

Teachers' Perceptions of Technology Integration in Early Childhood Classrooms in Dhaka City.

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A thesis submitted to Brac Institute of Educational Development in partial fulfillment of the
requirements for the degree of
Master of Science in Early Childhood Development

Brac University

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Declaration

It is hereby declared that

1. The thesis submitted is my own original work while completing a 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 the main sources of help.

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Ethics Statement

Title of Thesis Topic: Teachers' Perceptions of Technology Integration in Early Childhood Classrooms in Dhaka City.

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1. Source of population Teachers of children aged from 3 to 6 years

2. Does the study involve (yes, or no)

- a) Physical risk to the subjects -----no
- b) Social risk -----no
- c) Psychological risk to subjects -----no
- d) discomfort to subjects -----no
- e) Invasion of privacy -----no

3. Will subjects be clearly informed about (yes or no)

- a) Nature and purpose of the study -----yes
- b) Procedures to be followed -----yes
- c) Physical risk -----yes
- d) Sensitive questions -----yes
- e) Benefits to be derived -----yes
- f) Right to refuse to participate or to withdraw from the study -----yes
- g) Confidential handling of data -----yes
- h) Compensation and/or treatment where there are risks or privacy is involved -----yes

4. Will signed verbal consent be required (yes or no)

- a) from study participants -----no
- b) from parents or guardians -----N/A
- c) Will precautions be taken to protect the anonymity of subjects? -----yes

5. Check documents being submitted herewith to the Committee:

- a) Proposal -----yes
- b) Consent Form -----yes
- c) Questionnaire or interview schedule -----yes

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Abstract

Technology has increasingly become an important component of early childhood education, influencing teaching strategies, learning environments, and children's engagement in classrooms. In urban educational settings such as Dhaka city, the integration of digital tools in early childhood classrooms is gradually expanding. However, teachers' perceptions and experiences play a critical role in determining how effectively technology is integrated into teaching and learning practices. This study explores early childhood teachers' perceptions of technology integration in classrooms within selected schools in Dhaka city. The research focuses on understanding how teachers use digital tools in their teaching practices, the benefits they observe in children's learning, and the challenges they encounter while integrating technology with play-based learning approaches.

Using a qualitative research design, data were collected through in-depth interviews and a focus group discussion with twelve early childhood teachers working in two urban schools located in Dhaka. The study examines teachers' experiences with digital resources such as multimedia presentations, educational applications, and interactive learning tools in early childhood classrooms. The findings indicate that teachers generally view technology as a supportive tool for enhancing children's engagement, supporting language and cognitive development, and enriching classroom activities through visual and interactive learning experiences. However, the study also identifies several challenges, including limited training, concerns about screen time, and the need to balance technology use with play-based learning approaches.

The study highlights the importance of professional development opportunities and institutional support to help teachers integrate technology in appropriate ways. By exploring teachers'

perspectives, this research contributes to a better understanding of how technology can be effectively incorporated into early childhood education in Bangladesh. The findings may inform policymakers, school leaders, and teacher training institutions in developing strategies that promote meaningful and balanced use of digital tools in early childhood classrooms.

Keywords: Early childhood education; technology integration; teachers' perceptions; digital learning tools; play-based learning; Dhaka city.

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List of Acronyms

ICT	Information and Communication Technology
ECE	Early Childhood Education
IDI	In-Depth Interview
FGD	Focus Group Discussion

Chapter I: Introduction & Background

Introduction

The growing prevalence of digital technologies has transformed early learning environments, prompting educators and researchers to examine how these tools can be integrated effectively in early childhood education (Blackwell, Lauricella, & Wartella, 2014; Haugland, 2018). Young children today are frequently exposed to digital tools such as tablets, smartphones, laptops, smart TVs, interactive whiteboards, and educational applications both at home and in school, which influences the ways they communicate, explore, and acquire knowledge (Plowman & McPake, 2013). This rapid digitalization raises critical questions about how technology can enhance learning while preserving developmentally appropriate, play-based pedagogies (Neumann, 2018). The motivation for this study stems from observing the increased use of digital devices in early childhood classrooms and recognizing the need to understand teachers' perceptions, confidence, and practices regarding technology integration. Understanding these perspectives is essential, as the effectiveness of technology in supporting early literacy, numeracy, and creative development depends largely on teachers' beliefs, skills, and classroom strategies (Hossain & Islam, 2018).

The early childhood education landscape in Bangladesh is diverse, ranging from government pre-primary programmes, NGO-supported initiatives, and private or international schools. This diversity has contributed to unequal access to digital resources across institutions. Urban private and international schools, particularly in Dhaka, are more

likely to have interactive whiteboards, projectors, tablets, laptops, smart TVs, and stable internet connectivity. In contrast, many government and low-income schools face shortages of ICT (Information and Communication Technology) infrastructure, devices, and technical support (Bangladesh Bureau of Educational Information and Statistics - BANBEIS, 2022). These disparities are also reflected in teacher professional development opportunities, as many early childhood educators receive limited training focused on integrating technology within play-based or inquiry-oriented pedagogy.

The COVID-19 pandemic highlighted the critical role of technology in early childhood education. When schools were closed, both teachers and families depended heavily on digital communication and online learning platforms such as Zoom, Google Meet, WhatsApp, and various learning management systems. This situation revealed significant challenges related to digital literacy, unequal access to devices and internet connectivity, and limitations in teachers' readiness to deliver developmentally appropriate online instruction. Many educators struggled to adapt early years of pedagogy to virtual environments, while families faced barriers in supporting children's learning at home. Even after the return to in-person classes, technology continues to play a key role in teaching and learning, with increased expectations for its integration. This shift is also reflected globally, as organizations like UNESCO have emphasized disparities in ICT preparedness across different educational contexts.

Despite growing investment in educational technology, research focusing specifically on early childhood teachers' perceptions in Dhaka is limited. Most existing studies in Bangladesh have examined technology integration in primary or secondary education, with relatively less attention given to early childhood settings where learning needs,

developmental characteristics, and pedagogical approaches differ significantly. The absence of context-specific evidence may lead to policy and school-level decisions that do not adequately reflect the realities of early childhood classrooms. Therefore, given the rapid digitalization of education and the post-pandemic emphasis on ICT readiness, it is essential to explore how early childhood teachers in Dhaka perceive and experience technology integration in their teaching practices.

The rationale of this study is the growing importance of digital literacy and the need to ensure developmentally appropriate technology use in early childhood classrooms. While national initiatives have promoted digital education, guidance for early childhood teachers on balancing technology use with play-based learning remains limited. The findings of this study may contribute to improving early childhood teaching practices by providing insights into teachers' perceptions, challenges, and professional support needs related to technology integration, which may ultimately support the development of more effective early childhood education environments.

Statement of the Problem

Early childhood teachers in Dhaka frequently face a lack of clear guidance and sufficient support for integrating technology meaningfully within developmentally appropriate, play-based learning environments. Although the use of digital tools in early years of classrooms is increasing, teachers' pedagogical understanding and practical ability to use these tools effectively remain uncertain. Many schools have begun introducing resources such as multimedia presentations, tablets, and educational applications; however, there is limited evidence on how confident, capable, or supported teachers feel in using these tools to

enhance children's development. As a result, there is a risk that technology may be used in a superficial or disconnected way rather than as a purposeful and supportive element of teaching and learning (Blackwell, Lauricella, & Wartella, 2014).

The problem is influenced by several contextual and systemic factors within the early childhood education sector. While national education policies promote digital learning, early childhood education has not been explicitly prioritized in many ICT-related policy initiatives. Existing digital education strategies are mostly designed for higher grade levels, leaving early childhood teachers without specific pedagogical guidelines for using technology with young learners (UNESCO, 2021). Research indicates unequal access to ICT resources and infrastructure disparities across schools in Dhaka (BANBEIS, 2022), which also affects early childhood education settings, limiting young children's opportunities for developmentally appropriate digital learning. Urban private and international schools tend to have better digital infrastructure, whereas many government and low-income schools face shortages of devices, internet connectivity, and technical maintenance support.

Limited access to ICT resources affects both teaching practices and student learning experiences. Unequal distribution of technology creates differences in classroom opportunities, restricting teachers' ability to experiment with digital tools or develop technology-supported learning activities. When devices are available, teachers may still face difficulties due to the lack of age-appropriate digital content, inadequate technical assistance, and insufficient classroom organization for technology-based activities. These conditions may reduce teachers' willingness to use technology and contribute to inconsistent ICT integration practices (Kozma, 2008).

Teachers' professional development is another critical component of the problem. Many early childhood educators receive only basic ICT training that focuses on operational skills rather than pedagogical application in play-based or inquiry-oriented learning contexts. Research suggests that effective technology integration requires teachers to develop both technical competence and pedagogical understanding of how digital tools can support learning processes (Tondeur et al., 2017). Similar challenges have been reported in global early childhood education discussions by UNESCO, which emphasizes the need for specialized training models for early years of technology integration (UNESCO, 2021). Without targeted professional learning opportunities, teachers may experience anxiety, lack confidence, or develop resistance toward technology use in early childhood classrooms (Inan & Lowther, 2010).

School leadership support and institutional readiness also play important roles in shaping teachers' perceptions. In schools where leadership provides clear ICT implementation plans, technical support, and professional encouragement, teachers are more likely to experiment with digital learning tools and integrate them effectively into classroom activities. Conversely, when technology is introduced without adequate infrastructure, training, or policy direction, teachers may feel overwhelmed or perceived technology as an additional burden rather than a pedagogical resource (Ertmer & Ottenbreit-Leftwich, 2010).

Despite increasing expectations for digital competency following the COVID-19 pandemic, empirical evidence regarding early childhood teachers' perceptions of technology integration in Dhaka remains limited. Most existing research in Bangladesh focuses on ICT integration at primary or secondary education levels, leaving early

childhood education relatively underexplored (BANBEIS, 2022). Therefore, this research is necessary to address this knowledge gap by exploring teachers' beliefs, experiences, and challenges related to ICT use in early childhood education. The findings are expected to support the development of teacher training programmes, inform school-level ICT planning, and promote developmentally appropriate technology integration in early childhood classrooms.

Purpose of the study

The aim of this study is to investigate early childhood teachers' perceptions of technology integration in Dhaka, with particular emphasis on how they understand the role of digital tools in supporting young children's learning and development. It further explores how teachers balance the use of technology with play-based and child-centered approaches, and how their professional beliefs, classroom experiences, and institutional settings shape their views on technology use in early years education.

More specifically, the study intends to provide empirical insights that can inform policy and practice in early childhood education, contributing to ongoing discussions—such as those led by the United Nations Educational, Scientific, and Cultural Organization—on the appropriate use of technology in early learning environments.

Significance and Justification of the study

The rationale for this study stems from the increasing use of digital technology in early childhood classrooms and the limited understanding of how it can be applied in age-appropriate ways. Although the integration of Information and Communication

Technology (ICT) has become a key priority in global educational development, its use in Early Childhood Education (ECE) remains complex and under-researched, particularly in developing countries like Bangladesh. While ICT is widely emphasized in national education policies, the primary focus has largely been on primary and secondary levels, with comparatively less attention given to early years of education. As a result, early childhood classrooms often lack clear pedagogical guidance on how digital tools can be meaningfully integrated with developmentally appropriate practices. This study is therefore important because it explores teachers' perceptions and experiences of technology integration in ECE classrooms in Dhaka city. Understanding how teachers interpret the role of technology, the purposes for which they use it, and the challenges they face will provide valuable insights into how digital tools are implemented in early learning environments (Yelland, 2018; Plowman et al., 2010; BANBEIS, 2022). By focusing on teachers' perspectives, this research highlights the realities of classroom practice and helps identify areas where support and guidance are needed.

Another important aspect of this study is its potential contribution to improving educational practice. The findings will provide practical insights for early childhood teachers, school leaders, and teacher training institutions regarding the effective use of technology in early learning environments. By identifying the benefits and challenges teachers experience when integrating technology, the study can help educators develop strategies that ensure technology enhances rather than replaces play-based and child-centered learning. In addition, the findings can inform the design of professional development programs by highlighting teachers' training needs, technological skills, and pedagogical understanding. Such knowledge can support the development of training initiatives that are more practical,

context-sensitive, and aligned with early childhood pedagogical principles (Tondeur et al., 2017).

The study also has important implications at the policy level. Policymakers and curriculum developers require evidence-based insights to design realistic and effective strategies for ICT integration in ECE. Currently, national ICT policies often emphasize infrastructure development and digital access but provide limited guidance regarding developmentally appropriate technology use for young children. By documenting teachers' experiences and challenges, this research can help inform more contextually relevant policies, resource allocation decisions, and leadership practices. Policymakers may use the findings to strengthen institutional support systems, improve digital infrastructure, and design guidelines that help teachers integrate technology while maintaining balanced, play-based learning environments (UNESCO, 2021).

Furthermore, this study seeks to fill a significant gap in the existing literature. Much of the research on technology integration in early childhood education has been conducted in Western or high-income contexts, where access to resources, teacher training, and technological infrastructure differs considerably from that of Bangladesh. As a result, the practical realities of ICT use in Bangladeshi early childhood classrooms remain insufficiently examined. By focusing on teachers' perspectives within the context of Dhaka, this study offers context-specific insights that help address this gap, reflecting the cultural, pedagogical, and infrastructural conditions of Bangladesh and contributing to the broader discourse on educational technology in low- and middle-income countries (Blackwell et al., 2014; Kozma, 2008).

Finally, the study aims to support the broader objective of enhancing Early Childhood Development (ECD). Early childhood represents a crucial stage for cognitive, social, emotional, and language growth. When used thoughtfully, technology can enrich these areas by providing interactive and multisensory learning experiences that foster curiosity and engagement. However, without appropriate guidance, excessive or unsuitable use of technology may limit valuable play-based learning opportunities. By examining how teachers balance digital tools with developmentally appropriate practices, this research generates insights to ensure that technology supports holistic child development. Ultimately, the findings can inform educators, institutions, and policymakers in creating more balanced, inclusive, and developmentally appropriate learning environments for young children in Bangladesh.

Operational Definition

Technology Integration

In this study, technology integration refers to the intentional use of digital tools such as tablets, computers, interactive boards, educational applications, and multimedia resources to enhance teaching and learning in early childhood classrooms, rather than using technology solely for entertainment or presentation purposes.

Teachers' Perception Teachers' perception refers to early childhood educators' beliefs, attitudes, confidence levels, and understanding regarding the effectiveness, appropriateness, and challenges of using technology to support young children's learning and development.

Early Childhood Education (ECE)

Early childhood education refers to formal learning environments designed for children in the pre-primary age group, generally below seven years, with a focus on play-based, child-centered, and developmentally suitable learning approaches.

Play-based Learning

Play-based learning refers to educational approaches that incorporate both structured and unstructured play to support children's cognitive, social, emotional, and physical development, where technology is used as a complementary tool rather than replacing hands-on learning experiences.

ICT Readiness

ICT readiness refers to the extent to which schools are equipped with appropriate technological infrastructure, teachers possess necessary digital competencies, and institutions provide adequate support and resources to effectively integrate information and communication technology into early childhood teaching and learning.

Research Objectives:

1. To explore teachers' beliefs and attitudes regarding technology use in early childhood education.
2. To identify the perceived benefits of integrating digital tools in early years of classrooms.

3. To examine the challenges and barriers that teachers encounter during technology integration.

Research Questions

1. How do early childhood teachers perceive the pedagogical role of technology in supporting young children's learning and development?
2. What learning outcomes and classroom changes do teachers observe when using digital tools in early years settings?
3. What challenges do teachers encounter when using digital tools with young children?

Chapter II: Literature Review

The rapid advancement of digital technologies has brought substantial changes to educational environments around the world (Voogt & Roblin, 2012). In the twenty-first century, children are growing up in environments where devices such as smartphones, tablets, computers, and interactive media are a regular part of daily life (Plowman & McPake, 2013). These technologies shape how young children communicate, play, and learn from an early stage (Neumann, 2018). As a result, there is increasing recognition among educators and policymakers of the need to incorporate technology into education systems, including early childhood education (Blackwell, Lauricella, & Wartella, 2014).

Given that early childhood is a critical period for cognitive, social, emotional, and language development, it is important to explore how technology can be effectively utilized within these learning contexts (Haugland, 2018).

In this study, the literature review examines several important aspects of technology integration in early childhood education. These include how digital tools support young children's learning, educators' perceptions and attitudes toward using technology, the difficulties encountered when incorporating technology into early years classrooms, and the research gaps that currently exist, particularly within the context of Bangladesh.

This chapter brings together insights from books, journal articles, policy documents, and research studies on the integration of technology in early childhood education. It highlights the views of different scholars and researchers who have examined the connection between digital technologies and early learning environments. Through this review, the chapter provides a conceptual and theoretical foundation for the present study.

Technology in Early Childhood Education

The integration of digital technology in early childhood education has grown considerably over the past twenty years (Blackwell, Lauricella, & Wartella, 2014). With the increasing availability of digital devices in both homes and educational institutions, young children are now regularly engaged with technology in their everyday lives (Plowman & McPake, 2013). Scholars suggest that when digital tools are used appropriately and aligned with children's developmental needs, they can create valuable learning opportunities in early education settings (Haugland, 2018; Neumann, 2018).

Plowman, McPake, and Stephen (2010) emphasize that young children are not merely passive users of technology; rather, they actively engage with digital media in ways that enhance their learning and development. Their study shows that children interact with technology through exploration, experimentation, and problem-solving activities. Digital tools also enable children to access information, create digital content, and communicate with others, broadening their learning opportunities beyond the traditional classroom environment.

Digital technologies provide distinctive features that enhance early learning experiences. For instance, multimedia resources integrate visual, auditory, and interactive components, making it easier for children to grasp complex concepts. Yelland (2018) notes that technology can offer multisensory learning experiences that stimulate various aspects of children's cognitive development, enabling them to explore ideas through images, sounds, animations, and interactive tasks.

Another major benefit of digital technology is its capacity to increase student engagement. Studies indicate that young learners are often more motivated when digital tools are incorporated into learning activities. Hirsh-Pasek et al. (2015) highlight that interactive digital media promotes active learning when children are involved in meaningful and purposeful tasks rather than merely receiving information passively. For example, digital storytelling platforms enable children to construct their own stories using images, sounds, and text, thereby fostering creativity as well as language development.

Digital tools can also contribute to the development of early literacy and numeracy skills. Neumann (2018) reports that interactive e-books and phonics-based applications support

children in building vocabulary and strengthening early reading abilities. These resources often allow repeated practice and provide instant feedback, which helps reinforce learning. In a similar way, educational games focused on counting, sorting, and pattern recognition can enhance young children's foundational mathematical skills.

At the same time, researchers stress that digital technology should not substitute play-based learning approaches that are fundamental in early childhood education. Play-based activities enable children to explore their surroundings, collaborate with peers, and develop essential social and emotional competencies. The National Association for the Education of Young Children (NAEYC) and the Fred Rogers Center (2012) recommend that digital tools be used as supportive resources that enrich children's learning experiences rather than replace hands-on, experiential learning.

Teachers' Beliefs and Attitudes Toward Technology

Teachers have a key influence on how technology is implemented in educational contexts. Their beliefs, attitudes, and perceptions play an important role in shaping both the extent and the quality of digital tool integration in classroom practices. Research consistently indicates that teachers' views about technology strongly impact how often and in what ways it is used in teaching and learning.

Blackwell, Lauricella, and Wartella (2014) report that educators who perceive technology as educationally valuable are more inclined to incorporate digital tools into their instruction. Such teachers tend to use technology to facilitate creative activities, collaborative tasks, and interactive learning experiences. On the other hand, teachers who

are concerned about the possible negative effects of technology on children's development may be less willing to use digital tools in their classrooms.

These perceptions are often linked to teachers' understanding of child development. In early childhood education, many educators are especially cautious about screen exposure and its possible impact on young children's physical, social, and emotional growth. Edwards (2013) notes that early childhood teachers frequently express concern that excessive use of technology may limit opportunities for physical play, social interaction, and engagement with the natural environment.

As a result, such beliefs often shape teachers' decisions regarding the timing and manner of technology use in classrooms. Some educators take a more restrictive approach by minimizing screen time and using digital tools only for specific learning purposes, while others adopt a more integrated approach, using technology to promote creativity, collaboration, and inquiry-based learning.

In addition, teachers' attitudes toward technology are influenced by broader cultural and institutional contexts. Schools that promote innovation and provide adequate technological infrastructure tend to foster more positive attitudes toward technology integration. In contrast, educators working in settings with limited resources or unclear policies often encounter greater difficulties in effectively incorporating digital tools into their teaching practices.

Teachers' Confidence and Professional Development

Another important factor affecting the integration of technology in early childhood education is teachers' confidence in using digital tools. This confidence, often described as technological self-efficacy, refers to educators' belief in their ability to effectively incorporate technology into their teaching practices.

Inan and Lowther (2010) found that teachers with stronger technological self-efficacy are more inclined to try out new instructional methods and incorporate digital tools into classroom activities. When educators feel confident in using technology, they are more open to adopting innovative teaching and learning approaches.

Professional development is a crucial element in enhancing teachers' confidence and skills in technology integration. Tondeur et al. (2017) highlight that effective training should go beyond technical instruction and also emphasize pedagogical approaches for meaningful technology use. Teachers need guidance on how digital tools can be aligned with learning goals and used to improve classroom interaction.

Training programs that include hands-on activities, collaborative learning opportunities, and continuous mentoring are especially beneficial for teachers' professional development. These approaches enable educators to actively engage with digital tools, exchange ideas with colleagues, and develop practical strategies for incorporating technology into their teaching.

However, despite the importance of such training, many teachers report limited access to professional development opportunities related to technology integration. In many cases,

training programs focus mainly on basic ICT skills rather than the pedagogical application of technology in early childhood settings. As a result, teachers may feel insufficiently prepared to use digital tools effectively in their classrooms.

Challenges of Technology Integration

Although digital technology has many potential advantages for early childhood education, teachers encounter a range of challenges when trying to integrate it into classroom practice (Blackwell, Lauricella, & Wartella, 2014; Plowman & McPake, 2013). A major challenge is the lack of adequate technological resources. Kozma (2008) points out that many educational institutions, especially in developing countries, do not have enough devices, stable internet access, or technical support. Such infrastructural limitations often hinder teachers from using digital tools consistently in their teaching (Neumann, 2018).

Alongside resource limitations, educators also experience pedagogical difficulties in using technology effectively in early childhood settings. In the absence of clear curriculum guidance or structured frameworks, teachers may find it challenging to decide how digital tools can best support learning outcomes. Consequently, technology is sometimes used more for entertainment than for purposeful educational engagement (Haugland, 2018; Plowman & McPake, 2013).

Classroom management is another concern. Young children can easily become distracted when using digital devices, which can disrupt learning activities and make it harder for teachers to maintain focus (Neumann, 2018). Therefore, educators need to carefully structure and supervise technology use to ensure it enhances rather than interrupts learning (Blackwell et al., 2014).

Issues related to screen time also create significant concerns for teachers and parents. Many express worries about the possible negative effects of excessive screen exposure on children's physical and developmental well-being (American Academy of Pediatrics, 2016). This requires educators to strike a careful balance between digital activities and traditional play-based learning approaches (Haugland, 2018).

In Bangladesh, the government has acknowledged the role of technology in improving educational quality, and several national initiatives have been introduced to support ICT integration as part of the broader goal of developing a digital society (Ministry of Education, Bangladesh, 2018; Hossain & Islam, 2018). The "Digital Bangladesh" initiative highlights the use of technology to expand educational access, improve teaching practices, and encourage innovative learning methods (Rahman, 2019). According to the Bangladesh Bureau of Educational Information and Statistics (BANBEIS, 2020), many schools have already started introducing digital resources such as multimedia classrooms, computer labs, and ICT facilities.

Despite these developments, the integration of technology in early childhood education is still relatively underdeveloped. National ICT policies and programs tend to prioritize primary and secondary education, while early years education often receives less emphasis in policy planning and resource distribution (Khan et al., 2020; Sultana & Hossain, 2019). Moreover, access to digital tools is uneven across different types of schools. Private and international institutions generally have better access to technology and internet connectivity compared to government and rural schools, leading to significant disparities in learning opportunities for both teachers and children (Hossain & Islam, 2018; BANBEIS, 2020).

Gaps in Existing Literature

Despite the increasing amount of research on technology integration in education, several key gaps still exist in the literature. One major limitation is that a large proportion of studies have been conducted in Western or high-income countries, where educational systems and technological infrastructure are comparatively well developed (Plowman & McPake, 2013; Blackwell, Lauricella, & Wartella, 2014). As Kozma (2008) notes, the educational realities in developing countries are quite different from those in developed contexts. Issues such as inadequate resources, overcrowded classrooms, and varying levels of teacher preparedness can significantly affect how technology is implemented in schools (Hossain & Islam, 2018; Sultana & Hossain, 2019).

Another notable gap concerns early childhood education itself. Much of the existing research on digital technology in education has concentrated on primary and secondary levels, while early years settings remain comparatively underexplored (Neumann, 2018; Haugland, 2018). Early childhood education is distinctive, as it requires age-appropriate pedagogical approaches and careful guidance to ensure that digital tools are used in ways that support young learners' development (Plowman, Stevenson, & McPake, 2012).

In addition, there is a scarcity of research focusing specifically on teachers' perceptions and experiences of technology integration in Bangladesh. Existing studies tend to emphasize infrastructure development, policy initiatives, or general ICT implementation in education (Khan, Rahman, & Akter, 2020; Rahman, 2019). Relatively few qualitative investigations explore how teachers understand technology and how their beliefs shape their classroom practices (Sultana & Hossain, 2019). Addressing this gap is essential for

gaining a more comprehensive understanding of technology use in early childhood education within the Bangladeshi context.

The reviewed literature demonstrates the increasing significance of digital technology in early childhood education. Studies indicate that when used effectively, technology can enrich children's learning by promoting engagement, fostering creativity, and supporting the development of early literacy and numeracy skills (Haugland, 2018; Neumann, 2018). However, the effectiveness of technology integration largely depends on teachers' beliefs, confidence, and instructional approaches (Blackwell et al., 2014). Educators who recognize the educational value of digital tools are more likely to incorporate them into their teaching practices. Moreover, professional development and institutional support are crucial in enabling effective technology use (Plowman et al., 2012; Hossain & Islam, 2018).

Nevertheless, teachers continue to face several challenges, including limited access to resources, inadequate training opportunities, and concerns about maintaining a balance between digital use and play-based learning (Kozma, 2008; Neumann, 2018). At the same time, important gaps persist in the literature, particularly regarding early childhood education in developing contexts such as Bangladesh (Sultana & Hossain, 2019; Khan et al., 2020). Given the limited research on early childhood teachers' perceptions of technology integration in Dhaka, this study aims to provide new insights into how educators experience and interpret the use of digital tools in their classrooms. These insights may contribute to informing future policies, professional development programs, and educational practices that promote effective and meaningful technology integration in early childhood education.

Chapter III: Methodology

This section represents the research methodology to understand the preschool teachers' perception regarding the use of technology in the early childhood classroom. This chapter is going to discuss the research approach, research site, research participants, sampling procedure, data collection tool, data collection methods, data management and analysis, validity and reliability, ethical considerations, and limitations of the study.

Research Approach and Design

This study adopts a qualitative research approach using a descriptive interpretive research design to explore early childhood teachers' perceptions of technology integration in their classrooms. A qualitative approach is appropriate for this study because the research aims to understand teachers' experiences, beliefs, and perspectives regarding the use of technology in early childhood education. Rather than focusing on numerical measurement or statistical relationships, qualitative research allows the researcher to explore participants' views in depth and to capture the meanings they attach to their practices and experiences.

The qualitative approach is particularly suitable for this study because teachers' perceptions, attitudes, and classroom experiences cannot be fully understood through quantitative data alone. By using qualitative methods, the researcher can collect rich and detailed information about how teachers perceive the role of digital tools in supporting young children's learning, what benefits they observe, and what challenges they face in integrating technology in early years classrooms. This approach also allows participants to

express their thoughts in their own words, providing deeper insights into the realities of technology to use in early childhood settings.

To collect the data, the study involves two schools where twelve early childhood teachers participate in the research. Six teachers participate in In-Depth Interviews (IDI) to provide detailed individual perspectives on technology integration, while six teachers participate in a Focus Group Discussion (FGD) to explore shared experiences and collective views among teachers. Semi-structured interview guides are used for both the IDI and FGD sessions to ensure that the discussions remain focused on the research objectives while allowing flexibility for participants to elaborate on their experiences. This combination of data collection methods helps the researcher gain both individual insights and group perspectives, which strengthens the overall understanding of teachers' perceptions regarding technology use in early childhood education.

Research Site

For this research, two schools were chosen from the Gulshan and Banani areas of Dhaka city, Bangladesh. Currently working in one of these schools at Banani and already having connections with teachers from the school in Gulshan, I was able to leverage these relationships to obtain permission from the school authorities to interview teachers. This prior and current engagement with the schools made it easier to gain access and facilitated the smooth conduct of the study.

Both schools are well-resourced for private institutions, offering diverse pedagogical approaches and access to digital learning tools such as computers, tablets, projectors, and multimedia resources. These preschools provide early childhood education programs

where young children engage in both traditional play-based learning and emerging digital learning practices. The schools cater to a diverse student body, reflecting various socioeconomic backgrounds, educational philosophies, and cultural contexts. This variety ensured that a wide range of perspectives and experiences could be captured, enriching the study's findings. Selecting these urban schools also facilitated access to educators with varying levels of experience and training, further contributing to the depth and richness of the data collected.

Research Participants

The participants in this study were early childhood teachers working in private early childhood education settings in Dhaka, Bangladesh. These teachers were responsible for educating young children in pre-primary and kindergarten classrooms, typically aged between 3 and 6 years. The teachers brought diverse professional backgrounds and experiences to the study. The sample aimed to include teachers with varying levels of teaching experience and educational qualifications, including both graduate and postgraduate degree holders, to gain a comprehensive understanding of teachers' perspectives regarding technology use in early childhood classrooms.

The selection of early childhood teachers as participants was particularly important because they are directly involved in designing and implementing classroom learning experiences for young children. Their daily interactions with children provide valuable insights into how digital tools are used in teaching and learning activities. Teachers' beliefs, experiences, and confidence in using digital technology significantly influence how technology is integrated into classroom practices. Therefore, their professional

perspectives are essential for understanding both the opportunities and challenges associated with technology integration in Early Childhood Education.

For the data collection process, twelve early childhood teachers were selected as research participants. Among them, six teachers participated in In-Depth Interviews (IDI) to provide detailed individual insights into their experiences and perceptions regarding technology integration. These interviews were conducted with teachers from both selected schools to capture perspectives from different institutional contexts. In addition, a Focus Group Discussion (FGD) was conducted with six teachers from one of the participating schools. The FGD allowed teachers to share their collective experiences, reflect on common challenges, and discuss their views on the use of digital tools in early childhood classrooms. The combination of IDIs and the FGD helped to triangulate the data and provided a deeper understanding of teachers' perceptions, practices, and challenges related to technology integration in early childhood education settings in Dhaka.

Table:1 Demographic details of research participants for IDI

IDI no	Date	Sex	Age	Teaching Experience	Education	Class teacher of	Students age	Number of students
IDI 1	20/02/26	Male	38	15	Masters	Kindergarten	5-6	15
IDI 2	21/02/26	Female	38	4	Graduation	Kindergarten	5-6	10
IDI 3	22/02/26	Female	26	2	Graduation	Playgroup	3-4	8
IDI 4	22/02/26	Male	45	15	Graduation	Music	3-6	15

IDI 5	23/02/26	Female	30	14	Graduation	Playgroup	3-4	10
IDI 6	23/02/26	Female	40	10	Graduation	Bangla	3-6	15

Table 2 Demographic details of research participants for FGD

FGD no	Date	Sex	Age	Experience	Education	Class teacher of	Students age	Number of students
FGD 1	24/02/26	Female	34	12	Masters	Kindergarten	5-6	10
FGD 2	24/02/26	Female	41	20	Graduation	Nursery	4-5	11
FGD 3	24/02/26	Female	36	15	Graduation	Art	3-6	15
FGD 4	24/02/26	Female	39	18	Graduation	Kindergarten	5-6	15
FGD 5	24/02/26	Female	26	2	Graduation	Grade 1	6	6
FGD 6	24/02/26	Female	26	4	Graduation	Playgroup	3-4	11

Sampling Procedure

Purposive sampling was used to select participants who could provide rich and relevant information about technology integration in early childhood classrooms. Early childhood teachers from kindergarten and pre-primary sections in Gulshan and Banani, Dhaka, were identified through school administrators and professional networks. This sampling strategy allowed the researcher to select participants who had direct experience with teaching young children and who could meaningfully reflect on the use of technology in their classrooms.

The inclusion criteria required participants to have at least one year of teaching experience in early childhood education and some level of exposure to digital tools or technology in their teaching practices. Teachers from private schools were selected to ensure that participants had some familiarity with technological resources used in early childhood classrooms. A total of twelve teachers participated in the study, with six teachers participating in in-depth interviews (IDI) and six teachers participating in a focus group discussion (FGD).

Participation in the study was voluntary, and informed consent was obtained from all participants before the data collection process began. The researcher explained the purpose of the study, the procedures involved, and the confidentiality of participants' information. Participants were also informed that they could withdraw from the study at any time without any negative consequences.

Data Collection Tool

To comprehensively explore early childhood teachers' perceptions of technology integration in Early Childhood Education (ECE) classrooms, two primary data collection tools were utilized: an In-Depth Interview (IDI) guideline and a Focus Group Discussion (FGD) guideline. These tools enabled the researcher to gather detailed qualitative data by combining teachers' individual experiences with collective reflections on technology use in classroom settings. Using both tools helped strengthen the credibility of the research findings, as it allowed the study to capture both personal perspectives and shared viewpoints regarding the integration of digital tools in early childhood education.

The In-Depth Interview (IDI) guideline consisted of 20 open-ended questions designed to facilitate detailed discussions with the selected early childhood teachers. These questions were developed with academic guidance to ensure that they addressed the key objectives of the study. The open-ended format encouraged teachers to express their experiences, perceptions, and classroom practices freely, generating rich qualitative data. The interview questions explored several important aspects, including how teachers use digital tools in their classroom activities, the benefits they observe in children's learning and engagement, their level of confidence in using technology, and the challenges they encounter while integrating digital tools with play-based learning approaches. The IDIs were conducted with six teachers from two selected schools in Dhaka, Bangladesh, allowing the researcher to gather diverse individual perspectives from different institutional contexts.

In addition to the interviews, a Focus Group Discussion (FGD) guideline was used to facilitate a structured group discussion among six early childhood teachers from one of the

participating schools. The FGD guideline included 10 semi-structured questions that encouraged participants to share their collective experiences and discuss their views regarding the use of Information and Communication Technology (ICT) in early childhood classrooms. The group discussion provided an interactive environment where teachers could reflect common challenges, share strategies, and build upon each other's ideas. The FGD questions focused on topics such as teachers' experiences with technology use, the impact of digital tools on children's engagement and learning, the institutional support available for technology integration, and the professional development needs of teachers.

The combination of IDIs and the FGD allowed the researcher to collect comprehensive and in-depth qualitative data. While the interviews captured detailed individual experiences and perceptions, the focus group discussion provided insights into shared practices and collective viewpoints among teachers. Together, these data collection tools helped develop a deeper understanding of teachers' perceptions, benefits, and challenges related to technology integration in early childhood classrooms in Dhaka.

Data Collection Method and Procedure

Data for this study was collected using a combination of in-depth interviews (IDI) and a focus group discussion (FGD). These methods were selected to gain a comprehensive understanding of preschool teachers' perceptions of digital tools and the strategies they use to integrate technology effectively in early childhood classrooms.

In-depth Interviews (IDI): Six preschool teachers participated in semi-structured, in-depth interviews. An interview guide with open-ended questions was developed to explore teachers' experiences, beliefs, perceived benefits, challenges, and confidence in using

digital tools with young children. Interviews were conducted face-to-face at the participants' schools or online when necessary. Each interview lasted approximately 30–40 minutes and was audio-recorded with participants' consent to ensure accurate and complete capture of data.

Focus Group Discussion (FGD): Six preschool teachers participated in a focus group discussion. The discussion was guided by a set of open-ended questions to explore shared experiences, collaborative strategies, and collective perspectives regarding the use of digital tools in teaching. The FGD was conducted in a familiar school setting to encourage active participation and open dialogue. The session lasted approximately 30–40 minutes and was audio-recorded with participants' permission.

The combination of IDIs and FGD provided both depth and breadth in data collection. While IDIs offered detailed insights into individual teachers' experiences and beliefs, the FGD captured group dynamics, consensus, and contrasting viewpoints, allowing for a holistic understanding of how digital tools are perceived and applied in preschool classrooms.

Data Management and Analysis

In this study, qualitative data were meticulously managed and organized, including interview transcripts, FGD recordings, and field notes. The data collection of instruments and procedures was reviewed by expert faculty members of BRAC University to ensure their robustness and alignment with the research objectives. Content analysis was employed to identify and interpret recurring themes within the data, providing a systematic

approach to analysis. Several steps were followed to ensure a comprehensive and methodical examination of the data, as depicted in Figure 1.

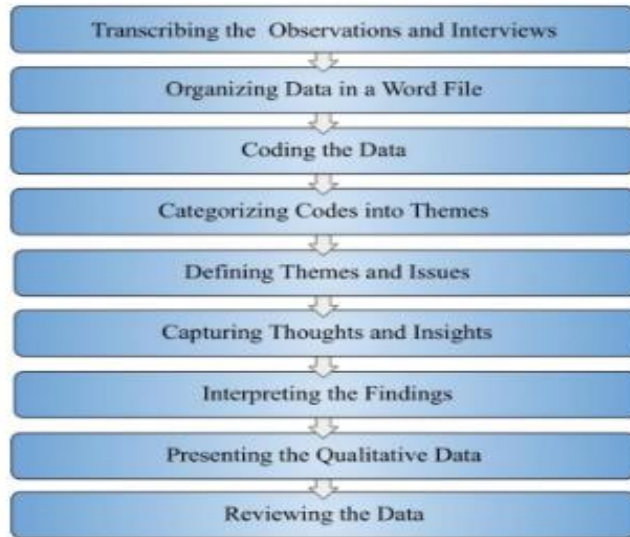


Figure 1: *The Process of Data Management and Analysis.*

The analysis process began with transcribing and organizing the collected data from in-depth interviews (IDI) and the focus group discussion (FGD). Each type of data was stored in separate files for easy access and review. The transcripts and field notes were read multiple times, highlighting sections directly related to the research questions. This iterative process helped identify patterns, themes, and key issues that consistently emerged across participants. Personal reflections and interpretations were recorded separately to better understand the relevance of the data to the research objectives.

To ensure the findings were well-supported, data were presented by summarizing the main points under each identified theme and including direct citations from the interview and FGD transcripts. This approach provided a rich, detailed account of the study's findings, illustrating themes with participants' own words. The final step involved a thorough review

of the summarized data and themes to ensure accuracy and completeness, cross-referencing with the original transcripts and field notes to validate the findings.

This structured approach to data management and analysis ensured that the study's conclusions were robust and credible, offering an in-depth understanding of preschool teachers' perceptions and practices regarding the use of digital tools in early childhood classrooms.

Validity & Reliability

To ensure the validity of this study, several measures were taken. The interview guide and FGD questions were reviewed by expert faculty members of BRAC University to confirm their alignment with the research objectives and relevance to preschool teachers' perceptions of digital tools. Triangulation of data sources, including both in-depth interviews (IDI) and the focus group discussion (FGD), was applied to capture multiple perspectives and enhance the credibility of findings. Member checking was also conducted, allowing participants to review summaries of their responses to ensure that their views were accurately represented.

Reliability was maintained through careful documentation of all data collection procedures. Interviews and the FGD were audio-recorded and transcribed verbatim to ensure an accurate record of participants' responses. Field notes and reflections were systematically organized, and consistent coding procedures were applied during content analysis. Repeated review of transcripts and iterative discussions of emerging themes helped reduce researcher bias and increase the consistency of the findings.

By applying these strategies, the study ensured that the data collected were both credible and dependable, providing a trustworthy basis for interpreting preschool teachers' perceptions and experiences with the integration of digital tools in early childhood classrooms.

Ethical Issues

Ethical considerations were carefully addressed throughout the study. Before the commencement of data collection, ethical approval was obtained from the BRAC Institute of Educational Development (BRAC IED), BRAC University. Participants were fully informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw from the study at any time without any penalty.

Instead of written consent, oral informed consent was obtained from all participants prior to the interviews and focus group discussion. Participants were assured that their identities would remain confidential. To maintain anonymity, pseudonyms were used in the transcripts and all identifying information was removed from the data.

All audio recordings, transcripts, and related documents were securely stored and accessed only by the researcher. The collected data was used strictly for academic and research purposes. These ethical practices ensured that participants' rights, dignity, and privacy were respected throughout the research process.

Limitations of the Study

Despite careful planning and implementation, this study has several limitations that should be acknowledged.

Due to the limited availability of participants, the researcher was unable to conduct all interviews face-to-face. Instead, several interviews were conducted through the Zoom platform. Conducting interviews online made scheduling more convenient for participants and facilitated the recording process. However, the absence of face-to-face interaction may have limited the researcher's ability to observe non-verbal cues and classroom context during interviews.

The study relied on self-reported data from teachers. Participants may have provided socially desirable responses or may not have fully recalled their experiences accurately, which could influence the authenticity of some responses.

Finally, since the researcher was responsible for collecting and analyzing the data, there is a possibility of researcher bias during interpretation. However, careful transcription, repeated review of the data, and systematic analysis were undertaken to minimize this limitation.

These limitations should be considered when interpreting the findings of the study. Nevertheless, the research provides valuable insights into preschool teachers' perceptions and experiences regarding the use of digital tools in early childhood classrooms.

Chapter IV: Results/Findings & Discussion

The qualitative data gathered through six in-depth interviews (IDIs) and one focus group discussion (FGD) highlighted five significant themes related to preschool teachers' perceptions of the pedagogical role of technology, observed learning outcomes, and challenges in technology integration.

Results/Findings

Theme 1: Pedagogical Role of Technology in Early Childhood Education

Teachers emphasized that technology plays a critical pedagogical role in early childhood classrooms. It serves not only as a medium to present content but also as a facilitative tool that enhances engagement, supports differentiated learning styles, and complements traditional play-based activities. Participants highlighted that ICT tools—such as smart TVs, tablets, laptops, and projectors—allow teachers to design lessons that are more interactive, visually stimulating, and tailored to young learners’ developmental needs. Technology was perceived as a bridge between classroom instruction and students’ natural curiosity, helping them actively participate in learning experiences rather than remaining passive recipients of knowledge.

Sub-theme 1.1: Technology as a Tool for Engagement and Instruction

Teachers consistently reported that digital tools help capture and maintain children’s attention, which is often difficult to achieve with traditional methods alone. The visual and auditory features of smart TVs, interactive presentations, and educational software were described as particularly effective in keeping young children focused during lessons. The participants also mentioned that ICT allows them to present information in varied formats, enabling children to engage with the content in a more meaningful and memorable way. *"I use smart TV to show phonics songs, educational videos and interactive activities. This helps children stay engaged and support visual and auditory learning."* (IDI 1#, 20/02/26). This quotation highlights that technology acts as an engagement tool while simultaneously reinforcing learning objectives. Teachers observed

that students are more motivated to participate in lessons when technology is integrated, as it aligns with their interests and everyday experiences, particularly in a generation increasingly exposed to digital devices from home.

Sub-theme 1.2: Supporting Multiple Learning Styles

Another key role of technology identified by teachers was its ability to accommodate diverse learning styles. Teachers noted that young children learn differently: some respond best to visual stimuli, others to auditory cues, and some through kinesthetic or hands-on activities. Technology allows educators to blend these approaches seamlessly, offering a richer, multimodal learning environment. For instance, videos, animations, songs, and interactive applications can present the same content in multiple formats, thereby catering to the wide range of learning preferences in a single classroom. *"Some students learn through pictures and some through sound. Using ICT allows us to combine videos, music, and images, which support different types of learners.* (FGD 1#, 24/02/26). This quotation illustrates that ICT provides teachers with flexibility to personalize learning experiences without segregating students by ability. It also allows less confident learners to access concepts in ways that suit their learning style, thus promoting inclusion and equity in early childhood classrooms.

Sub-theme 1.3: Complementing Play-Based Learning

Participants emphasized that technology should not replace traditional play-based approaches but rather enhance and complement them. Teachers shared that ICT could introduce concepts in an interactive and engaging way before students move on to hands-on activities, thereby creating a hybrid pedagogical approach. For example, a digital story

or number game can set the context for a subsequent art activity, manipulative session, or role-play, reinforcing learning through active exploration. This integration was described as particularly effective in maintaining students' attention while promoting experiential learning. *"We can start the lesson using ICT and then move to hands-on activities. Both can work side by side depending on how the teacher plans the lesson."* (FGD #4, 24/02/26). This approach ensures that screen time is purposeful and directly linked to learning objectives, rather than being purely entertain-based. Teachers highlighted that when ICT is used thoughtfully, it strengthens the connection between visual or digital representations and physical, sensory experiences, supporting holistic cognitive, social, and creative development in young learners.

Theme 2: Observed Learning Outcomes and Classroom Changes Teachers

consistently reported that the integration of digital tools in early childhood classrooms has multiple impacts on children's learning and classroom dynamics. These changes are evident in engagement, cognitive development, creativity, social interaction, and exposure to real-world experiences. Teachers emphasized that when ICT is integrated purposefully, it enhances both the quality and efficiency of learning, allowing young learners to grasp concepts in diverse and interactive ways.

Digital tools not only complement traditional learning but also transform the classroom environment, making it more interactive, inclusive, and responsive to individual learning needs. Teachers also highlighted that the outcomes vary depending on age, prior to exposure to technology, and the pedagogical strategies employed.

Sub-theme 2.1: Enhancing Engagement and Motivation

Teachers reported that the use of ICT significantly increases children's motivation and attention span. Interactive videos, songs, and digital storytelling capture children's interest, making them more active participants in lessons. "*When we use interactive apps or videos, children are very excited and participate actively. They are more willing to complete tasks and explore concepts.*" (IDI#3, 22/02/26) "*Students are more focused when the lesson starts with a smart TV activity. They become eager to contribute and answer questions.*" (FGD#3, 24/02/26)

Engagement is a critical predictor of learning in early childhood. Technology serves as a motivational scaffold, encouraging children to interact with the content. Teachers noted that even students who are normally passive participants show higher attention and participation when lessons include multimedia elements. This supports Vygotsky's social constructivist perspective, where learning is enhanced by stimulating, interactive tools and adult mediation.

Sub-theme 2.2: Supporting Cognitive Development and Problem-Solving Skills

Teachers observed that ICT facilitates cognitive skills development, including language, numeracy, and problem-solving. Children can visualize abstract concepts through digital simulations, games, and interactive exercises. "*We used a digital game to teach numbers. Children could match quantities with digits, and even students who struggled with numbers learned faster than traditional methods.*" (IDI#2, 21/02/26) "Children were able to understand patterns and sequences better when using interactive apps that give instant feedback." (FGD#1, 24/02/26)

Digital tools provide immediate feedback and allow children to experiment without fear of mistakes, promoting problem-solving skills and higher-order thinking. Teachers

emphasized that young learners benefit from visual cues, interactive prompts, and gamified exercises, which traditional methods may not fully offer. Cognitive scaffolding is more personalized when teachers leverage ICT effectively.

Sub-theme 2.3: Fostering Creativity and Expression

Teachers noted that technology encourages children to explore and express ideas creatively, particularly in music, art, and storytelling. Digital drawing apps, music composition tools, and interactive story platforms help children generate original work.

“Technology should be a crayon. It’s just another tool on the shelf that children can grab when they need to express an idea.” (IDI#2, 21/02/26). “When children create stories using interactive story apps, they can combine words, images, and sound, which increases imagination and storytelling skills” (FGD#1, 24/02/26).

Digital tools are not only consumptive but also productive, allowing children to construct knowledge and ideas. Teachers observed that students who are shy in verbal communication often express themselves more freely through digital media, highlighting increased inclusion and confidence in creative expression.

Sub-theme 2.4: Promoting Collaboration and Social Interaction

Teachers highlighted that ICT-supported activities often require students to work together, discuss, and solve tasks collaboratively." *Two children huddled over a tablet talking through a problem together, which builds social and verbal skills.” (IDI#4, 22/02/26) “In group storytelling apps, children share ideas and negotiate roles, improving communication and cooperation.” (FGD#1, 24/02/26)*

While some critics argue that screen time reduces social interaction, teachers in these

classrooms observed the opposite. When ICT is carefully scaffolded, it promotes peer collaboration, joint problem-solving, and verbal communication. It encourages children to negotiate, listen, and articulate ideas in a structured but playful environment.

Sub-theme 2.5: Exposure to Real-World Concepts and Contexts

Teachers also reported that ICT broadens children's horizons, enabling access to real-world experiences beyond the classroom. Digital maps, virtual field trips, and online videos allow children to explore environments and phenomena that are otherwise inaccessible. *"We used a digital map to find their houses and a voice recording app to interview a local firefighter over a video call. The connection to the real world was evident."* (IDI#1, 20/02/26) *"Children could watch videos of animals in their natural habitat. It sparked curiosity and inspired them to ask more questions and create related activities in class."* (FGD#1, 24/02/26)

ICT acts as a window to the world, expanding children's experiences and supporting inquiry-based learning. Teachers found that children make meaningful connections between digital content and classroom tasks, fostering deeper understanding and curiosity. This aligns with research suggesting that technology can serve as a mediated learning tool, bridging experiential gaps in early childhood education.

Theme 3: Challenges in ICT Integration in Early Childhood Classrooms

Teachers consistently reported that, while ICT offers significant pedagogical advantages, its integration is accompanied by practical, pedagogical, and institutional challenges. These challenges affect both teacher confidence and student learning outcomes and require

careful management and planning. Teachers emphasized that addressing these challenges is critical for successful, meaningful integration of technology in early childhood education (ECE).

Sub-theme 3.1: Technical and Infrastructure-Related Challenges

One of the most cited challenges was the technical limitations of devices, internet connectivity, and classroom infrastructure. *"Most of the time, electricity or Wi-Fi issues disrupt the class. Once, the tablet battery died in the middle of an activity, and we had to quickly switch to storybooks."* (IDI#2, 21/02/26) *"The smart TV and tablets sometimes freeze, or the apps do not load properly. In older parts of the building, internet coverage is very spotty, which interrupts lessons."* (FGD#1, 24/02/26).

Technical problems such as intermittent internet, insufficient devices, or malfunctioning equipment are common barriers in ECE settings. Teachers must maintain low-tech backup plans, such as printed worksheets or storybooks, to ensure continuity in learning. These technical disruptions can reduce the effectiveness of ICT-based activities and require additional teacher time and preparation.

Sub-theme 3.2: Managing Student Behavior and Attention

Teachers noted that excessive screen exposure or poorly designed ICT activities can lead to boredom, distraction, or reduced attention spans.

"Children get bored very quickly because they are already used to tablets and smartphones at home. It's challenging to keep them engaged for the entire session." (IDI#3, 22/02/26) *"Some students may become addicted to devices if technology is*

overused, and they lose interest in non-digital activities like drawing or group games.”
(FGD#1, 24/02/26)

While ICT can increase engagement, unmoderated or repetitive use may negatively affect young children’s learning behaviors. Teachers need to balance digital and hands-on activities to maintain attention and ensure developmental appropriateness. This aligns with existing research indicating that screen time must be carefully managed in early childhood to prevent overreliance on digital devices.

Sub-theme 3.3: Pedagogical Challenges

Teachers highlighted the difficulty of aligning digital tools with pedagogical objectives, ensuring that technology supports learning rather than passive consumption.

"Sometimes it's hard to find high-quality apps. Many apps are just for entertainment and do not really help children learn the intended concepts.” (IDI#1, 20/02/26) *“It is challenging to integrate technology in a way that supports play-based learning. If a child just clicks ‘next’ repeatedly, it’s not real learning.”* (Focus group notes FGD#1, 24/02/26)

Selecting appropriate ICT resources requires careful judgment. Teachers must evaluate apps and digital content for educational value, interactivity, and age-appropriateness.

Failure to do so may reduce ICT to a digital worksheet, which contradicts the principles of play-based, inquiry-oriented learning. This reinforces the need for pedagogical training in ICT use.

Sub-theme 3.4: Limited Professional Training and Support

Many teachers reported a lack of formal ICT training tailored to early childhood education, which impacts their confidence and effectiveness. *"I am comfortable using tablets and smart TVs, but I haven't received any official ICT-related training for early years. I sometimes struggle to select appropriate apps and plan lessons efficiently."* (IDI#4, 22/02/26) *"Teachers need hands-on workshops that show how to use technology for creative activities, not just for showing videos or slides."* (IDI#1, 24/02/26)

Professional development is essential to help teachers effectively integrate technology while maintaining developmentally appropriate practices. Training should focus not just on technical skills, but on pedagogical strategies, app selection, and classroom management in digital contexts. Without this support, teachers may underutilize ICT or use it ineffectively.

Sub-theme 3.5: Equity and Accessibility Issues

Teachers also highlighted the challenge of unequal access to technology among students, which can create disparities in learning experiences. *"Some children have laptops or tablets at home, while others don't. We need to ensure all students get equal access in the classroom."* (IDI#5, 23/02/26) *"Equity is a big concern. If children are not familiar with technology at home, they may feel left behind during digital activities."* (FGD #1, 24/02/26. Disparities in access to technology can affect learning outcomes and participation, highlighting the need for schools to provide shared, age-appropriate devices. Equity considerations are crucial for ensuring inclusive ICT integration and preventing digital divides at the early childhood level.

Theme 3 illustrates that ICT integration in early childhood classrooms is not without challenges. Teachers face technical, pedagogical, behavioral, and equity-related barriers that require planning, institutional support, and professional development. Despite these challenges, teachers remain committed to using technology to enhance learning, provided there are clear guidelines, appropriate training, and reliable infrastructure. “We always keep low-tech backup plans and adjust our activities depending on the technology available. It requires careful planning, but it is worth it for children’s learning.” (IDI#2, 21/02/26)

Theme 4: Teacher’s Confidence, Professional Development, and School Support

Teachers’ confidence in using ICT in early childhood classrooms emerged as a key factor influencing effective technology integration. This confidence was shaped not only by individual familiarity with digital tools but also by the level of professional and institutional support available to them. While many teachers demonstrated confidence in using basic technologies, they emphasized that sustained support systems are essential to strengthen and maintain this confidence.

Sub-theme 4.1: Teacher Confidence in Using Technology

Teachers generally reported moderate to high confidence in using basic technological tools such as tablets, smart TVs, and laptops. This confidence was largely influenced by prior exposure, personal familiarity, and everyday use of digital devices.

“I am comfortable using tablets, laptops, and smart TVs in my classroom. Most of the time, I can manage lessons without any issues, though sometimes I struggle to

find high-quality apps.” (IDI#1, 20/02/26) “Teachers are confident to use technology with young children because children today are already familiar with tablets and smart devices at home.” (FGD#1, 24/02/26)

However, teachers acknowledge that confidence is often situational and may decrease when faced with unfamiliar tools or limited resources. This indicates that confidence alone is not stable without continuous support.

Sub-theme 4.2: Professional Development as a Support for Confidence

Teachers strongly emphasized that ongoing professional development plays a crucial role in building and sustaining their confidence. Many participants reported a lack of formal ICT training specifically tailored for early childhood education, which affected their ability to use technology effectively. *"I have not received any official ICT-related training for early childhood. Sometimes I struggle to select suitable apps and plan lessons efficiently.” (IDI#4, 22/02/26) “Teachers need training that shows how to help children create their own digital art or music, rather than just consuming content.” (FGD#1, 24/02/26).* Teachers perceived training not just as skill development, but as a confidence-building mechanism that enables them to integrate ICT in a more meaningful and developmentally appropriate way.

Sub-theme 4.3: Institutional and Leadership Support

Institutional support emerged as a significant factor influencing teacher confidence. Teachers reported that availability of resources, technical support, and leadership guidance enhanced their ability to use ICT effectively. *"Our school provides tablets,*

laptops, and smart TVs, and they support us when devices or internet connections fail.” (IDI#2, 21/02/26) *“School leadership must provide proper guidance on classroom setup, device use, and safe content.”* (FGD#1, 24/02/26). When schools provided structured support, teachers felt more confident and were able to focus on pedagogical practices rather than technical challenges.

Sub-theme 4.4: Peer Collaboration and Mentorship

Peer collaboration was identified as an important informal support system that strengthened teacher confidence. Sharing ideas, apps, and teaching strategies helped teachers feel more secure and reduced uncertainty in using ICT. *“We often share apps, activities, and lesson ideas among teachers. This peer support helps us feel more confident.”* (IDI#5, 23/02/26). Collaborative environments enable teachers to learn from each other, making ICT integration less intimidating and more accessible.

Sub-theme 4.5: Post-Pandemic Confidence Development

Teachers reported that the COVID-19 pandemic significantly contributed to building their confidence in using digital tools. Increased exposure to online teaching and ICT-based training created opportunities for skill development and practical experience.

“During the pandemic, we had online classes and ICT-based training. This improved our confidence.” (FGD#1, 24/02/26) *“We became more comfortable using smart TVs, apps, and interactive content.”* (IDI#3, 22/02/26). This experience demonstrated that structured exposure and continuous use of technology can significantly enhance teacher confidence.

Theme 5: Observed Learning Outcomes and Classroom Changes Due to ICT

Teachers highlighted that the integration of ICT positively influenced children's engagement, motivation, cognitive skills, creativity, and social interactions, while also changing classroom dynamics and teaching approaches.

Sub-theme 5.1: Increased Engagement and Motivation

Teachers reported that children are more attentive and motivated during technology-supported lessons compared to traditional methods. Digital content, such as interactive videos, songs, and apps, captured children's interest and made learning enjoyable.

"Children are very excited when we use smart TVs or tablets. They pay attention and participate more actively in the activities compared to regular lessons." (IDI#1,

20/02/26) "Using videos, music, and interactive games keeps students engaged. They are curious and want to learn more when technology is incorporated." (FGD#1, 24/02/26)

ICT functions as a motivational tool, enhancing attention spans and encouraging children to actively participate. Engagement is particularly notable for visual and auditory learners who benefit from multimedia content.

Sub-theme 5.2: Development of Cognitive Skills

Teachers observed improvements in problem-solving, memory, and understanding of abstract concepts when digital tools were used. Interactive apps and visual content support cognitive development by allowing children to explore concepts in dynamic ways. *"We used a digital map to teach children about community helpers. They could locate houses and places, and it helped them understand the concept better than just*

looking at pictures.” (IDI#2, 21/02/26) “Children learn phonics faster when we combine videos, sounds, and images. It supports their memory and understanding of letters and words.” (FGD#1, 24/02/26) ICT promotes conceptual understanding and memory retention, making abstract or unfamiliar topics more concrete through visual and interactive elements.

Sub-theme 5.3: Enhancement of Creativity and Fine Motor Skills

Teachers noted that creative activities using digital tools, such as drawing apps, digital painting, or music creation software, enhanced children’s creative expression. “Children enjoy making their own digital art. They experiment with colors, shapes, and music, which develops their creativity and fine motor skills.” (IDI#3, 22/02/26) “When children use technology to build digital cities or design things, they are expressing themselves creatively and collaboratively.” (FGD#1, 24/02/26). Technology not only supports creativity but also develops fine motor coordination through touchscreen interactions. Teachers emphasized that combining digital play with hands-on activities maximizes developmental outcomes.

Sub-theme 5.4: Improved Social and Collaborative Learning

Teachers observed that technology can encourage collaboration, as children often work in pairs or small groups to explore apps, solve problems, or discuss content. “*Two children huddled over a tablet and discussed how to solve a problem together. This promotes communication and social skills.*” (IDI#4, 22/02/26) “*In group activities using smart boards or interactive games, children learn to share, negotiate, and work collaboratively.*” (FGD#1, 24/02/26). Technology fosters peer interaction, teamwork, and

verbal communication, which are crucial components of early childhood development. The teacher's facilitation ensures that collaborative learning remains structured and purposeful.

Sub-theme 5.5: Changes in Classroom Dynamics

Teachers reported that the use of technology changes the role of the teacher and the flow of lessons. Lessons become more child-centered, with children taking active roles in exploring content, while teachers act as facilitators. *"Using technology allows me to split the class. While one group explores digital content, I work with another group on literacy. This makes lessons more personalized and effective."* (IDI#5, 23/02/26) *"Technology changes classroom routines. We move from traditional teacher-centered instruction to activities where children explore and learn at their own pace."* (FGD#1, 24/02/26). Technology reshapes teaching strategies, promoting personalized and differentiated learning. Children engage in self-directed learning, while teachers monitor, guide, and scaffold the learning process.

Sub-theme 5.6: Limitations and Considerations

While benefits were widely reported, teachers also highlighted the need for balance to prevent overreliance on digital tools. Excessive screen time or poorly chosen apps can reduce the effectiveness of learning and limit hands-on play. *"Technology should be a tool, like crayons. It helps express ideas, but children still need to explore nature and hands-on activities."* (IDI#6, 23/02/26) *"Technology cannot replace play-based learning. We must balance screen-based and physical activities to ensure holistic development."* (FGD#6, 24/02/26). Effective technology integration requires careful planning,

moderation, and alignment with developmental goals, ensuring technology enhances rather than dominating learning experiences.

Discussion

The purpose of this study was to explore preschool teachers' perceptions regarding the integration of Technology in early childhood education (ECE). The findings revealed that teachers generally perceive technology as a valuable pedagogical tool that enhances engagement, supports diverse learning styles, and enriches classroom experiences. At the same time, participants highlighted several challenges related to infrastructure, screen exposure, pedagogical alignment, and professional development. The discussion below interprets the findings of this study in relation to existing literature and educational practices, organized according to the five themes identified in the results.

Pedagogical Role of Technology in Early Childhood Education

Teachers in the study perceived technology as an important pedagogical tool that enhances teaching and learning in early childhood classrooms. They highlighted that tools such as tablets and smart TVs increase student engagement, support differentiated instruction, and make lessons more interactive and developmentally appropriate for young learners.

The findings indicate that technology serves as a supportive resource rather than a replacement for traditional teaching approaches. Teachers highlighted those digital tools present information through visual, auditory, and interactive formats, which help capture children's attention and promote multimodal learning experiences (Blackwell et al., 2014;

Neumann, 2018). At the same time, they emphasized that technology should complement play-based learning rather than dominate it. For example, teachers described using videos or digital stories to introduce concepts, followed by hands-on activities such as art and role play. This approach aligns with developmentally appropriate practices and supports research suggesting that technology is most effective when integrated with guided, play-based learning (Plowman & McPake, 2013).

Observed Learning Outcomes and Classroom Changes

The findings show that technology integration positively influences both learning outcomes and classroom dynamics in early childhood settings. Teachers reported that digital tools enhance children's engagement and motivation through interactive videos, songs, and applications that capture attention and encourage active participation (Haugland, 2018). They also observed improvements in cognitive development, particularly in language, numeracy, and problem-solving skills, as children explore concepts visually and receive immediate feedback. Additionally, technology supports creativity and collaboration through activities such as digital storytelling, drawing, and music, aligning with research on cognitive development (Neumann, 2018) and Vygotsky's social constructivist theory, which emphasizes interaction and shared learning.

Challenges in technology Integration in Early Childhood Classrooms

Despite the benefits of technology integration, teachers identified several challenges affecting its effective use in early childhood classrooms. Major issues included technical

and infrastructure limitations such as unstable internet connections, limited availability of devices, and occasional equipment malfunctions, which often disrupt lessons and require alternative teaching strategies. Such barriers are commonly reported in developing contexts, where access to reliable technology and connectivity plays a crucial role in successful implementation.

Teachers also raised concerns about managing children's attention and screen exposure, noting that excessive use of digital devices may reduce attention spans and interest in non-digital activities. Additionally, they highlighted pedagogical challenges in selecting appropriate digital resources, as many applications focus more on entertainment than learning. These findings emphasize the need for careful monitoring of screen time and the importance of teacher expertise in choosing developmentally appropriate, high-quality digital tools.

Teachers' Confidence, Professional Development, and Schools' Support

Teachers' confidence and support were key factors influencing technology integration in early childhood classrooms. While most teachers reported moderate confidence in using basic tools like tablets and smart TVs, they emphasized the need for hands-on professional development to strengthen their pedagogical use of technology. Institutional support, including access to resources, maintenance, and leadership guidance, further enhanced their confidence, while peer collaboration provided an important informal support system for sharing ideas and practices. Additionally, the COVID-19 pandemic accelerated teachers' exposure to digital tools, increasing their confidence and ability to integrate technology effectively in classroom teaching.

Impact of technology on Classroom Dynamics and Learning Practices

The findings show that technology integration has positively influenced classroom dynamics and teaching practices by promoting more child-centered learning, where children actively explore and teachers act as facilitators. Teachers reported that digital tools support differentiated instruction and flexible classroom management, allowing them to address individual learning needs. They also observed improvements in creativity, communication, and fine motor skills through activities like digital drawing and storytelling. However, teachers emphasized the importance of maintaining a balance, ensuring that technology enhances rather than replaces play-based, hands-on learning experiences.

Implications for Educational Practice and Future Research

The findings of this study suggest several important implications for educational practice. Early childhood institutions should provide structured professional development that builds both technical and pedagogical skills for effective ICT integration. Schools also need to invest in reliable infrastructure and child-friendly digital resources to support inclusive learning environments. In addition, curriculum developers should include clear guidelines that promote balanced technology use, cyber safety, and alignment with play-based learning. While the study offers valuable insights into teachers' perceptions, further research is needed to examine the long-term impact of digital tools, as well as perspectives of parents, children, and the influence of socio-economic factors on ICT access and use.

Conclusion

This study explored early childhood teachers' perceptions, experiences, and practices regarding technology integration in classrooms in Dhaka through six in-depth interviews and one focus group discussion. The findings show that technology plays a supportive role in pedagogy, enhancing engagement, facilitating differentiated learning, and complementing play-based activities. Teachers reported that digital tools such as tablets, smart TVs, and apps support multimodal learning and contribute to children's cognitive development, creativity, motivation, and social interaction when used appropriately.

However, the study also identified several challenges, including differences in children's prior exposure to technology, limited infrastructure, concerns about excessive screen time, and the need for ongoing professional development. Teachers emphasized that technology should be used thoughtfully, aligned with developmental goals, and integrated with traditional and hands-on learning rather than replacing them.

Overall, the study achieved its objectives by providing a clear understanding of teachers' perspectives, highlighting both the benefits and challenges of ICT integration. It underscores the importance of teacher training, adequate resources, and balanced implementation. The findings suggest that technology can be a valuable and transformative tool in early childhood education when supported by proper planning, pedagogy, and institutional support.

Recommendations

Based on the findings of this study, several recommendations can be made to improve the effective integration of technology in early childhood classrooms. These recommendations focus on strengthening teaching practices, improving institutional support, and guiding future research and policy development.

Integrate technology with play-based learning: Teachers should use digital tools to support and enrich hands-on and play-based activities rather than replacing traditional learning experiences.

Use developmentally appropriate digital resources: Teachers should select age-appropriate applications and multimedia materials that support children's cognitive, social, and creative development.

Maintain balanced and purposeful screen time: Technology use should be carefully monitored to ensure that children engage in meaningful learning while maintaining adequate opportunities for physical and social activities.

Strengthen digital infrastructure in schools: Educational institutions should provide reliable internet access, child-friendly devices, and safe digital platforms to support effective technology integration.

Provide professional development for teachers: Schools should organize regular training programs to help teachers develop pedagogical and technical skills for integrating technology effectively in early childhood classrooms.

Develop clear ICT policies for early childhood education: Policymakers should establish guidelines regarding appropriate technology use, digital safety, and balanced

screen exposure for young children.

Ensure equitable access to technology: Educational authorities should ensure that children from diverse socio-economic backgrounds have equal access to digital learning opportunities.

Encourage further research on ICT in early childhood education: Future studies should examine the long-term impact of ICT use on children's development and explore innovative digital tools that can enhance early learning experiences.

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Appendix 1.

Semi-Structured In-Depth Interview Questionnaire (ECE Teachers)

1. Can you describe your teaching experience in early childhood education (years, class level, school type)?
2. What types of digital tools or technologies do you use in your early childhood classroom?
3. Can you describe a typical situation when you decide to use it?
4. For what purposes do you usually integrate technology in your lessons?
5. How do you feel about using technology with young children in ECE?
6. In your view, how does technology support children's learning and development?
7. Do you think technology aligns with play-based learning? Why or why not?
8. What positive changes have you observed in children when using digital tools in class?

9. Can you share an example of a successful lesson/activity where technology worked well?
10. What challenges do you face when integrating ICT in your classroom?
11. What institutional/technical challenges exist (internet, devices, leadership support)?
12. How do you usually manage or cope with these challenges?
13. How confident do you feel using technology in teaching young children?
14. Have you received any ICT-related professional training?
15. How does your school support or encourage technology integration in ECE
16. Do you think current policies/curriculum guidelines are sufficient for ECE ICT?
17. What support or resources would make ICT use more effective for you?
18. What type of training would help you use technology more confidently?
19. What suggestions do you have for improving ICT integration in early years of classrooms?
20. Anything else you would like to share regarding technology use in ECE?

Focus Group Discussion Questions (FGD)

1. How do you currently use digital tools in your classroom activities?
2. What benefits do you observe when children engage with technology?
3. What challenges do teachers commonly face while integrating ICT in ECE?
4. Do you feel technology supports or conflicts with play-based learning? Discuss.
5. How confident do teachers feel when using technology with young children?
6. What training or professional development opportunities are needed?
7. How do school leadership and infrastructure influence ICT integration?
8. In what ways did technology change after the COVID-19 pandemic?
9. What would an ideal ICT-supported ECE classroom look like for you?
10. What recommendations do you want policymakers/schools to consider?

Appendix 2

Bangla Translation

ইন-ডেপথ ইন্টারভিউ প্রশ্ন

1. আপনি প্রারম্ভিক শৈশব শিক্ষায় (ECE) কত বছরের শিক্ষকতার অভিজ্ঞতা রাখেন? কোন শ্রেণি স্তরে এবং কী ধরনের বিদ্যালয়ে (সরকারি/বেসরকারি) পড়িয়েছেন?
2. আপনার প্রারম্ভিক শৈশব শ্রেণিকক্ষে আপনি কোন ধরনের ডিজিটাল টুল বা প্রযুক্তি ব্যবহার করেন?
3. সাধারণত কোন পরিস্থিতিতে বা কখন আপনি প্রযুক্তি ব্যবহারের সিদ্ধান্ত নেন—একটি উদাহরণ দিয়ে ব্যাখ্যা করবেন?
4. কোন উদ্দেশ্যে আপনি সাধারণত আপনার পাঠদানে প্রযুক্তি সংযুক্ত করেন?
5. প্রারম্ভিক শৈশব শিক্ষায় ছোট শিশুদের সঙ্গে প্রযুক্তি ব্যবহার সম্পর্কে আপনার অনুভূতি কী?
6. আপনার দৃষ্টিতে প্রযুক্তি কীভাবে শিশুদের শেখা ও বিকাশে সহায়তা করে?
7. আপনার মতে, প্রযুক্তি কি খেলাভিত্তিক শিক্ষার (Play-based learning) সঙ্গে সামঞ্জস্যপূর্ণ? কেন বা কেন নয়?
8. শ্রেণিকক্ষে ডিজিটাল টুল ব্যবহারের ফলে শিশুদের মধ্যে আপনি কী ধরনের ইতিবাচক পরিবর্তন লক্ষ্য করেছেন?
9. এমন কোনো সফল পাঠ বা কার্যক্রমের উদাহরণ শেয়ার করবেন যেখানে প্রযুক্তি কার্যকরভাবে কাজ করেছে?
10. শ্রেণিকক্ষে আইসিটি (ICT) সংযুক্ত করতে গিয়ে আপনি কী ধরনের চ্যালেঞ্জের সম্মুখীন হন?
11. প্রাতিষ্ঠানিক বা প্রযুক্তিগত কী কী সমস্যা রয়েছে (যেমন: ইন্টারনেট, ডিভাইসের অভাব, নেতৃত্বের সহায়তা)?
12. আপনি সাধারণত এই চ্যালেঞ্জগুলো কীভাবে মোকাবিলা করেন?
13. ছোট শিশুদের পাঠদানে প্রযুক্তি ব্যবহারে আপনি নিজেকে কতটা আত্মবিশ্বাসী মনে করেন?
14. আপনি কি আইসিটি-সম্পর্কিত কোনো প্রশিক্ষণ পেয়েছেন? পেয়ে থাকলে সংক্ষেপে বলবেন?
15. আপনার বিদ্যালয় কীভাবে প্রারম্ভিক শৈশব শিক্ষায় প্রযুক্তি ব্যবহারে সহায়তা বা উৎসাহ প্রদান করে?

16. আপনার মতে, বর্তমান নীতি বা কারিকুলাম নির্দেশিকা কি প্রারম্ভিক শৈশব শিক্ষায় আইসিটি ব্যবহারের জন্য যথেষ্ট?
17. কোন ধরনের সহায়তা বা রিসোর্স পেলে আপনার জন্য আইসিটি ব্যবহার আরও কার্যকর হবে বলে মনে করেন?
18. কী ধরনের প্রশিক্ষণ আপনাকে প্রযুক্তি আরও আত্মবিশ্বাসের সঙ্গে ব্যবহার করতে সাহায্য করবে?
19. প্রারম্ভিক শৈশব শ্রেণিকক্ষে আইসিটি সংযুক্তকরণ উন্নত করার জন্য আপনার কী সুপারিশ রয়েছে?
20. প্রারম্ভিক শৈশব শিক্ষায় প্রযুক্তি ব্যবহার সম্পর্কে আপনি আর কিছু শেয়ার করতে চান কি?

ফোকাস গ্রুপ ডিসকাশন (FGD) প্রশ্ন (বাংলা)

1. বর্তমানে আপনারা কীভাবে শ্রেণিকক্ষের কার্যক্রমে ডিজিটাল টুল ব্যবহার করছেন?
2. শিশুদের প্রযুক্তি ব্যবহারের সময় আপনি কী ধরনের উপকারিতা লক্ষ্য করেছেন?
3. প্রারম্ভিক শৈশব শিক্ষায় আইসিটি সংযুক্ত করতে গিয়ে শিক্ষকরা সাধারণত কী ধরনের চ্যালেঞ্জের সম্মুখীন হন?
4. আপনার মতে, প্রযুক্তি কী খলোভিত্তিক শিক্ষাকে সমর্থন করে নাকি বাধা সৃষ্টি করে?
আলোচনা করুন।
5. ছোট শিশুদের সঙ্গে প্রযুক্তি ব্যবহারে শিক্ষকরা কতটা আত্মবিশ্বাসী বলে আপনি মনে করেন?
6. কী ধরনের প্রশিক্ষণ বা পেশাগত উন্নয়নের সুযোগ প্রয়োজন বলে আপনারা মনে করেন?
7. বিদ্যালয়ের নেতৃত্ব এবং অবকাঠামো কীভাবে আইসিটি সংযুক্তকরণকে প্রভাবিত করে?
8. কোভিড-১৯ মহামারির পর প্রযুক্তি ব্যবহারে কী ধরনের পরিবর্তন এসেছে?
9. আপনার কল্পনায় একটি আদর্শ আইসিটি-সমর্থিত প্রারম্ভিক শৈশব শ্রেণিকক্ষ কেমন হবে?
10. নীতিনির্ধারক বা বিদ্যালয় কর্তৃপক্ষের জন্য আপনারা কী সুপারিশ করতে চান?

Appendix 3

Consent Form:

Voluntary Consent Form

TITLE OF STUDY: Teachers' Perceptions of Technology Integration in Early Childhood Classrooms in Dhaka City.

PURPOSE OF STUDY: This study is being conducted as part of my master's degree requirements from the Institute of Educational Development- BRAC University. This study aims to understand how early childhood teachers perceive and integrate digital technology in their classrooms.

RISKS:

Participants will not face any threats for their involvement in the study, whether directly or indirectly. Teachers of children aged 3-6 will be participating in the survey, with the results primarily serving as a requirement for their degree.

ADVANTAGE OF THE STUDY:

Participating in this study does not offer any immediate advantages for you. However, your insights may help improve ICT support and professional development in early childhood education.

CONFIDENTIALITY

All data collected from the participants during the research will be kept confidential.

VOLUNTARY PARTICIPATION

Participation in this study is optional. The decision to participate in the study rests with the individual. If the participant chooses to participate in this study, they will need to sign a consent form. Once the consent form is signed, participants have the freedom to withdraw

at any time without needing to explain. Opting out of this study will have no impact on the participant's relationship with the researcher, if there is one. If a participant decides to withdraw from the study prior to the completion of data collection, your data will either be returned to you or destroyed. I sincerely appreciate your cooperation.

Consent Statement

By agreeing to participate in this study, you confirm that:
You understand the purpose of the research.
You are participating voluntarily.
You allow the interview/FGD to be audio-recorded for research use only.

Oral Consent Question (to be asked before recording):
“Do you voluntarily agree to participate in this interview and allow audio recording?”
Participant response: ___ Yes / ___ No

Participant Code (for anonymity): _____

Date: _____

Appendix 4

In-Depth Interview (IDI) Transcript

Interview Type: In-Depth Interview (IDI)

Participant: Early Childhood Teacher

Researcher: Tahmina Mamataz

Location: Dhaka, Bangladesh

Duration: Approximately 30–40 minutes

Introduction

Researcher:

Good afternoon. Thank you for taking the time to participate in this interview. I am Tahmina Mamataz, conducting this study as part of the requirements for my master's degree at the Institute of Educational Development (IED), BRAC University.

The purpose of this study is to explore teachers' perceptions and experiences regarding the integration of technology in early childhood classrooms in Dhaka. During this interview, I would like to learn about your experiences, opinions, and perspectives. There are no right or wrong answers; your personal views are highly valued.

Your participation is entirely voluntary. You may choose not to answer any questions and may withdraw from the interview at any time without providing a reason. With your consent, this interview will be audio recorded solely for research purposes. All information shared will remain confidential, and your identity will not be disclosed in any report or publication.

May I proceed with the interview?

Participant:

Yes, certainly.

Teaching Experience

Researcher:

Could you describe your teaching experience in early childhood education, including years of experience, class levels, and types of institutions?

Participant:

I have approximately 15 years of teaching experience in primary education and around five to six years of early childhood education, particularly within the IB Early Years Programme (IB-EYP), ranging from Playgroup to Kindergarten.

I have taught Playgroup for one and a half years, Nursery for one year, KG1 for three years, and KG2 for approximately one year. These experiences have enabled me to work closely with young learners during their foundational stages of development.

Additionally, I have worked in several institutions, including Anani Gatton School, Beach Academy, Maldives Gateway International School, Abdul Kader Molla International School, and currently Smart Innovation School. These diverse experiences have strengthened my understanding of early childhood pedagogy.

Digital Tools Used in the Classroom**Researcher:**

What types of digital tools or technologies do you use in your classroom?

Participant:

Technology plays a supportive role in early years of education by enhancing engagement and interaction. For instance, platforms such as YouTube are used during warm-up sessions to teach rhymes and songs. For foundational mathematics concepts, such as shapes and basic operations, platforms like Khan Academy can be useful.

For literacy development, Jolly Phonics' audio-visual resources are particularly effective. Storytelling applications also support language development.

Additionally, PowerPoint presentations are used for activities such as digital gallery walks. Recently, I introduced Google Draw, which has proven effective for interactive tasks. Following the COVID-19 pandemic, the use of tablets has increased in some schools, further supporting the integration of such tools.

Feelings About Using Technology**Researcher:**

How do you feel about using technology with young children?

Participant:

I have a positive attitude toward using technology in early childhood education. Children today are naturally familiar with digital devices. Even short, focused activities using technology can enhance engagement and support quicker understanding of concepts.

Technology and Children's Learning**Researcher:**

In your view, how does technology support children's learning and development?

Participant:

Technology facilitates differentiated instruction by allowing teachers to design activities that meet diverse learning needs. For example, smart boards enable interactive participation rather than passive worksheet-based learning.

Visual aids such as images and videos enhance understanding. Teachers can pause videos, ask questions, and promote discussion. Tools like Ed Puzzle further enhance interactivity by embedding questions within video content.

Technology and Play-Based Learning**Researcher:**

Do you think technology aligns with play-based learning? Why or why not?

Participant:

Technology can complement play-based learning through digital storytelling, interactive games, and visual exploration. However, it cannot replace traditional play, which is essential for developing motor skills and cognitive abilities. Therefore, technology should be used as a supportive tool rather than a substitute.

Positive Changes Observed**Researcher:**

What positive changes have you observed when using digital tools?

Participant:

Digital tools enhance pronunciation, language development, imagination, and student motivation. They also increase attention and engagement during lessons, particularly when visual and interactive elements are incorporated.

Example of a Successful Lesson

Researcher:

Can you provide an example of a successful lesson using technology?

Participant:

An example is teaching Jolly Phonics. Earlier, when smart boards were not widely available, I used projectors to display flashcards from PDF resources. Students could clearly view the content and practice collectively.

Additionally, playing phonics songs supported auditory learners and improved pronunciation and reading skills.

Challenges in Using Technology

Researcher:

What challenges have you faced?

Participant:

Previously, limited internet access and electricity shortages were significant challenges. To address this, I often used personal mobile data and saved resources offline.

Although access to technology has improved in many schools, resource limitations still exist in some contexts.

ICT Training

Researcher:

Have you received ICT-related training?

Participant:

Yes, I have completed several ICT-related courses, including a diploma in software and hardware from NIIT and another diploma from the University of Science and Technology in Sharjah, focusing on programming languages such as C++ and Java.

Additionally, I completed courses on MS Word and PowerPoint and participated in an IB workshop on integrated technology around 2021–2022. I have also completed a digital safeguarding course offered by the British Council.

School Support

Researcher:

How does your school support ICT integration?

Participant:

The school provides strong support through access to devices such as iPads, high-speed internet, smart boards, and sound systems. Teachers are also provided with laptops to facilitate the use of digital tools in lessons.

Policies and Curriculum**Researcher:**

Are current policies sufficient for ICT integration?

Participant:

School-level digital policies are currently under development. These emphasize that technology should support teaching rather than replace it and highlight responsible digital use.

At the national level, there is limited focus on ICT integration in early childhood education, particularly in government schools where resources are often lacking.

Resources Needed**Researcher:**

What resources would improve ICT use?

Participant:

Teachers require targeted training on selecting appropriate digital tools. Additionally, parental awareness and training are essential to support children's digital learning at home.

Training Needs**Researcher:**

What type of training is needed?

Participant:

Training in digital tools, digital literacy, and online resource utilization would be beneficial. Awareness of digital policies and plagiarism is also important.

Suggestions for Improvement**Researcher:**

Do you have any suggestions?

Participant:

ICT integration in early childhood education in Bangladesh remains limited. More professional development opportunities for teachers and awareness programs for parents are necessary.

It is important to distinguish between educational technology and recreational screen time to address parental concerns.