Integration

This theme represents the diverse access to digital tools and infrastructure in schools. Though government initiatives have supplied laptops, projectors, and tablets, many participants reported that these resources are underutilized because of infrastructural and administrative challenges. Also, several teachers pointed out that poor internet connectivity and power supply issues significantly hamper effective integration.

“We have the internet at school, but it’s so slow and unreliable that we can’t use it for online lessons or research” (Interview #4, 2024)

“During extremely hot weather or load-shedding, classes become exhausting. Having backup power could help maintain a better learning environment” (Interview #4, 2024)

The above statements show those infrastructural limitations, especially regarding the internet and electricity for educational purposes. Though the tools are available, many teachers face problems using them in the classroom.

“Our school has projectors, but they’re old, and most teachers don’t know how to fix them when they stop working” (Interview #1, 2024)

“The school has only one multimedia room, and we need permission from the HT to use it. Because of this, most teachers avoid using it” (Interview #3, 2024)

Also, a few participants said that because of administrative policies and institutional unwillingness, they could not effectively use the technologies in the classroom. However, the problems are faced in both urban and rural settings.

“We have enough equipment from the government, but accessing them requires special permissions, and they are rarely used” (Interview #4, 2024)

“Schools in rural areas don’t get nearly as much tech support or resources as city schools, which makes it harder to keep up” (Interview #5, 2024)

This shows that technological access is not equal across all schools, with infrastructural investments differing particularly by location.

It is not the only scenario, after the school and classroom observation. Some teachers who are ICT-trained are unwilling to share their knowledge with other colleagues. One of the reasons is that it requires additional time, and they are already underpaid. Teachers do not always have access to the devices provided by the government. It is easy to do their job such as typing questions from outside because some teachers find it difficult as well as time-consuming. This scenario is very similar in both urban and rural areas.

Sustainability of ICT Integration

Sustainability refers to the ability of schools to maintain and improve the integration of digital tools over time. Many participants expressed concerns regarding the short-term nature of ICT training and the lack of continuous professional development.

The short-term ICT training and high turnover rates challenge long-term technology integration.

“We received ICT training, but when those teachers left the job, no one replaced them”
(Interview #1, 2024)

Participants noted that without ongoing training, the initial benefits of ICT sessions are lost over time.

“If ICT training was part of our regular professional development instead of a separate workshop, more teachers would take it seriously” (Interview #3, 2024)

A few teachers reported that some schools have managed to implement sustainable ICT practices through continuous support and mentorship.

“In our school, ICT is integrated into our regular training, and we have a mentor system that helps sustain our digital skills” (Interview #7, 2024)

“Urban schools tend to have regular refresher courses and better support, while in rural areas, one-time training is all we get” (Interview #1, 2024)

The observation data indicates that the sustainability of the ICT training and its impacts depend on teachers and external factors such as infrastructure, availability of gadgets, and teachers' interest and motivation. All of the rubrics are interconnected and equally important for the successful integration of technology.

2. Teacher Training in Technology Integration

Teachers need good training to use technology effectively in classrooms. Some participants pointed out that available ICT training is often too brief and theoretical, lacking practical application. Many teachers said that the limited duration of ICT training programs makes it challenging to fully understand and apply digital teaching techniques.

“ICT training was helpful, but without follow-up sessions, we forget most of it over time” (Interview #2, 2024)

“The training lasted only 10 days, and we had to rush through everything. We learned how to use different tools, but there was no time to practice properly” (Interview #5, 2024)

The selection process for ICT training is often criticized for being biased.

“The HT selects the participant for the training, so those who have a good relationship with him mostly get the chance to be nominated” (Interview #8, 2024)

“I have been teaching for years, but I was never selected for ICT training. The same teachers keep getting nominated, while the rest of us are left behind” (Interview #1, 2024)

Even after completing ICT training, many teachers do not actively incorporate digital tools in their classrooms.

“Even teachers who received ICT training are also unwilling to use their knowledge” (Interview #6, 2024)

In contrast, a few participants said that hands-on training that included real-life classroom scenarios significantly improved their ability to integrate technology.

“The ICT training I received helped me structure my lessons better. I learned how to organize content, create interactive lesson plans, and make students more engaged” (Interview #5, 2024)

Teachers in urban areas reported more frequent training opportunities compared to those in rural schools. On the other hand, there is also high competition among urban teachers because of the slot limitations on the training.

“Teachers in city schools get more training opportunities. In rural areas, many teachers don’t even know how to use a computer properly” (Interview #3, 2024)

Some other underlying issues come to the surface after observation. The ICT training also provides monetary remunerations to the participants. Some teachers want to join the training eagerly because of the financial value. Even in fair selection, comparatively younger teachers

get priority because of their prior knowledge of using gadgets. Unfortunately, after a few years, some of them change their career plans, and the school loses a trained teacher.

Teachers' Lack of Confidence in Using Technology

A common finding was that many teachers lack confidence in using technology in the classroom because of insufficient training and a lack of hands-on practice.

“I still feel unsure about using technology in class because we never had enough time to practice during training” (Interview #4, 2024)

“We have computers and projectors, but many teachers don't use them because they don't know how” (Interview #1, 2024)

In schools where only a few teachers are trained, the irregular use of technology is common. Thus, overall confidence in digital teaching remains low.

“Only a few of us know how to use multimedia, so digital lessons are not a regular thing in our school” (Interview #5, 2024)

However, it is not always a confidence issue; rather, it is also an issue of interest. Teachers already have some pre-prepared traditional lessons and teaching materials. Teachers are very comfortable using those inside the classroom. Technology or multimedia requires some additional lesson plans and preparation. Some teachers only prefer using technology if an external visitor is coming for a visit or a performance evaluation from the government office.

Inconsistent Technology Use

When teachers use digital tools inconsistently, students have different learning experiences. Participants observed that some teachers frequently use multimedia lessons, while others return to traditional methods.

“One day, they might have an interactive multimedia lesson, and the next day, they go back to traditional lectures. This imbalance affects their ability to adapt to digital learning” (Interview #5, 2024)

The absence of clear guidelines leads to the subjective and uneven implementation of technology in classrooms.

“In my school, only a few teachers are comfortable using technology, which creates inconsistency in students’ learning experiences” (Interview #4, 2024)

Some teachers believe that a mix of traditional and digital methods may sometimes be beneficial, depending on the subject matter.

“There are subjects where traditional teaching works best, so a complete switch to digital isn’t always necessary” (Interview #7, 2024)

“Not all teachers have the same level of ICT training, which is why some classes use multimedia effectively while others do not” (Interview #3, 2024)

Classroom observations revealed that the use of technology varied significantly across different subjects. In some classes, teachers integrated multimedia presentations, online resources, and interactive tools, while in others, lessons were delivered through traditional lecture methods without any digital support. In one observed lesson, a teacher effectively used a projector to display interactive materials, engaging students in a multimedia-supported discussion.

3. The Generation Gap Among Teachers

Generational differences among educators further complicate the integration of technology. This theme explores how attitudes and teaching practices differ between senior and younger teachers.

Many senior teachers are comfortable with traditional methods and are unwilling to accept technology.

“My senior colleagues are not comfortable using technology, and they usually don’t appreciate the encouragement to use it either” (Interview #2, 2024)

“Senior teachers in my school still use chalk and talk. They don’t see the need to use projectors or digital content” (Interview #2, 2024)

This generational gap often results in conflict between those who wish to innovate and those who prefer traditional methods.

“There is always a silent conflict among junior and senior colleagues. Senior teachers prefer traditional methods of teaching because they are unwilling to learn new skills and practice new methods” (Interview #2, 2024)

“When I started using multimedia in my classes, my senior colleagues made comments like ‘real teaching happens with a book, not a screen.’” (Interview #2, 2024)

A few participants noted that not all senior teachers are unwilling; some have accepted technology. They also encourage others to use it.

“I have been teaching for over 25 years, but I enjoy using multimedia in my lessons. It makes teaching more engaging and effective” (Interview #5, 2024)

Also, some younger teachers admitted that not all young people are proficient in using technology in the classroom.

“Being young doesn’t automatically mean you know how to use technology well. I still struggle with some ICT tools and need more training” (Interview #8, 2024)

The generation gap is a very crucial idea to explain. After the school observation, it is evident that some teachers are very enthusiastic about the quality development of education. Also, some teachers want to continue the traditional method. In both cases, age was not an issue. Mostly, it is the mindset of the teachers. For some young teachers, this is a temporary job. They search for better opportunities. They are usually not concerned about change or betterment. Some teachers with 10 to 15 years of experience are very willing to learn new ideas for teaching. They are interested in applying them inside the classroom.

The Selection Bias in ICT Training

One major obstacle to fair technology use in schools is that some teachers receive ICT training due to personal connections, not based on their qualifications or needs. This bias can lead to unequal opportunities for both teachers and students, delaying effective technology integration in education. Participants reported that ICT training opportunities are frequently allocated based on favoritism.

“The participant for the training is selected by the HT, so those who have a good relationship with him mostly get the chance to be nominated” (Interview #3, 2024)

This bias results in a concentration of ICT skills among a few teachers.

“I have been teaching for years, but I was never selected for ICT training. The same few teachers keep getting chosen, leaving many of us behind” (Interview #1, 2024)

Some participants pointed out that teacher turnover further undermines the benefits of selective training, calling for a more transparent, needs-based process.

“Unfortunately, most of the teachers who get ICT training don’t stay in the profession for long. They switch jobs, leaving us with a continual loss of digital expertise” (Interview #5, 2024)

“There should be a clear, merit-based system for selecting teachers for ICT training so that everyone gets a fair chance” (Interview #2, 2024)

Classroom observations and teacher feedback revealed that ICT training opportunities were not always distributed fairly. In several schools, teachers openly expressed concerns about how training participants were chosen. Some reported that decisions were made by head teachers or administrators who often favored certain staff members over others. When training is distributed fairly, more teachers will feel empowered to use technology effectively, ultimately benefiting the students they teach.

4. Lack of Institutional Support

Institutional support from school leadership is critical for effective technology integration. However, many teachers report insufficient encouragement and administrative barriers hamper their efforts.

Teachers frequently report that their head teachers (HTs) and school management committees (SMCs) do not actively promote the use of digital tools.

“Even teachers' initiative to use technology inside the class is not very appreciated by the SMC” (Interview #6, 2024)

“Our HT does not promote the use of multimedia. There is no clear policy on when or how to use it” (Interview #5, 2024)

Access to digital resources is often controlled by administrative decisions, making it difficult for teachers to utilize technology effectively.

“HT controls access to multimedia classrooms, and teachers have to ask permission to use them” (Interview #1, 2024)

“Our school has projectors, but they are kept in the HT's office, and we need approval to use them. This makes it inconvenient to plan multimedia lessons” (Interview # 8, 2024)

Some teachers said that SMCs mostly focus on administrative tasks and celebrations for different occasions rather than on enhancing academic quality through technology.

“The school management committee does not pay any attention to improving the quality of education. They are more interested in celebrating national events and handling funds” (Interview #3, 2024)

“Even when teachers show interest in using multimedia, the SMC does not provide any additional support or encouragement” (Interview #1, 2024)

However, a few teachers from urban schools noted that proactive leadership sometimes leads to better support and more opportunities for ICT training.

“Our HT encourages us to use multimedia and even organizes training sessions to help us improve” (Interview #7, 2024)

“Schools in urban areas have more leadership-driven initiatives for multimedia use. In rural schools, there is still hesitation in adopting digital teaching methods” (Interview 2, 2024).

From the observation data, there is another finding that is interior setup. Some school buildings are old, and they do not have the required electric setup to use technology in their classrooms. The school committees are also not interested in renovating their buildings.

Teacher Workload

The integration of technology is seen as an additional responsibility. Most of the teachers already have heavy workloads. This section shows how time management and administrative tasks block teachers from using technology in the classroom.

Teachers often find it difficult to allocate time for preparing multimedia lessons among other responsibilities.

“I want to use multimedia more, but between lesson planning, grading, and other responsibilities, I just don’t have the time” (Interview #3, 2024)

“Setting up the projector and preparing multimedia content takes extra time, which I often don’t have” (Interview #7, 2024)

In many schools, only one or two teachers receive ICT training. They are expected to be responsible for all digital-related tasks.

“I am the only one in the school who received ICT training, so HT expects me to do all the computer-related work” (Interview#7, 2024)

“I spend more time fixing projectors and troubleshooting internet issues than actually teaching” (Interview #7, 2024)

Most of the teachers also have non-teaching responsibilities that take lots of time.

“We are overloaded with non-teaching responsibilities like stipend distribution and data entry, leaving little time for improving lessons” (Interview #1, 2024)

Some teachers incorporate technology through careful planning. However, others, especially in rural schools, struggle with higher workloads due to fewer staff members.

“I plan my lessons so I can use multimedia in class without feeling rushed” (Interview #3, 2024)

“In rural schools, one teacher handles multiple subjects and administrative work, making it hard to focus on ICT integration” (Interview #7, 2024).

Teachers in Bangladesh's government primary schools face heavy workloads and low pay. They receive fewer days off and holidays compared to other employees. Many teachers also run private tuition centers or groups, where students pay significant fees. As a result, teachers dedicate extensive effort to these private classes, preparing handouts and suggestions for students. Also, managing large classrooms, creating lesson plans, delivering lessons, and grading assignments already consume much of their time. Adding private tuition increases their workload further. This situation affects teachers' professional lives and daily time management. In some cases, teachers perform better in private tuition sessions and underperform in their official school duties.

Financial Burden on Teachers

The cost related to technology is another issue. Many teachers pointed out that they need to pay for their digital teaching. Teachers regularly use personal funds to access mobile data and maintain internet connectivity in the classroom.

“I use my phone to show students videos, but buying mobile data all the time is expensive” (Interview #2, 2024)

“Since the school does not provide a strong Wi-Fi connection, I have to use my mobile data, which costs a lot every month” (Interview #5, 2024)

Even when equipment is provided, teachers are often required to purchase additional resources such as USB drives or speakers.

“We have projectors and laptops, but we don’t have funds to buy accessories like USB drives or speakers, so sometimes I have to buy them myself” (Interview #3, 2024)

Sometimes, the teachers also need to pay for maintenance, which discourages them from using digital tools regularly.

“If the projector breaks, there’s no budget for repair. Either we collect money to fix it, or it just stays broken” (Interview #1, 2024)

“We are told to use technology, but if something gets damaged, we are expected to pay for the repair. It makes me hesitant to use the equipment” (Interview #8, 2024)

Some teachers also pointed out that in better-funded urban schools, there may be partial support. However, rural teachers face much higher financial burdens.

“Our school reimburses some of the costs for internet, but only if we provide receipts and formal requests” (Interview #5, 2024)

“In rural schools, we don’t even have a proper internet connection, so we have to rely on our mobile data to access teaching materials” (Interview #1, 2024)

The financial burden is a common picture for both rural and urban settings. The school and classroom observation ensures that a stable internet connection, proper modem or good quality device, and stable electricity supply are not always available for all the teachers. These are the key elements of a multi-media classroom. Thus, sometimes, the teachers need to use their tools and devices. This cost is non-reimbursable. However, the amount of money is not important. This is a sign of professional dedication and must be appreciated. Unfortunately, there is no policy or initiative to support and encourage the teachers for their dedication.

5. Student Engagement and Learning Outcomes

A key benefit of technology integration pointed out by many teachers is the positive impact on student engagement and learning outcomes. However, challenges related to consistency and home access create problems.

Teachers said that multimedia lessons engage students and help them in active participation.

“When I use a projector, students participate more and pay attention, but without multimedia, they get distracted and misbehave” (Interview #4, 2024)

“Student attendance increases when they know we’ll be using multimedia in class” (Interview #8, 2024)

Despite positive in-school outcomes, many students do not have access to digital resources at home. Thus, that limits their ability to engage in learning.

“Students love learning with technology, but most of them don’t have computers or the internet at home, so they can’t practice outside school” (Personal communication: Interview #4, 2024)

“Students are excited about multimedia lessons, but they forget the content quickly if they don’t have similar learning materials at home” (Personal communication: Interview #3, 2024)

When not every teacher uses technology in their classrooms, students usually face different learning experiences.

“Some teachers use multimedia, while others stick to old methods. Students get confused by this inconsistency” (Interview #5, 2024)

“Students in one class might learn with videos and animations, while in another class, they just read from the textbook. This inconsistency affects their interest in learning”
(Interview #4, 2024)

Some educators acknowledged that while technology generally increases engagement, it does not work equally well for every student.

“Some students pay attention during multimedia lessons, but others treat it like watching cartoons and don’t take it seriously” (Interview #8, 2024)

“Some students understand better when they read from a book and take notes, rather than watch videos” (Interview #1, 2024)

Addressing the issue of inconsistent technology use in education is challenging. The data shows that students from rural areas mostly have limited access to gadgets and technology. They also face more financial limitations than urban students. In the urban areas, students have better access to technology. However, most students do not utilize it in a resourceful way. Insufficient proper guidance is one of the underlying reasons.

Students who have smartphones or devices at home mostly use them for entertainment purposes. At home, it is a common scenario for most students that they do not get any guidance from their parents. Though students learn something from school, they often forget because of the lack of practice.

Digital Safety and Student Behavior

While digital tools can enhance learning, they also bring challenges related to student behavior and online safety. Teachers noted issues in monitoring and managing digital usage in classrooms.

Some teachers observed that when given access, students sometimes misuse digital resources for non-educational purposes.

“Some students misuse the internet when given access in school, so we struggle to monitor and control what they do online” (Interview #2, 2024)

The open nature of digital access complicates efforts to keep students focused on educational content.

“It is hard to keep track of every student online, and some end up using the internet for entertainment rather than learning” (Interview #7, 2024)

A few educators highlighted that clear rules and external monitoring could help mitigate these risks.

“When we have clear rules for internet use, students tend to stay on task and use technology responsibly” (Interview #5, 2024)

“Parents are concerned that technology will distract students more than help them learn” (Interview #4, 2024)

Knowledge of digital safety is one of the major concerns for both teachers and parents.

6. Parents' Support and their limitations

Parental support is essential for reinforcing learning. However, many parents are unwilling or financially unable to invest in technology for home use. Teachers reported that many parents, particularly in low-income areas, cannot afford digital devices or Internet services for their children.

“Parents are okay with multimedia in school, but they don’t want to spend money on internet access at home” (Interview #7, 2024)

“Most families in my area cannot afford smartphones for their children, so they depend entirely on classroom-based learning” (Interview #8, 2024)

Some teachers said that parents do not recognize how digital learning can enhance their children’s education.

“Many parents don’t see the need for digital learning at home. They think textbooks are enough” (Interview #1, 2024)

“Parents are supportive in theory but hesitate to buy devices because they don’t see them as necessary for learning” (Interview #2, 2024)

There is also concern that technology at home may lead to distractions rather than educational benefits.

“Parents worry that if they give children a phone, they will use it for entertainment rather than education” (Interview #5, 2024)

“Some parents believe technology is just a distraction and prefer old-school teaching” (Interview #1, 2024)

While most teachers reported resistance, a few noted that some parents, even those who are financially struggling, are willing to invest in technology for better learning.

“Some parents save money to buy devices for their children, even if it is difficult for them” (Interview #6, 2024)

“Parents in urban schools are more aware of digital learning, while in rural areas, many still believe traditional education is better” (Interview #3, 2024)

Besides financial issues, other important issues have been found. The lack of social media and multimedia orientation for the students is an important issue. Also, parents are not aware

enough of the process of online classes, teaching, or learning methods. In PTA meetings (Parents-Teachers Meetings), teachers do not focus much on these issues. Being less informative about the process, they often think it is unnecessary.

7. The COVID-19 Aftermath

The COVID-19 pandemic accelerated a rapid transition to online teaching. Teachers were forced to adopt online teaching without adequate training or support.

“During COVID-19, we worked without specific working hours to stay connected with students, but the school never acknowledged our extra effort” (Interview #4, 2024)

“We were given no formal training on how to conduct online classes. We just had to learn as we went” (Interview #4, 2024)

Low attendance and engagement in virtual learning sessions were reported.

“The attendance of students in Zoom classes was very low. Many of them had no internet access at home” (Interview #5, 2024)

“Even when students attended online classes, many of them were not actively engaging. It was hard to know if they were learning” (Interview #4, 2024)

Teachers often had to use their resources to maintain online learning.

“We had to use our internet and mobile data to conduct classes, but there was no financial support from the school or government” (Interview #4, 2024)

“We paid for our internet and software, but the school never compensated us for those expenses” (Interview #7, 2024)

Some teachers mentioned that the pandemic helped them to adapt to technology.

“COVID-19 forced us to learn how to use digital tools, and now I use them even in physical classrooms” (Interview #3, 2024)

“In cities, students had Wi-Fi and laptops. In rural areas, most families couldn’t afford mobile data, so online learning wasn’t possible” (Interview #1, 2024)

COVID has had a long-term impact on the education sector. It changed the education sector rapidly.

8. Reduced Overall Effectiveness of ICT Integration

Random and inconsistent use of digital tools hampers the overall effectiveness of technology integration in the classroom.

Preparing digital content requires significantly more time than traditional teaching methods.

“Using technology inside the classroom requires preparation and practice. This is also a time-consuming task” (Interview #8, 2024)

Technical issues and the need for advanced preparation further complicate the use of digital tools.

“We need to prepare multimedia content well in advance, and any technical mishap during a lesson can disrupt the whole session” (Interview #2, 2024)

Some teachers find that with structured planning and continuous training, extra preparation can help to improve lesson quality.

“With proper planning and training, the extra time spent on preparing digital lessons is worthwhile, as it makes the class much more engaging” (Interview #1, 2024)

“In subjects like science, where visual representation is key, the preparation takes longer, but the payoff in student understanding is significant” (Interview #8, 2024)

Classroom observations revealed that teachers often used digital tools inconsistently. Some integrated technology into their lessons, but many struggled due to time constraints or a lack of technical expertise. Thus, students' experiences varied based on their teacher's comfort with ICT tools.

In subjects like science and mathematics, technology-enhanced student comprehension. For example, one science teacher used animated simulations to explain the solar system. Students were more engaged and asked more questions compared to a previous textbook-based lesson. However, such digital lessons were uncommon across subjects.

A significant challenge was the extra time needed to prepare digital content. Traditional lessons required minimal preparation, whereas digital lessons demanded hours of work. Some teachers stay late to refine materials, while others depend on textbooks and worksheets due to time constraints.

Many teachers, despite understanding the benefits of digital tools, hesitate to use them regularly because of the extra workload. Some preferred traditional methods. Others outsource tasks like creating presentations or typing assignments to local printing shops instead of preparing them themselves. This pattern appeared in both urban and rural schools, indicating that even when technology was available, it was not always used effectively.

These observations suggest that while digital tools have great potential to enhance learning, their inconsistent use and the additional burden of preparation often make their integration ineffective. To bridge this gap, schools need to offer structured training, reliable technical support, and dedicated preparation time for teachers. Without these essential resources, technology will continue to be an underutilized tool in the classroom rather than a meaningful part of everyday learning.

9. Infrastructure and Maintenance Problems

A reliable technological infrastructure is fundamental to effective ICT integration. However, maintenance and outdated equipment lead to significant challenges. Many teachers reported that the provided digital equipment is often old.

“Our school has projectors, but they’re old, and most teachers don’t know how to fix them when they stop working” (Interview #8, 2024)

The absence of dedicated technical support or sufficient maintenance budgets further exacerbates the problem.

“If any of the equipment becomes damaged, it will be a challenge to repair or take liability for that” (Interview #1, 2024)

A few participants noted that some urban schools have better-maintained equipment and dedicated technical support.

“In our school, we have a dedicated technician who regularly checks and maintains the equipment, so our digital tools rarely break down” (Interview #5, 2024)

“Schools in rural areas struggle with outdated technology and poor repair services, while urban schools seem to manage their digital resources more effectively” (Interview #4, 2024)

Reliable technological infrastructure is crucial for effective ICT integration in schools. However, many schools struggle with outdated and poorly maintained equipment, delaying modern teaching methods. Teachers often express frustration over malfunctioning digital tools like projectors, interactive whiteboards, and school-provided computers. For instance, dim and blurry projectors make visual presentations hard to engage with. In one case, a teacher had to

abandon a lesson due to repeated technical glitches, reverting to traditional methods, disappointing both teacher and student.

A significant factor in these challenges is the lack of dedicated technical support and limited maintenance budgets. Many schools lack clear procedures for repairing or replacing faulty equipment. Consequently, teachers hesitate to use digital tools, fearing blame if something breaks. Some broken equipment remains unused for months, even an entire academic year, due to insufficient funding or trained personnel for repairs.

The situation varies between urban and rural schools. Urban schools with regular maintenance and technical support enable teachers to use digital tools more consistently without frequent disruptions. In contrast, rural schools face greater difficulties in maintaining digital resources. In several rural classrooms, computers, and projectors remain unused simply because there is no one available to repair them. Some teachers even avoid using digital tools altogether, not wanting to risk further breakdowns.

The issue extends beyond just broken hardware. Teachers in both urban and rural schools note that the administration also delays maintenance. In one school, a broken projector remained unrepaired for an entire academic year due to budget constraints.

Reliable Power and Electricity

A stable power supply is essential for the effective use of technology, yet many schools struggle with frequent load shedding and low voltage.

Participants highlighted that unreliable electricity disrupts digital lessons regularly.

“During extremely hot weather or power outages, classes become exhausting. Having backup power could help maintain a better learning environment” (Interview #4, 2024)

The absence of generators or alternative energy solutions exacerbates the problem.

“Before introducing multimedia classrooms, the government should ensure regular electricity supply and proper internet connection first” (Interview #8, 2024)

Some participants noted that urban schools tend to have more reliable power and backup systems compared to rural schools.

“Urban schools often have backup generators and more stable power, while in our rural area, power cuts are a daily occurrence” (Interview #6, 2024)

“If we could invest in solar panels, we wouldn’t have to worry as much about power outages disrupting our classes” (Interview #7, 2024)

Interviews and classroom observations found that a secure source of electricity is key for the effective utilization of technology in schools. Schools in general, and schools in rural districts face regular load-shedding. As a result, it is not simple to use learning tools digitally.

10. The Influence of School Leadership

School leadership plays a key role in shaping ICT integration. However, many participants reported that unsupportive leadership hampers technology use in the classroom. Teachers expressed that their efforts to use technology are often not supported by school leadership.

“Even teachers' initiative to use technology inside the class is not very appreciated by the SMC” (Interview #1, 2024)

Administrative barriers restrict access to multimedia tools and digital classrooms.

“HT controls access to multimedia classrooms, and teachers have to ask permission to use them” (Interview #6, 2024)

Some participants reported that proactive leadership can enhance ICT adoption.

“Our HT encourages us to use multimedia and even organizes training sessions to help us improve” (Interview #7, 2024)

“In urban schools, leadership is more open to technology, but in rural areas, we still face a lot of resistance from the top” (Interview #6, 2024)

Classroom observations and teacher feedback made it clear that school leadership plays a crucial role in shaping how technology is integrated into teaching. While some schools had proactive leaders who encouraged ICT adoption, many teachers expressed frustration over a lack of administrative support that made it difficult to use digital tools effectively.

11. The Gap Between Government Initiatives and Classroom Practice

Government initiatives have provided substantial digital resources, yet there remains a significant gap between these provisions and their effective implementation in classrooms.

Many teachers reported that despite the government’s provision of equipment and funding, there is no clear, actionable plan for integrating these resources into everyday teaching.

“The government has provided everything, including computers and projectors, and allocated money for Wi-Fi, but the authority is unwilling to use them” (Interview #3, 2024)

Bureaucratic procedures and administrative resistance often hinder the effective use of technology.

“Policies sound good on paper, but in reality, there is no clear plan for how teachers are supposed to integrate technology into their daily teaching” (Interview #1, 2024)

A few teachers noted that in some schools, proactive leadership and localized policies have helped bridge this gap.

“Our school has managed to integrate digital tools successfully because our HT and SMC actively implement and monitor the government’s policies” (Interview #4, 2024)

“In urban schools, technology is used more effectively because of better infrastructure and proactive administration, whereas in rural areas, the gap remains very wide” (Interview #7, 2024)

Observation in schools and teacher feedback highlighted that though the government wants to encourage teachers to use technology in the classroom, they need more effective initiatives. Organizing regular training as well as providing high-speed internet at low cost will be more effective.

Chapter 5

Discussion and Conclusion

5.1 Discussion

Technology use in education is a common scenario worldwide. The main target of using technology in the classroom is to improve learning experiences (Huang et al., 2019; Roblyer, 2015). Educators and researchers deliberately work hard to know how to use technology for a better learning environment. Mishra and Koehler's (2006) framework, TPACK, focuses on integrating technology in education to ensure effective teaching and learning. In this part, issues found in the findings, such as unequal access, insufficient teacher training, generational divides, heavy workloads, and infrastructural and policy gaps, will be discussed in detail.

This study found that despite government initiatives to supply digital devices such as laptops, projectors, and tablets, internet connectivity and unstable power hamper the initiative. Schools in rural areas suffer the most. Teachers also reported that administrative restrictions often limit access even when equipment is available.

Bennett and Maton (2010) emphasize the common digital divide in education. Access to technology is unequal across regions and socioeconomic groups. Pelgrum (2001) states that providing technology is only part of the solution. Adequate infrastructure, such as reliable internet and electricity, is equally essential. Thus, in reality, digital resources remain underutilized due to infrastructural limitations and administrative barriers.

Both the results and the literature suggest that policymakers must not only distribute digital devices fairly for full benefit from ICT integration. Strong infrastructure and maintenance programs for all schools, including urban and rural areas, are needed. Also, participants pointed

out a biased selection process. They said that not all teachers receive training. Only a few selective teachers receive it. Thus, other teachers do not get the chance to be trained. Barak (2007) and Sorensen et al. (2007) have noted that short-term, one-off training sessions or single training do not ensure the long-term technology competence of the teachers. Also, Lawless and Pellegrino (2007) state that continuous, hands-on professional development is essential for effective ICT integration. The TPACK framework (Mishra & Koehler, 2006) emphasizes that integrating technology into pedagogy requires a sustained, multifaceted approach. These perspectives highlight the need for more practical and inclusive training programs for teachers.

The results indicate the necessity of ICT training for professional development. This will help ensure that all teachers develop the skills needed to integrate technology effectively. Also, it reduces the gap caused by biased selection and short training durations. This bias also discourages the teachers from performing better.

Another issue that appeared many times is that some trained teachers plan to leave the profession. As a result, interested teachers miss their chance to receive training. Ingersoll (2001) marked this issue as a major factor and stated that trained teachers leave the profession, leading to school losses and missed training opportunities for others. Kelly and Northrop (2015) also stated that schools invest in training these teachers, but they often leave, leading to instability and a loss of resources, while other interested educators miss out on training opportunities.

A common observation in the study was that many teachers lack confidence in employing technology due to insufficient practical training and limited hands-on experience. Hew and Brush (2007) note that teacher confidence is necessary for technology adoption. Without sufficient support and practice, teachers are likely to return to traditional methods. Jang (2009) further says that practical, experiential learning in ICT is necessary to build confidence. The

data, which indicate a deficit in practical training opportunities, reflects these findings and emphasizes the importance of supportive professional development.

Increasing teacher confidence requires not only improved ICT training but also ongoing mentorship and practical sessions. Enhancing teacher confidence is fundamental to ensuring a smooth transition from traditional to digital teaching practices (Roblyer, 2015). It is very important to make room for co-learning. The study also finds that seats for ICT training are very limited. Teachers often miss the opportunity. The best way here is teachers who received the training must guide the teachers who are willing to take multimedia class and miss the chance of training (Kelly & Northrop, 2015). According to Kelly and Northrop (2015), schools invested in their teachers. This can make the transition faster and boost the confidence of all teachers.

The study revealed a significant generational gap. Generally, younger teachers are more interested in ICT integration than their senior counterparts. Some senior teachers continue to rely on traditional methods, while younger teachers often struggle with the lack of institutional support. However, they want to innovate their teaching.

Hew and Brush (2007) and Barak (2007) both highlight that resistance to technology is often found more among senior teachers who are accustomed to traditional teaching methods. At the same time, younger teachers, though generally more adept with digital tools, may face challenges if they lack adequate training (Mishra & Koehler, 2006). These studies emphasize the need to address both generational attitudes and the practical support required to bridge this gap.

To address this challenge, schools should establish mentorship programs. They can pair digital-savvy younger teachers with senior educators. Research suggests that mentoring relationships

help in developing curriculum integration of technology, redesigning lessons with technology-rich resources, and overcoming barriers to ICT adoption (Duran et al., 2001). Reverse mentoring is where younger teachers support senior colleagues in acquiring digital skills. It has also been found effective in reducing resistance to technology and promoting collaboration (Duran et al., 2001). Encouraging such mentorship initiatives can promote technology adoption in classrooms.

The participants in the study reported that the integration of technology adds significantly to their workload. They struggle to find time for digital lesson planning due to their other responsibilities. Additionally, when only one or two teachers receive ICT training, they are loaded with extra responsibilities.

Multiple studies have found that an increased workload is a significant barrier to technology integration (Lawless & Pellegrino, 2007). Overloaded teachers tend to avoid additional responsibilities. Also, research by Jang (2009) emphasizes that administrative support and workload management are critical factors for successful ICT adoption.

The findings suggest that reducing non-teaching responsibilities and distributing ICT tasks more evenly among teachers can improve digital integration. Administrative reforms and the hiring of dedicated technical support staff may help alleviate these burdens and allow teachers to focus more on innovative teaching methods. Most participants thought that using technology in the classroom creates a positive attitude among the students. Lim et al. (2020) found the positive impact of technology in the classroom in both Bangladesh and Nepal. However, challenges remain—students without access to technology at home struggle to reinforce classroom learning.

La Velle et al. (2003) and Jang (2009) have found that technology, when effectively integrated, boosts student engagement. Also, it facilitates the practical understanding of complex concepts. However, the literature also acknowledges that inconsistent use of technology can lead to irregular learning outcomes (OECD, 2015). This demonstrates both the positive impact of multimedia on engagement and the challenges posed by limited home access.

Several teachers reported that they need to bear significant personal costs to support ICT integration, such as purchasing mobile data and funding minor equipment repairs. Research by Pelgrum (2001) and OECD (2015) highlight that financial restrictions can limit the effective use of technology in education. The literature emphasizes that sustainable digital integration requires financial support for maintenance and operational costs. These observations indicate that without proper funding arrangements, the financial burden on teachers hampers consistent technology use.

To solve these financial challenges, it is essential to introduce targeted interventions such as reimbursement schemes, school-funded internet access, and partnerships with private organizations to subsidize costs. Public-private partnerships have proven to be an effective strategy in reducing ICT-related financial burdens in education. For example, the ConnectEd Initiative in the United States facilitated partnerships with major technology companies like Adobe and Apple. This allows schools to receive free or discounted software and devices, reducing financial strain on educators (Beesley, 2021). Similarly, research has shown that such collaborations have contributed significantly to subsidizing ICT-related expenses in education across various global initiatives (OECD, 2015). Implementing similar approaches in Bangladesh could support government primary school teachers by easing financial limitations and ensuring more consistent technology use in classrooms.

Many participants expressed that their schools do not provide sufficient institutional support for ICT integration. Teachers often reported that they must seek permission to access multimedia classrooms. School management does not actively promote the use of technology. Hew and Brush (2007) emphasize that administrative support is crucial for successful technology integration. The literature also points out that institutional barriers, including bureaucratic procedures and leadership indifference, delay ICT adoption (Lawless & Pellegrino, 2007). Also, these challenges indicate that even when digital resources are available, a lack of proactive leadership significantly limits their use.

The role of school leadership in ICT integration has been widely recognized in existing literature. Chang et al. (2021) highlight that principals play a crucial role in facilitating the use of technology by creating a culture of technology integration. Similarly, Sincar (2013) points out that school administrators often struggle with adopting new technologies themselves. Without active leadership, technology remains an underutilized resource in many schools.

To improve ICT integration, school leaders must take a more proactive role in supporting technology use within classrooms. This includes developing clear policies that encourage the use of digital tools, incorporating ICT into strategic planning, and ensuring that teachers have easy access to necessary resources. Research suggests that when school leaders actively engage in ICT initiatives and provide structured guidance, teachers are more likely to integrate technology into their teaching practices (Chang et al., 2021; Sincar, 2013). School management can create an environment where teachers feel more confident and motivated to utilize technology in their classrooms.

Although many parents are supportive of technology use in schools, the study found that they are often unwilling or unable to invest in digital tools for home use. Bennett and Maton (2010) and OECD (2015) have documented the digital divide that extends into students' home

environments. The literature indicates that socioeconomic factors and a lack of digital awareness among parents create this gap. Participants observed that students without home access to digital tools struggle to support their learning.

Addressing the digital divide requires collaborative efforts between schools, governments, and communities. Initiatives such as affordable technology loan programs, community digital centers, and parent education workshops could help bridge this gap and ensure that students benefit from technology both at school and at home.

The COVID-19 pandemic brought a sudden shift to online learning in Bangladesh, exposing major gaps in ICT preparation. Teachers reported that they did not receive formal training for online teaching. Also, they faced low student attendance in virtual classes and spent their own money on digital resources. Das (2021) points out that the transition to online education created several challenges, such as limited access to devices, poor internet connections, and low student engagement. These issues show that the existing ICT infrastructure and training programs were not enough to support online learning. To address these problems, it is important to improve ICT infrastructure, provide better training, and ensure that teachers have the necessary resources to use technology effectively in online education.

To solve these challenges, it is important to improve ICT infrastructure. Teachers need continuous training and proper resources to use technology effectively. A hybrid learning model, which combines online and face-to-face teaching, can help schools continue learning during disruptions. Research shows that hybrid learning improves the resilience of education systems and helps schools adapt to future challenges (Bozkurt, 2022). Teachers also need ongoing digital training to develop skills for online teaching. Studies suggest that regular training helps teachers manage virtual classrooms and builds their confidence in using technology (Bozkurt, 2022). Without these steps, teachers will continue to struggle with ICT

integration. Online education will also remain difficult. Schools must focus on hybrid learning and digital training to ensure a stronger and more prepared education system.

Sustainability is a major concern as many teachers shared that ICT training is only offered once. Mishra and Koehler (2006) and Rodrigues et al. (2003) emphasize that ICT integration is a continuous process that needs regular professional development. The literature suggests that without ongoing training and support, the initial benefits of ICT initiatives do not last. A lack of follow-up training and frequent teacher change make it difficult to sustain digital education in schools.

To make ICT integration sustainable, schools need to include technology training in regular professional development programs. Studies show that continuous training, peer support, and hands-on practice help teachers use technology better in education (Ghavifekr & Rosdy, 2015). Providing equal access to digital resources and structured ICT training also improves learning outcomes (Mapisa & Makena, 2024). Mentorship programs help teachers and students by increasing engagement and academic success (Ghavifekr & Rosdy, 2015). These steps can ensure that teachers continue to build their digital skills and use technology effectively in classrooms.

Inconsistent use of digital tools in classrooms was a major challenge in this study. Some teachers regularly used multimedia in their lessons, while others continued with traditional methods. The literature (e.g., Ghavifekr & Rosdy, 2015; Hew & Brush, 2007) shows that inconsistent ICT use creates unequal learning experiences for students. Differences in teacher skills and school support make this problem worse. Findings from this study reflect these issues. Without clear guidelines and regular training, ICT benefits are not equally available in all classrooms.

To make ICT use consistent, schools need clear policies. They should also encourage teachers to work together. Research shows that technology works best when it supports learning goals (Mapisa & Makena, 2024). Teachers must have a clear purpose when using ICT. Studies also suggest that when teachers collaborate, they use technology more effectively (Mapisa & Makena, 2024).

Regular assessments and peer-sharing can help teachers improve ICT use. Peer learning allows teachers to share experiences and solve problems together. Without this, many struggle to use technology in class (Bozkurt, 2022). When ICT use is not consistent, students get different learning experiences. By following these strategies, schools can improve ICT use in classrooms. Clear policies, training, and teacher collaboration can reduce inconsistencies and improve student learning.

The study found that the irregular use of digital tools reduces the effectiveness of ICT integration. Teachers shared that preparing digital lessons takes extra time, and technical issues make it even harder. As a result, many prefer traditional teaching methods.

Lawless and Pellegrino (2007) explain that if ICT integration is not managed properly, the extra effort needed can lower its impact. Similarly, Jang (2009) highlights that without a structured plan for digital lessons, the benefits of technology may not be fully achieved. These studies show that when teachers face difficulties in preparation, digital tools are used inconsistently, reducing their effectiveness.

To improve ICT integration, schools should help teachers by reducing the burden of preparation. Support from institutions, sharing digital resources among teachers, and providing regular training can make ICT use more effective in classrooms.

Even when schools receive digital tools, outdated equipment and poor maintenance make them difficult to use. Pelgrum (2001) and Bozkurt (2022) highlight that ICT integration needs regular maintenance and proper infrastructure. Without this, digital tools become outdated and ineffective. Research shows that technology needs regular upkeep to function properly in classrooms (Mapisa & Makena, 2024). If maintenance is not done, equipment stops working, making it harder for teachers to use technology in their lessons. Schools need IT support to keep digital tools running smoothly (Ghavifekr & Rosdy, 2015).

To solve this issue, schools should create maintenance plans, set aside funds for repairs, and hire IT staff. Regular maintenance can prevent breakdowns and keep technology available for teachers and students. Upgrading to simple and durable equipment can also reduce technical problems. By taking these steps, schools can ensure that technology remains a useful tool in the classroom.

School leadership is important for ICT integration. The study found that when school leaders do not support technology use, teachers struggle to use digital tools in the classroom. The lack of encouragement makes it difficult for teachers to adopt ICT. Hew and Brush (2007) highlight that strong leadership helps in adopting new technologies. When school leaders promote digital learning, teachers are more likely to use technology. This supports research showing that leadership can either help or block ICT integration.

For ICT integration to be successful, school leaders need clear policies that support technology use. Schools should have proper guidelines on using digital tools in classrooms and provide necessary resources. Studies show that structured policies and leadership training can improve ICT use in schools (Ghavifekr & Rosdy, 2015). Leadership training helps school administrators understand the benefits of ICT and how to apply it in education (Bozkurt, 2022). Strong

leadership, clear policies, and proper training can help teachers feel confident in using technology. This will create a better learning environment and improve ICT use in schools.

A major concern in the study was that ICT training opportunities were often given based on favouritism rather than actual need. This led to an unequal distribution of digital skills among teachers. Barak (2007) and Lawless and Pellegrino (2007) mention that when only a small number of teachers receive ICT training, technology integration remains limited. Research suggests that a fair and transparent selection process is necessary to ensure equal access to training and reduce skill gaps among teachers (Tondeur et al., 2016). When selection is not based on merit, many teachers are excluded from learning digital skills, which creates an imbalance in ICT adoption across classrooms. Some teachers become more confident in using technology, while others remain dependent on traditional methods. This inconsistency affects the overall effectiveness of ICT integration in schools.

To address this issue, schools should follow a clear and merit-based selection process for ICT training. A rotational system can also help ensure that all teachers get a chance to improve their digital skills over time. Research highlights that continuous and inclusive professional development programs contribute to more effective technology use in education (Tondeur et al., 2016). Providing equal opportunities for ICT training will help create a balanced and skilled teaching workforce. This approach will not only enhance teachers' confidence in using technology but also promote consistent ICT adoption across classrooms. Ensuring fair access to training will ultimately strengthen technology integration and improve teaching practices in primary education.

A stable power supply is essential for the effective use of digital tools in classrooms. Many teachers in the study mentioned that frequent power outages and unreliable electricity create major challenges. Pelgrum (2001) and Bozkurt (2022) state that even with advanced digital

tools, weak infrastructure and an unstable power supply can limit their effectiveness. Studies show that schools in areas with frequent power cuts struggle to use ICT properly. This issue is more common in rural schools, where the lack of electricity makes it harder to integrate technology into teaching.

Studies highlight that even with modern digital tools, poor electricity infrastructure can make them ineffective. Akter (2024) emphasizes that digital education in rural schools faces serious challenges due to unreliable power and poor connectivity. Limited access to stable electricity can severely restrict students' learning opportunities, especially in remote areas. These findings align with the study, which shows that rural schools in Bangladesh struggle more with power issues than urban schools.

Improving electrical infrastructure, particularly in rural areas, is necessary for sustainable ICT integration. Schools should invest in backup power solutions, such as generators or solar panels, to ensure that technology remains functional during outages. Providing alternative energy sources will help maintain a stable digital learning environment and improve the effectiveness of technology in education.

Integrating technology into classrooms creates challenges related to digital safety and student behaviour. The study found that teachers face difficulties in monitoring students' online activities. Some students misuse the Internet for non-educational purposes. Hew and Brush (2007) and Bozkurt (2022) explain that while technology can improve learning, it also creates risks. These include distractions and access to inappropriate content. The literature highlights the need for clear digital policies and monitoring tools to keep students focused on learning. Without proper supervision, the benefits of ICT use in classrooms may not be fully achieved.

To address this issue, schools need clear guidelines on technology use. Policies should define rules for responsible internet behaviour and steps to prevent misuse. Research suggests that schools with structured digital safety policies help students develop awareness and accountability when using technology (Martin et al., 2022). Schools should also introduce digital literacy programs. These programs can teach students about online risks, safe browsing, and the dangers of cyberbullying. Educating students on responsible technology use can prevent misuse and encourage ethical online practices (Chen & Shi, 2018). Schools can arrange training sessions or provide digital safety resources to guide parents. This can help them support their children in using technology responsibly.

By implementing clear policies, educating students, and engaging parents, schools can create a safer digital learning environment. These steps will ensure that ICT integration supports student learning while minimizing risks.

Government initiatives have increased the availability of digital tools in schools. However, the study found a gap between these policies and their actual implementation in classrooms. Many teachers reported that even though schools received computers, projectors, and Wi-Fi funding, bureaucratic barriers prevent their effective use.

Research (e.g., U.S. Department of Education, 2001; Pelgrum, 2001) shows that providing ICT resources is not enough. Successful integration requires clear policies and strong administrative support. This study supports these findings. It highlights that poor planning and administrative resistance create obstacles to using technology in classrooms.

To close this gap, schools need clear and practical guidelines on ICT use. School leaders should provide better support and ensure regular monitoring. Policies should also be adapted to meet

the needs of individual schools. These steps will help ensure that digital resources are used effectively in daily teaching.

Overall Synthesis and Future Directions

The findings present a detailed picture of ICT integration in education. There are many challenges to using technology in the classroom. These include poor infrastructure, lack of teacher training, weak leadership, financial constraints, and policy implementation issues. The study supports existing research that shows ICT integration requires a complete approach that considers all these factors.

Future research should focus on long-term studies to understand the effects of ongoing teacher training on ICT use. It should also explore new ways to fund digital infrastructure and examine how school leadership can encourage digital learning. More studies are needed to understand the differences between urban and rural schools so that solutions can be designed for specific contexts.

5.2 Conclusion

This study aimed to explore the challenges and opportunities of ICT integration in teaching and learning. The findings show that, despite government investments in digital tools, many obstacles prevent their effective use in classrooms. These include limited access to technology, lack of teacher training, high workloads, differences between younger and older teachers, weak institutional support, financial burdens, and infrastructure issues.

The study found that government initiatives are not always applied effectively in schools. Urban schools often have better infrastructure and more support from school leadership. In contrast, rural schools struggle with problems such as the slow internet and frequent power

outages. These infrastructure challenges continue to create a digital divide, making it harder for students to access technology.

The research also highlights that short-term ICT training does not prepare teachers well. Without ongoing training, many teachers feel unprepared and lack confidence in using technology. Selection bias in ICT training further widens the gap, as only certain teachers receive training while others are left behind. These findings support previous research (e.g., Bennett & Maton, 2010; Mishra & Koehler, 2006), which stresses that ICT integration requires more than just providing digital tools. It needs strong policies, continuous support, and fair training opportunities for all teachers.

Reflecting on the overall study, it is clear that it has met its goal of identifying key challenges and possible solutions for ICT integration in education. The research confirms that technology has the potential to improve learning, but success depends on good infrastructure, proper teacher training, strong school policies, and adequate funding. If these factors are not addressed, digital tools may not lead to meaningful improvements in teaching and learning.

On a personal level, this study has been a valuable learning experience. It has deepened my understanding of ICT integration and the need for systemic changes rather than just increasing investments in technology. I now see the importance of aligning government policies with the actual needs of schools. This research has also reinforced my understanding of the role of continuous training, fair resource distribution, and strong school leadership in ensuring the successful use of technology.

Furthermore, the study highlights areas for future research. There is a need to explore the long-term effects of continuous ICT training on teachers and students. More research is also required on hybrid learning models to see how they can help bridge the digital divide.

In conclusion, this study shows that coordinated efforts from policymakers, school leaders, and educators are needed to close the gap between digital policies and actual classroom use. Schools can fully benefit from technology by offering continuous training, distributing resources fairly, strengthening leadership, and implementing clear policies. This study provides insights into current challenges and serves as a foundation for future studies to improve ICT integration in education.

5.3 Recommendations

Based on the study's findings, the following recommendations are suggested to improve ICT integration in education:

1. Improve Digital Infrastructure:

Invest in stable internet and reliable power backup, especially in rural areas, to ensure digital tools can be used consistently in classrooms.

2. Provide Ongoing ICT Training:

Move away from one-time workshops and offer continuous, hands-on training for teachers to help them effectively use digital tools.

3. Ensure Fair Training Selection:

Create a transparent and needs-based process for selecting teachers for ICT training to ensure equal opportunities for skill development.

4. Strengthen School Leadership Support:

Encourage school leaders and management committees to actively promote technology use by providing clear policies and incentives for ICT adoption.

5. Reduce Administrative Workload:

Hire additional staff to handle non-teaching responsibilities so that teachers have more time to prepare digital lessons and use technology effectively.

6. Provide Financial Support for ICT:

Establish budgets or reimbursement schemes to cover ICT-related expenses, reducing the financial burden on teachers.

7. Develop Hybrid Learning Models:

Design flexible teaching strategies that combine traditional and digital methods to ensure learning continues even during disruptions such as power outages.

8. Engage Parents in Digital Learning:

Conduct digital literacy workshops for parents to raise awareness of the benefits of technology in education and encourage home-based learning support.

9. Set Up Community Digital Learning Centers:

Create local centers where students, particularly in low-income and rural areas, can access technology outside of school.

10. Conduct Long-Term Research:

Support studies that track the effects of ongoing ICT training on teachers' skills and student learning outcomes.

11. Investigate Urban-Rural Differences:

Conduct comparative studies on ICT integration in urban and rural schools to develop location-specific solutions.

12. Study Leadership's Role in ICT Integration:

Further research should focus on how school leadership and institutional culture impact ICT adoption and how leadership training can improve technology use in schools.

A balanced approach that combines digital tools with traditional methods is recommended to ensure consistent learning outcomes. Schools should also consider providing supplementary resources for students without home access to ensure that digital learning benefits are equitably distributed. These recommendations address both short-term and long-term challenges, ensuring that technology becomes a sustainable and effective part of education.

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Interview Question

ডেমোগ্রাফিক ডেটা

স্কুলের নামঃ

জেলাঃ

শিক্ষকের নামঃ

চাকরির সময়কালঃ

প্রশ্নঃ

- প্রযুক্তি বা টেকনোলজি সম্পর্কে আপনার ধারণা কি?
- আপনি নিজে কি ক্লাসরুমে কোন প্রযুক্তি- ডিভাইস, মাল্টিমিডিয়া বা অন্যকিছু ব্যবহার করেন?
- আপনি প্রযুক্তি ব্যবহারে কতটুকু স্বচ্ছন্দবোধ করেন?
- আপনার প্রতিদিনের স্কুলে বা কাজের ক্ষেত্রে টেকনোলজি বা প্রযুক্তি কতটা জরুরি?
- ক্লাসরুমে পড়ানোর ক্ষেত্রে কোন কোন টুল বা ডিভাইস বা প্রযুক্তিগত জিনিস আপনাদের স্কুলে সহজে পাওয়া যায়?
- আপনি ক্লাসরুমে এর মধ্যে থেকে কোনগুলো ব্যবহার করেন এবং কেন? যেগুলি ব্যবহার করেন না সেগুলি ব্যবহারে অসুবিধা কি?
- ক্লাসরুমে প্রযুক্তি ব্যবহারের ক্ষেত্রে আপনার সহকর্মী ও স্কুলের এডমিনিস্ট্রেশনের মনোভাব কেমন?
- আপনি নিজে প্রযুক্তি ব্যবহারের সময় কি কোন অসুবিধা হয়? কি ধরনের অসুবিধা?
- শিক্ষকরা প্রযুক্তি ব্যবহারের ক্ষেত্রে স্কুল থেকে কি কি পদক্ষেপ নেয়া হয়?
- ক্লাসে পড়ানোর সময় কোন সাবজেক্টের ক্ষেত্রে আপনার মনে হয় প্রযুক্তি ব্যবহার করা উচিত বা ব্যবহার করা সহজ?
- আপনার নিজের অভিজ্ঞতা থেকে ক্লাসরুমে পড়ানোর সময় প্রযুক্তি ব্যবহার করে পড়ালে আর না পড়ালে কি কি সুবিধা বা অসুবিধা হয়? বা আপনি কি কোন পার্থক্য লক্ষ্য করেছেন?
- আপনার প্রযুক্তি ব্যবহার করা বা না করা একজন শিক্ষকের পাঠদানকে কি প্রভাবিত করে বলে আপনি মনে করেন?
- করোনাকালীন সময় শিক্ষার্থীদেরকে পাঠদান ও যোগাযোগ করার ক্ষেত্রে প্রযুক্তির ব্যবহারকে আপনি কিভাবে দেখেন?
- করোনাকালীন সময় শিক্ষার্থীদের পড়ানোর সময় তাদের কি কোন অসুবিধা হয়েছে?
- এসময় অভিভাবকদের মনোভাব কেমন ছিল?
- এসময় পড়ানোর ক্ষেত্রে স্কুল থেকে শিক্ষকদের জন্য কি পদক্ষেপ নেয়া হয়েছিল?
- সরকারিভাবে আপনাদের জন্য কি ধরনের প্রশিক্ষণ ও সুবিধার ব্যবস্থা করা হয় প্রযুক্তি ব্যবহারের জন্য?
- আপনার কি মনে ট্রেনিংয়ে যে সেসব বিষয় নিয়ে আলোচনা করা হয় একজন শিক্ষকের প্রতিদিনের ক্লাসে পাঠদান প্রযুক্তি ব্যবহারের ক্ষেত্রে সেইটুকু প্রশিক্ষণ যথেষ্ট?
- কি কি পদক্ষেপ নিলে আপনার জন্য সুবিধা হবে বলে আপনি মনে করেন?