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# Technology Adoption in Primary Schools: Perspectives from Rural Bangladesh

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**Abstract.** The digitalization of education from the early stages has been recognized by educationalists from across the world. Bangladesh, with the vision of digitalization in every sector, has been showing improvements in incorporating technology into education. However, the primary school level has not been able to keep pace with the implementation of basic technology, for example, computers, projectors, sound systems, etc., as much as the higher levels of education. Rural schools are being deprived of the facilities that created an invisible disparity between the urban and rural schools. This research aimed to investigate the factors that restrict technology adoption in rural schools, followed by suggested sustainable solutions for optimal results from teachers' and administrators' perspectives in the Bangladeshi context. This study followed a qualitative approach with eight different rural schools, involving fourteen individual interviews and one focus group discussion to gather data on the dynamics in participants' experiences, perceptions, and suggestions. Strategic sampling was used to ensure reliability. Among the fourteen participants, five were school administrators and nine were teachers. The focus group involved three teachers to take part in a discussion. Data were analyzed thematically. The findings show that technology adoption will benefit the educational environment with teachers' hands-on training, availability of technological equipment, funding from the government, and eliminating socio-economic barriers to provide an equal and harmonized educational environment for both urban and rural primary schools. The study recommends proper teacher training, sufficient funding for the required equipment, a distributed supply of technological support, and the recognition of other socio-economic problems and their solutions.

**Keywords:** adoption of technology; technology; primary education; challenges; infrastructure; teachers' teaching practice

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## 1. Introduction

Technology can be viewed as an advanced medium that focuses on efficiency in acquiring knowledge. According to Haleem et al. (2022), the use of technology is beneficial for distributing knowledge and is one of the main motivators behind educational improvement. Primary schools are the foundation for learners to gather the most input for the next level. In the modern education scenario, integrating technology into primary classrooms has the potential to engage young minds with information from various sources. According to Aidarbekova et al. (2021), "[e]ducational web resources" refer to electronic instructional materials available on a local or worldwide network in different formats, including text, graphics, archives, audio, and video. The younger the children, the better they learn with visual and auditory resources. Digital learning materials facilitate information processing by presenting students with a variety of media components to develop mental representations (Eady, 2013).

Using technology does not mean introducing these devices to the students but rather creating an effective environment where the students learn effectively. Children enter classrooms with different needs and abilities. Technology comes in handy when students can overcome those challenges by engaging digital tools. Simuforosa (2013) found that learners can help themselves to learn with the help of computers. Teachers use these devices to create effective lesson plans and conduct classes effectively. Classroom technologies enhance students' educational experience by improving interactivity, participation, audio-visual aids, and online learning materials (Whyte & Schmid, 2018). Schools that embrace technology for building a strong foundation for students make them more confident and capable in their learning journey.

Bangladesh has continuously been working on the country's development in different sectors, and technology adoption is a major leap. However, while the urban primary schools of Bangladesh are mostly equipped with updated technological infrastructure, rural public primary schools are less equipped with classroom technologies that can potentially enhance the education experience. According to Shohel and Kirkwood (2012), the barriers behind a "*technology-poor context*" are mostly "*economical, technological, socio-political*" etc. This leads to the disparity between urban and rural schools. Urban school stakeholders are ahead of the rural school stakeholders in incorporating technology into primary education (Rahaman & Akter, 2017). The stakeholders need to pay thorough attention to the affordability and needs perception of classroom technologies.

This disparity hinders most rural students from engaging with the advanced technology education system. This research aims to identify a few factors that prevent classroom technology adoption in rural primary schools. The research employed the technology adoption framework to identify the factors that impact classroom technology adoption and to propose possible solutions to the challenges. The findings of this study could be beneficial to policymakers and school administrators for incorporating technology to enhance the effectiveness of primary school education in rural Bangladesh.

Though there are many papers investigating the necessity of technology in the educational sector, few works have been done to understand teachers' and administrators' perceptions regarding technology adoption and the reasons behind those perceptions, particularly in the context of Bangladesh. The study had three research questions:

1. What are the perceptions of rural public primary school teachers towards using technology in primary education?
2. What are the benefits of using technology in primary education?
3. Which factors prevent rural public primary schools from adopting technology in education?

## 2. Literature Review

Many educationists have seen the prospects of what technology can do in education. This field might be new to pedagogy researchers, but it is being studied immensely to gain insights and develop further advancement.

### 2.1 Technology in Education in Bangladeshi Rural Primary Schools

As per connectivism theory, technology can help learners to regulate themselves for self-learning rather than fully depending on teachers and textbooks. In addition, learning, unlearning, and relearning are skills developed through this theory (Utecht & Keller, 2019). Technology in education is a relatively modern phenomenon, although every educational level falls short in implementing it effectively, especially in developing countries, such as Bangladesh. According to the Education Policy and Data Center (2018), around 32,615,000 students are enrolled in primary and secondary schools in Bangladesh, of which 17,300,000 are primary students. Even though the figure is much larger now, educational advancement has hardly been made in regard to the use of ICTs in schools.

In 2016, the Bangladeshi government stepped up and decided to digitalize primary education by ensuring interactive multimedia use. According to research (ICT Division, 2016), one multimedia classroom has been installed in around 1500 primary schools, with plans to increase that number to 65,000 by 2021 and eventually have one in every primary school in the country. However, the plans have not yet been accomplished. There are 6,020 government primary schools (73.7%) with multimedia classrooms out of a total of 8,164 in 10 districts in Khulna, where the multimedia classrooms are equipped with digital sound systems and laptops (BSS News, 2023). Given the constructive nature of this undertaking, it is essential that the outcome is equally distinguished. Despite having a clear goal and enough resources, Bangladesh still lags in propagating technology in rural primary schools.

### 2.2 Factors Affecting Technology Implementation in Rural Primary Schools

It is challenging to secure sufficient funds for the use of technology in the education sector in Bangladesh since it is a developing nation, with a large percentage of the population living in poverty (Sultana & Haque, 2018). Rural and low-income students confront extra challenges in school, resulting in lower completion rates compared to their urban or richer classmates (Bangladesh Education Fact Sheets 2020). The basic requirement for the use of technology is

electricity. Even though the Bangladeshi government secured electricity connections in almost every rural village, power outages present a persistent challenge. Khan et al. (2012) pointed out that most rural regions in Bangladesh have access to electricity for only around eight hours a day, making it extremely difficult to use computers. A proper Internet connection is equally important to having electricity.

Incorporating technology into education in Bangladesh has been successful due to online teaching and learning because of the Covid-19 pandemic. Every institution, both urban and rural, had to shift to online classes, with those in rural schools seemingly suffering the most. Research by Islam et al. (2021) on the use of technology in education in the urban slums of Dhaka during Covid-19 found that only 53% of the poorest households had an Internet connection, compared to almost 70% of richer households. This discrepancy was visible in different locations. Research indicates that children with access to a computer at home perform better academically than those without one. Romke (2013) found that the top ten students or students who ranked highest in their schools have access to computers and the Internet at home, whereas the students ranking lowest do not. Inevitably, students from rural areas hardly possess computers, resulting in a low success rate in participation or assessment.

**2.3 Technology in Pedagogy: Teacher and Learner Attitudes**

The integration of ICT into the educational process helps students acquire fundamental knowledge and skills and motivates them to engage in cognitive and educational activities (Aidarbekova et al., 2021). Technology plays a vital role in enhancing learning activities and shaping teaching methods. Teachers need to not only know about technology but also have the ability to integrate it into the curriculum. Teachers' ability to use modern technology in the school curriculum is not just about their skills. It also requires a collective effort, where individuals, groups, and institutions work together in learning and reflecting on their practices (Maksimovic & Dimic, 2016).

A transformative application of educational technology necessitates adjustments to finance, ICT, curriculum, assessment procedures, and pedagogy (Malik, 2018). According to Islam et al. (2023), despite teachers having access, they struggle due to not having proper training. Theodorio et al. (2024) identified that teachers' trainings are not designed in accordance with what would make them technologically competent. A center should be created to address educational disparities in technology and focus on programming, devices, networks, and that would help the trainee teachers to understand the technological design (Tauhiduzzaman et al., 2022).

Technology is considered an instrument that has the potential to improve children's social and cognitive development. Children who participate in technology-based educational activities tend to share leadership positions and engage in more interactions, demonstrating social growth (Pirani & Hossain, 2019). Parvin and Salam (2015) found that using technology improved students' general language abilities and helped them develop English communication skills

needed for academic and personal success. The use of ICT in the classroom is becoming more important because it helps students improve their teamwork skills and develop abilities that boost social skills, problem-solving, independence, responsibility, and the ability to think and take initiative (Ghavifekr & Rosdy, 2015). A report by UNICEF Bangladesh, Grameenphone, and Telenor (2023) shows that the ethical use of technology is important and that learners must understand how to use these tools efficiently and appropriately. Sulasmi (2022) conducted research in Bengkulu primary school and found that instructors believe using electronic media might maximize participants' capacity to engage their senses. González and Alonso (2021) discovered that success depends not only on simple access to ICT but also on students' enthusiasm to use engaging tools that differ from traditional methods, which allows for the presentation of a pleasant educational session with educational objectives.

According to Ghavifekr and Rosdy (2015), ICT enhances students' creativity and imagination by expanding their knowledge paradigm and facilitates the acquisition of all four (listening, speaking, reading and writing) learning skills. Fälth and Selenius (2024) assert that educators use technology as a method for teaching younger students' reading and writing. In addition to improving the four learning skills, the use of technology also improves the learning of other types of content. Tahir and Arif (2016) found that incorporating educational applications such as quizzes, memory games, and drawing into teaching is beneficial for children of this age range.

**2.4 Factors Restricting Technology Use**

It is found from many previous articles that teachers' lack of time, motivation, skills, and training are major challenges to implementing ICT in primary schools. The availability of digital equipment is not the only determining factor in the effectiveness of digital-based learning; rather, it is the instructor's accomplishment of certain competencies, such as computer abilities, creative thought, and communication skills (Jannah et al., 2020). While teachers recognize the benefits of technology, many are hesitant to use it in the classroom (Najdabbasi & Pedaste, 2014). Abareta and Prudente (2025) and Karimi and Khawaja (2025) highlighted inadequate training, time constraints, limited resources, and limited knowledge regarding technology incorporation in education field consequences in teachers' reluctance to incorporate technology.

Rahaman and Akter (2017) found that 18.2% of instructors in rural regions show no interest in ICT because they believe that technology is extremely hard and difficult to grasp. Teachers prefer the lecture approach due to time restrictions and other issues, such as internet disruption and unsuitable virtual classroom conditions (li et al., 2022). The reality is that the teacher-student ratio is very disproportionate in rural schools (Obaydullah & Rahim, 2019), leading to teachers failing to deliver lessons incorporating technology. Again, Mathew and Alidmat (2013) found that 10% of students think their teacher lacks appropriate material. Teachers find it challenging to employ audio-visual aids in the classroom since these materials are not easily accessible on the internet.

There are additional factors why teachers do not use technology in the classroom. Tahir and Arif (2016) found that teachers' main reasons for excluding mobile app use in schools were as follows: 1) students will lose concentration on their academics, 2) it is costly equipment that schools cannot afford to supply to all students, 3) students may abuse cell phone technology, and 4) students can use mobile phones to cheat on class assessments. Teachers must comprehend how technology fits into the educational process and the essentials of incorporating it in a way that enhances learning outcomes without being distracted (Malik, 2018).

## 3. Methodology

This section presents an elaborate description of how the data were collected and analyzed.

### 3.1 Research Design

A qualitative approach was applied to understand the participants' perspective and explore the present scenario of technology adoption in primary schools, emphasizing ease of technology use and challenges in adopting it. Phenomenology was employed to analyze teachers' and administrators' living experiences and perceptions. Semi-structured interviews and a focus group discussion were conducted to collect data. As experience is not a measurable variable, a qualitative approach was the most effective research approach for this study.

### 3.2 Participants

This study was conducted to understand the underlying situation and scenario of rural primary schools from the teachers' perspective on technology adoption. The research included different educational stakeholders, such as teachers and school administrators/principals, to ensure the reliability of the results. Strategic sampling was used, taking into consideration factors such as the educational background of the teachers and the socio-economic and geographical context. Fourteen individual interviews with participants from eight different schools were conducted. Five administrators and nine teachers were interviewed. In addition, three teachers were included in a focus group discussion. Since the interviews were semi-structured, the participants were able to share their perspectives and suggestions with ease. Their confidentiality was uncompromised throughout the session.

### 3.3 Research Instrument

In-person interviews were conducted, where the participants voluntarily participated and addressed their concerns and recommendations regarding technology adoption in rural primary schools. The teachers were asked questions about the availability of resources, teacher training, funding, and potential improvements in pedagogical implications. The sessions lasted for around ten to twelve minutes each. An elaborate focus group discussion was conducted to obtain the insights of teachers on specific topics, for example, what causes affect their incorporation of technology, problems that differ from urban schools, and their recommendations. The data collected from the interviews were recorded using notes and audio recordings and were critically analyzed for the research.

Interviews and focus group discussion were selected as the research instruments for data triangulation.

### 3.4 Data Collection

Data collection started in May 2024, with the first interview taking place on May 21, 2024. The first step was to ensure the consent of the participants and to ensure the confidentiality of their responses. Participants were given freedom to use their mother tongue, Bengali, to elicit the most authentic responses, which were subsequently translated and transcribed into English.

### 3.5 Data Analysis

This study followed Braun and Clarke's (2006) six steps of thematic analysis to present the data concerning the necessity of technology in modern education, access and ease of use of technological resources, and the challenges teachers face in utilizing these tools. Semantic thematic analysis was used to analyze the data, as participants explicitly stated their perceptions and experiences. Both teachers and administrators emphasized the positive effect of technology on students' learning outcomes while acknowledging the most impactful constraints, such as infrastructure, training, and funding support, that disrupt the effective implementation of technology. Data triangulation was performed in the form of in-person interviews and a focus group discussion to gain more in-depth knowledge. A qualitative approach was applied to explore the present scenario of technology adoption in primary schools.

## 4. Results and Findings

Data analysis revealed that the participating teachers perceived technology as a great assistive tool. As primary school classes are the foundation of a learner's life, introducing them to technology that would assist them in their education would prepare them accordingly. Participants also concluded that technology could help them with difficult learning challenges through videos rather than teaching from books only. They also indicated that it saves time and effort as it motivates them more.

Technology was found to be effective in engaging more attention and making the lessons entertaining. Primary school students love classes that are fun and easily understandable. Using audio-visual aids helps learners to gain a clearer concept of the lesson and their learning. The conventional lecture method could help them gain an overall idea of the concept, whereas audio-visual aids could give them a clearer image of that concept.

Other teachers spoke about the importance of technology, saying that audio-visual tools can help learners see the spelling of the words and hear the correct pronunciation. Where the teachers were enthusiastic to teach with the assistance of technology, they shared the problems they faced while introducing and also after using technology, for instance, the maintenance of the devices, having inadequate resources, etc. In addition, some or most schools in rural as well as urban areas use computers and other technological equipment only for official purposes such as grade compilation, keeping record of the students, etc.

The teachers also shared the socio-economic factors that hinder the use of technology in the classroom. They mentioned load-shedding, not having Internet support, not having proper teacher training, low funding to no funding for equipment, and other socio-economic factors. Very few of the teachers had actually received training for a short time, which was not adequate. Those without proper training or experience could not properly use technology to achieve the most benefits for the learners. Additionally, Bangladesh's capital-centric system hindered the even distribution and effective use of technological infrastructure. That is why urban areas have more access to technology in classrooms compared to the schools of rural and remote areas. All these reasons show the importance of the use of technology as well as the problems faced by the stakeholders.

### 4.1 Perceptions of Public Primary Schools toward Using Technology in Primary Education

All participating teachers equally confirmed the importance of technology in primary schools since it is the foundation of their academic learning, and learners achieve the most outcomes during this prime time. Students will highly benefit in their future academic and professional lives if they can develop their technological skills from the primary level. Some of the teachers pointed out the positive impact of technology as follows:

> *"If we teach the students with technological devices such as projectors and computers, then the impact of learning will remain longer in the memory of the students."* [T2]

> *"If the students get the opportunity to develop technological knowledge from the primary level, they will be highly benefited in their next academic and professional life with this knowledge."* [A2]

Most of the teachers regarded the adoption of technology positively, asserting that there are no alternatives to digital learning, whereas others emphasized that the adoption of technology must be followed by some effective tools:

> *"When we show anything on projectors, learners get motivated and interested in paying attention to the learning process. We can download different teaching materials from the Internet, which saves us time and effort. In addition, learners would be able to develop their technological skills."* [A4]

The teachers perceived technology as a leap toward educational advancement and the modernization of pedagogy, a more sustainable intellectual capital for future use.

### 4.2 Benefits of Using Technology in Primary Education

#### *4.2.1 The role of technology in enhancing learning*

The teachers believed in the necessity of technology use to create an engaging, effective, and entertaining learning environment for primary school students. Many teachers emphasized that technology could make teaching and learning both fun and effective. They also highlighted the importance of using visual aids to break through complex content. For instance,

> "*Visual learning will help the students to understand the topic very easily, and the result of visual learning lasts longer than the conventional learning process.*" [A2]

> "*Difficult lessons can be easily understood, and the teaching and learning process will be fun. There are many lessons that are very difficult to teach the students solely, depending on the books. To teach those lessons easily, we need to use laptops and projectors.*" [T3]

A3 expressed how technology aids language learning as students can comprehend better while watching and listening:

> "*If we use technology, students can see the spelling of words, and they also can listen to the correct pronunciation.*"

T8 also mentioned how students can learn "*critical topics through projectors and computers*" that will sustain their future academics. T6 elaborated on their guide's process,

> "*Our teachers' guide suggests we teach using technology. We need to let students listen and watch audio and video first so they can quickly understand the lecture. Nowadays, children are habituated to using technologies, that is why they find it interesting.*"

The teachers' responses show that they consider technology in their teaching because students enjoy visual learning and it has a longer impact. Despite accepting the benefits, the teachers frequently pointed to a lack of resources before it could help in learning. T1 called for a technologically well-equipped classroom that could be "*relevant to children's learning*".

*4.2.2 Teacher comfort in the use of technology*

The teachers shared a positive attitude toward using technology in the classroom, with their enthusiasm being prominent, although a few of them mentioned the constraints of using it. A1 and A4 highlighted how they used technology to make their teaching and learning effective. A3 and T8 emphasized the enjoyment of students being in a tech-facilitated classroom:

> "*We use technology in our classrooms to make the learning process fun and easy. Our teachers make different content by using technology to teach the students.*" [A3]

> "*I become so happy when children look at a picture with enjoyment, and they learn by watching. They are interested in learning more by looking at pictures. So, I get pleasure out of it, and I teach with enjoyment.*" [T8]

Most of the teachers echoed the same view, which implies their ease and enthusiasm in using different tools. T6 said the following: "*it helps my students understand the lessons very easily.*" While many teachers showed a positive mindset toward technology, few, like T8, presented an actual scenario of using technology. T8 showed a positive mindset but added that there is a huge lack in terms of facilitating technological equipment in the classroom. T9 asserted that they had a

computer, but it stopped working three years back and had not been repaired yet. According to T3:

> *"We use technology in our school for different official works. However, we cannot use technology in our classrooms because we haven't yet gotten the facilities to use technology in the classrooms."*

The findings show that the teachers found it interesting to use technology in their lessons, and they sought improvement with resources and technical facilities. According to them, they needed to learn about technology first before they could teach their students effectively using that technology.

### 4.3 Factors Preventing Rural Public Primary Schools from Adopting Technology

The teachers showed concern regarding the challenges of technology adoption in primary schools. Technology implementation would not be successful just by introducing the term to the teachers. Many essential follow-up activities are often unmet due to many socio-economic constraints. The teachers demanded solutions for infrastructure and resource unavailability, professional training on technology, funding and support, and other factors such as load-shedding, work pressure, low salaries, and other socio-economic factors.

#### *4.3.1 Availability of technological infrastructure*

Infrastructure gaps were concerning, with the teachers emphasizing the lack of essential technological resources such as computers, projectors, and the Internet. The inaccessibility of these resources makes teaching practice hard to employ. As A2 voiced:

> **"***We don't have projectors and computer labs in our school. Though we have a vulnerable Wi-Fi connection, that is not enough. However, our teachers try to teach the students using their own technological devices in the classrooms."* [A2]

Similarly, A4 shared having "*one projector, two laptops, and a Wi-Fi connection*" in their school. T3 expressed a positive viewpoint in terms of Internet connection but a negative one in terms of falling short in having computer labs:

> *"We don't have projectors and computer labs in our school. However, we have a Wi-Fi facility in the school with 20GB of data per month."*

However, T3 acknowledged that "*a laptop and a projector*" were given by the government and "*training has been ensured*" so that they can operate technologies. T5 shared how having one laptop and one projector for a whole school negatively affected the preparation of lessons for the class. The data show that there is an imbalance of infrastructural advantages in different schools. Some schools are equipped with computer labs and projectors, while others have the Internet. This disparity is crucial, since a lack of tools cannot lead to effective teaching.

#### *4.3.2 Training and professional development on technology*

In terms of training and professional development, the participants were split into two categories: 1) stakeholders/administrative and 2) teachers. The stakeholders provide/arrange training, whereas the teachers receive the training. The

interview data yielded variable results. All of the participating school stakeholders (A1, A2, A3, A4, A5) agreed that they had not been able to provide any sort of training program on technology use for the teachers. As A1 asserted:

> *"Actually, we do not have the capability and facility to provide any training to the students and teachers. However, the government offers training called ICT to teachers in every school. I think that training is not enough for the teachers".*

Another stakeholder (A3) shared that "*a 15-day training from the government*" was given to teachers, which he believed was not "*enough to develop our teachers' technological skills*". Some of the teachers mentioned that they had undergone professional training to enhance their skills, but that they were dissatisfied with the programs overall. Only T1 and T2 responded otherwise, that they were not provided with any sort of training. Several of the teachers even mentioned the timeframe of the training program, as T3 and T4 claimed to have received a 12-day ICT education training. Another teacher expressed frustration, saying:

> *"I have recently received the training in ICT in education, which was a 14-day training. However, I found it inadequate because we got the chance to develop our technical skills from the very surface level due to the time limitations. They did not teach us in detail."* [T5]

These insights indicate the gap between the training program and the original needs of the teachers in using technology effectively. Even though the government had offered some training programs, teachers found these relatively insufficient to acquire the necessary excellence for technology use in education.

*4.3.3 Government support and funding*

The data from the interviews revealed the financial crisis faced by schools and how it affects the integration of technology into the classroom. Most of the teachers mentioned having a significant budget every year from the government but that it did not cover the technological expenses. According to A2:

> *"We don't have any funds. We get a budget every year named the School Level Improvement Plan (SLIP). Before getting the budget of SLIP, we need to submit the expenditure plan of our school. According to the plan, we get the fund and spend that on the planned works."*

Another teacher also expressed discontentment in securing any funds from the government, since it was not a government-affiliated school. The teacher asserted:

> *"As we do not have the government's funds, we are facing financial problems. We need financial help, and that is why we are not able to implement technology. Currently, we do not have any problem with using the Internet, as the ownership of this school has been handed over. That is why we are getting Internet and electricity till now."* [T6]

Where rural government schools do not get enough funding for technology, rural private schools are facing more budgetary shortfalls since they are autonomous, without any support from the government.

*4.3.4 Other factors preventing technology use*

Teachers faced other sorts of challenges to meet the technological expectations, including load-shedding, decreased motivation due to workload, and regional constraints.

> *"I face various types of challenges, mostly load-shedding. Very often, we face the problem of load-shedding, and we need to shift the activities of our multimedia classroom to a normal classroom."* [T3]

A4 also expressed that not having "*backup electricity support*" can lead to disruptions to "*download necessary teaching materials*". The following concern was shared during the focus group discussion:

> *"As it is a village, we do not get electricity all the time. When it rains and storms, we do not get electricity. We want to teach students to use technology, but how will they use that at their homes when they do not have electricity?"*

Their responses demonstrate how rural schools had been deprived of the privilege of one of the basic requirements, namely, electricity. The teachers' concerns, as seen in the data, are justifiable, since electricity is the ground requirement for a classroom to be conducted. Another teacher (T5) shared: "*Classrooms are not well-equipped with technological facilities*." When there is a lack of computers, teachers need to use mobile phones, but according to T5, using a mobile phone is not allowed in classrooms. This phenomenon creates a big hassle for both the teacher and students.

The data show that not only does overworking drain the energy of the teachers but that low salaries also discourage teachers from adopting technological materials. Some of the teachers emphasized the issue of regional constraints, where "*laptop repairs take a long time due to the distance from Dhaka*" [T9]. Another teacher mentioned in the focus group discussion that theft of projectors and computers from classrooms is a common practice in their area, since it is a rural area. Teachers continuously go through different sorts of challenges to make their teaching practice as effective as possible.

*4.3.5 Focus group discussion*

The focus group discussion with three teachers (T9, T10, T11) yielded some insights into why they fail to incorporate technology into the classroom. They brought up that some teachers even take six classes every day and that they could not manage two to three hours daily preparing content for each subject. Also, taking equipment to every classroom is troublesome. Simultaneously, they acknowledged that the rural students are being deprived, as they felt that multimedia could make them enthusiastic about learning. They concluded by saying that rural learners are already lagging compared to urban learners and that if they do not get the opportunity to utilize technology, they will not be able to cope. Lastly, the discussion concluded with everyone verbalizing the need for equipment, training, and funds for multimedia classrooms.

## 5. Discussion

The discussion explores the role of technology in enhancing education while highlighting the challenges in implementation in rural areas.

### 5.1 Discussion of the Findings for Research Question 1

Primary school students are at the prime level for acquiring knowledge, and early exposure to information will lead to a successful academic life. The participating teachers and stakeholders acknowledged the potential that technology holds in transforming the classroom by being engaging, entertaining, and effective while ensuring equal access to content for every student.

Using technology increases the chances of the input being stored in long-term memory. Audio-visual aids can enhance learning by registering images, words, and sounds in the brain's sensory memory (Ho & Intai, 2017). Learners get excited while learning via multimedia and engage in the lesson, ensuring a successful teacher-student rapport. The results show that teachers feel comfortable using technology as it can save energy and time of the teachers. Effective use of audio-visual tools saves time and encourages students to observe and participate in classroom sessions (Mathew & Alidmat, 2013). Nonetheless, it has some downfalls as well, such as smartphones being used too much, being a distraction, etc.

Therefore, Poth (2023) suggested that only including technology will not help the students; they must also be provided with enough information on how they should use it to be beneficial and what the impact would be if not used appropriately. The participating teachers also shared their views on how technology can be beneficial for the stakeholders if they are sufficient and functional. Akram et al. (2022) supported these findings, explaining that the systematic incorporation of technology can play a vital role when the resources are proportionate in number and are upgraded to meet the need. The teachers also pointed out how proper training and time will enable them to be pedagogically more competent. Watson and Rockinson-Szapkiw (2021) affirmed this, saying that the proper use of technology can enhance the quality of teachers' pedagogy.

### 5.2 Discussion of the Findings for Research Question 2

Although the teachers acknowledged the importance of technology adoption in education, there are still various reasons for them not being able to do that. Focusing too much on book learning can make the learning process difficult and monotonous. The participating teachers, as well as higher school authorities, acknowledged the necessity of technology.

Additionally, the participants also shared how the learners feel energetic and attentive if multimedia is used inside the classroom. The teachers also felt the need to take a break from the conventional method of teaching to transform the classroom environment into a fun one. To extend the learning outcome of the students, teachers need to assimilate relevant content using different tools. According to Akram et al. (2022), learners can easily grasp the main concept clearly with the help of integrative materials that are backed up by technology. This results in better academic performance. Kormos and Wisdom (2021) also

supported the idea of technology as a guiding tool to increase the capability and effectiveness of teaching strategies both during and after class.

**5.3 Discussion of the Findings for Research Question 3**

Despite being enthusiastic, rural teachers are reluctant to use technology, as they have insufficient resources available. Sindakis and Showkat (2024) mentioned "*geographical disparity*" as one of the main reasons for technological adaptivity issues. To overcome the barriers, rural primary schools should be equipped with adequate technological equipment and Internet to create an equal education system in alignment with the urban schools. Insufficient funding hinders schools from providing appropriate technology, software, and Internet access, leading to a digital divide between urban and rural locations (Akter, 2024). The allocation of a sufficient budget for digital resources should be taken seriously by the government, policymakers, and stakeholders. Ampo et al. (2025) pointed out that content-making demands adequate time and effort, which is almost impossible in the Bangladeshi context, as teachers are already overloaded.

Technology cannot function on its own, and teachers need proper knowledge to be able to operate technology. Afrin (2025) also mentioned this aspect, saying that although the government of Bangladesh has incorporated technology into the education sector, the training program that was supposed to be on technology incorporation instead focused on the conventional teaching method. Afrin (2025) also mentioned that the gap between subject content and how to use technology cannot be bridged, leading to difficulty in using and incorporating technology purposefully. Teachers sometimes avoid employing technology in the classroom due to a lack of essential knowledge and particular technical abilities (Najdabbasi & Pedaste, 2014). Teachers are not content with the pre-service and in-service training facilities, limiting their competency. The provider offers ICT facilities but does not monitor implementation status, while the user of the ICT may have acquired it but cannot yet use it (Khan & Rahaman, 2020).

Akter (2024) found that only 40% of the teachers in primary schools have received proper training to ensure effective use of the technological equipment in classrooms. Without any prior training, teachers experience barriers in implementing technology in the classroom. Consequently, they revert to the conventional way of teaching to avoid any technological mishap during class. Many Gen X teachers find it challenging to learn complex technologies, whereas physical boards are easier to access (Tauhiduzzaman et al., 2022). Ensuring teachers' training in the effective use of technology should be prioritized more.

The government should allocate the necessary training and practice for the teachers. The education ministries in other countries seem to be more considerate in expediting teachers' technological competencies compared to the Bangladeshi government. An acceleration in focusing on teachers' training is vital to reach the vision of digitalization in education. nThough the government is putting effort into providing electricity for all, socio-economic conditions are a continuous challenge to incorporating technology. Rural villages still have a long way to go. The root problem needs to be addressed before envisioning the intended outcome of technology adoption. According to Ekeh and Hadebe-Ndlovu (2025), Nigeria's

diverse socio-economic context is responsible for the ineffective incorporation of technology in public early schools. Hakimi et al. (2025) concluded that there should be a strict focus on digital infrastructure to evenly distribute technological adoption among the stakeholders. Also, policies should be made to eradicate any financial-related issues. Akter (2024) and Afrin (2025) also stated that rural schools face difficulties in using digital equipment, unlike urban schools, due to substandard infrastructure, which includes power shortages and an unreliable Internet connection. This also creates a digital divide. School stakeholders must confront the issues and undertake effective strategies to ensure conducive IT settings. Burdening teachers with an excessive workload relative to their salary can cause demotivation in putting extra effort into technology-assisted teaching practice.

Rasmitadila et al. (2020) noticed three factors that affect teachers' motivation in teaching: their passion, commitment, and tasks and responsibilities. If teachers find enjoyment in their workplace, the feasibility of technology implementation in the classroom will increase. Policymakers should make sure that teachers have adequate content to maintain their motivation. Das (2021) reported that improved infrastructure, informed and qualified teachers, and evenly distributed access to equipment will develop and enhance the education sector. Bozkurt (2022) stated that the inclusion of ICT needs continuous improvement. The education community should engage in collaborative action that ensures accessibility to devices, thereby eliminating digital imbalances and fostering a holistically efficient domain for both teachers and students.

## 6. Limitations and Directions for Further Research

The main limitation of this research that must be acknowledged is that the sample could have been larger. Had the data been collected from a larger sample, and had different groups of stakeholders, such as students and parents, been surveyed, there might have been more comparisons and different outcomes. In addition, this study has the potential for further research by considering students and their parents in the collection of data, which may lead to a different direction for further research on the study topic. Interventional research can be done so that the differences can be measured, as well as how that would affect the educational sector and the stakeholders.

## 7. Conclusion

This investigation into technology adoption in rural primary schools not only explored the benefits of the digitalization of education but also underscored some crucial issues that require improvement from the government to the local education community. The study found that teachers acknowledge the necessity of technology but face multiple challenges that often lead to not incorporating technology in education. The factors are mostly inadequate time, work pressure, not having enough resources, not having proper training, etc. Data triangulation was covered as both in-person interviews and a focus group discussion were conducted. Here participants shared having a positive attitude but also shared challenges regarding incorporating technology. Undoubtedly, the education system has seen tremendous progress in technology integration, with the ongoing

introduction of new digital tools and facilities. The research also underlined the developmental skills that digital learning could accentuate. For example, problem-solving, analytical ability, and collaboration among students are not optional but rather a must. Also, this is not just for academics but also the professional realm. Different applications and tools may foster collaboration, and students can engage in group analysis and problem-solving using gaming apps and tools.

## 8. Recommendations

According to the social construction of technology theory (SCOT), technology is molded by social and cultural considerations, as are the challenges. In the Bangladeshi context, several challenges need to be addressed and resolved with effective measures. These include limited digital devices, a lack of sufficient teacher pre and in-service training, a lack of financial support from the government, lack of teacher motivation, and most importantly, the socio-economic conditions of the community in the educational sector (teachers, students, students' demographic background). The social context heavily shapes these factors.

All these challenges need to be addressed to ensure technological support in education. The discrepancy between the rural and urban primary schools in terms of these challenges should be monitored by the government, educational institutions, and stakeholders to make sure that every child is equally privileged with digital change. Ensuring these measures can eradicate the obstacles to tailoring more inclusive digitalization of primary education.

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## 10. References

Abareta, J. O., & Prudente, M. S. (2025). Digital technology tools (DTT) in science teaching: Teachers' perceptions of usage and effectiveness. *International Journal of Learning, Teaching and Educational Research*, *24*(1), 443–463. https://doi.org/10.26803/ijlter.24.1.22

Afrin, T. (2025). Exploring the integration of technology as a pedagogical tool among government primary school teachers in Bangladesh [Doctoral dissertation]. BRAC University, Gulshan, Bangladesh.

Aidarbekova, K. A., Abildina, S. K., Odintsova, S. A., Mukhametzhanova, A. O., & Toibazarova, N. A. (2021). Preparing future teachers to use digital educational resources in primary school. *World Journal on Educational Technology: Current Issues*, *13*(2), 188–200. https://doi.org/10.18844/wjet.v13i2.5653

Akram, H., Abdelrady, A. H., Al-Adwan, A. S., & Ramzan, M. (2022). Teachers' perceptions of technology integration in teaching-learning practices: A systematic review. *Frontiers in Psychology*, *13*, Article 920317. https://doi.org/10.3389/fpsyg.2022.920317

Akter, S. (2024). Digitalization of education in rural schools: A study of access, utilization, and impact toward digitalization in Bangladesh. *American International Journal of*

*Multidisciplinary Scientific Research*, *15*(1), 1–9. https://doi.org/10.46281/aijmsr.v15i1.2205

Ampo, W. M. G., Rullen, M. S. M., Deguit, E. O., Perocho, R. V., & Romero, P. J. B. (2025). From traditional school to virtual classroom: Students' lived experiences on blended learning implementation. *International Journal of Education and Emerging Practices, 1*(2), 1–15. https://doi.org/10.63236/injeep.1.2.1

Bozkurt, A. (2022). A retro perspective on blended/hybrid learning: Systematic review, mapping, and visualization of the scholarly landscape. *Journal of Interactive Media in Education, 2022*(1), 1–15. https://doi.org/10.5334/jime.751

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77-101.

BSS News. (2023, October 4). *Over 73 percent govt primary schools get ICT facility in Khulna Div*. https://www.bssnews.net/news/150770

Das, T. K. (2021). Online education during COVID-19: Prospects and challenges in Bangladesh. *Space and Culture, India, 9*(2), 65–70. https://doi.org/10.20896/saci.v9i2.1220

Eady, M. J., & Lockyer, L. (2013). Tools for learning: Technology and teaching strategies. In P. Hudson (Ed.), *Learning to teach in the primary school* (pp. 71–89). Cambridge University Press.

Education Policy and Data Center. [2018]. *Bangladesh national education profile 2018 update*. https://www.epdc.org/sites/default/files/documents/EPDC_NEP_2018_Bangladesh.pdf

Ekeh, M. C., & Hadebe-Ndlovu, B. N. (2025). Tech-enhanced teacher training: Evaluating pre-service early childhood teachers' experiences and perceptions. *International Journal of Learning, Teaching and Educational Research*, *24*(4), 72–92. https://doi.org/10.26803/ijlter.24.4.4

Fälth, L., & Selenius, H. (2024). Primary school teachers' use and perception of digital technology in early reading and writing education in inclusive settings. *Disability and Rehabilitation: Assistive Technology*, *19*(3), 790–799. https://doi.org/10.1080/17483107.2022.2125089

Ghavifekr, S., & Rosdy, W. A. W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science*, *1*(2), 175–191. https://files.eric.ed.gov/fulltext/EJ1105224.pdf

González, M. G., & Alonso, J. M. R. (2021). ICT in primary education: Review of its importance and a proposal. *South Florida Journal of Development*, *2*(1), 131–144. https://doi.org/10.46932/sfjdv2n1-012

Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers, 3*, 275−285. https://doi.org/10.1016/j.susoc.2022.05.004

Hakimi, M., Sediqi, M., Kohistani, A. J., & Quraishi, T. (2025). The role of digital literacy and technology adoption in facilitating social transformation in Afghanistan. *Jurnal Ilmiah Dinamika Sosial*, *9*(2), 175–191. https://doi.org/10.38043/jids.v9i2.6809

Ho, D. T. K., & Intai, R. (2017). Effectiveness of audio-visual aids in teaching lower secondary science in a rural secondary school. *Asia Pacific Journal of Educators and Education*, *32,* 91–106. https://doi.org/10.21315/apjee2017.32.7

ICT Division. (2016). *Prāthamika śikṣā konṭenṭ inṭarāyākaṭṭhiv mālṭimīḍiẏā ḍijiṭāl barṣane rūpāntarakaraṇ* [Transformation of primary education content into interactive multimedia digital version]. http://digitalcontent.ictd.gov.bd/index.php/site/index

Islam, T., Hussain, M., Shimul, S. N., Rupok, R. I., & Orthy, S. R. K. (2021). Integration of technology in education for marginalised children in the urban slum of Dhaka City during the Covid-19 pandemic. *EdTech Hub*. https://doi.org/10.53832/edtechhub.0063

Islam, M. M., Rahman, M., & Rabbi, Md. F. (2023). Transforming teaching practices: Enhancing ICT-pedagogy integration through curriculum innovations in teacher education of Bangladesh. *Journal of Research in Instructional, 3*(2), 87–102. https://doi.org/10.30862/jri.v3i2.223

Jannah, M., Prasojo, L. D., & Jerusalem, M. A. (2020). Elementary school teachers' perceptions of digital technology-based learning in the 21st century: Promoting digital technology as the proponent learning tools. *Al Ibtida: Jurnal Pendidikan Guru MI*, *7*(1), 1–18. https://www.syekhnurjati.ac.id/jurnal/index.php/ibtida/article/view/6088

Karimi, H., & Khawaja, S. (2025). Exploring digital competence among higher education teachers: A systematic review. *International Journal of Learning, Teaching and Educational Research*, *24*(1), 298–314. https://doi.org/10.26803/ijlter.24.1.15

Khan, M. S. H., Hasan, M., & Clement, C. K. (2012). Barriers to the introduction of ICT into education in developing countries: The example of Bangladesh. *International Journal of Instruction*, *5*(2), 61–88. https://www.researchgate.net/publication/281278856_Barriers_to_the_Introduction_of_ICT_into_Education_in_Developing_Countries_The_Example_of_Bangladesh

Khan, W., & Rahaman, M. M. (2020). Measuring the performance of e-primary school systems in Bangladesh. *International Journal of Modern Education and Computer Science*, *12*(1), 35–41. https://doi.org/10.5815/ijmecs.2020.01.05

Kormos, E., & Wisdom, K. (2021). Rural schools and the digital divide: Technology in the learning experience. *Theory & Practice in Rural Education*, *11*(1), 25–39. https://doi.org/10.3776/tpre.2021.v11n1p25-39

Li, S., Zhang, C., Liu, Q., & Tong, K. (2022). E-Learning during COVID-19: perspectives and experiences of the faculty and students. *BMC Medical Education*, *22*(1), 328. https://doi.org/10.1186/s12909-022-03383-x

Maksimovic, J., & Dimic, N. (2016). Digital technology and teachers' competence for its application in the classroom. *Istraživanja u Pedagogiji*, *6*(2), 59–71. https://scindeks.ceon.rs/Article.aspx?artid=2217-73371602059M

Malik, R. S. (2018). Educational challenges in 21st century and sustainable development. *Journal of Sustainable Development Education and Research*, *2*(1), 9–20. https://doi.org/10.17509/jsder.v2i1.12266

Mathew, N. G., & Alidmat, A. O. H. (2013). A study on the usefulness of audio-visual aids in EFL classroom: Implications for effective instruction. *International Journal of Higher Education, 2*(2), 86–92. https://doi.org/doi:10.5430/ijhe.v2n2p86

Najdabbasi, N., & Pedaste, M. (2014). Integration of Technology into Classrooms: Role of Knowledge and Teacher Beliefs. In *Communications in computer and information science* (pp. 117–122). https://doi.org/10.1007/978-3-319-07854-0_21

Obaydullah, A. K. M., & Rahim, M. A. (2019). Use of ICT for primary science teaching and learning at the primary schools in Bangladesh. *International Journal of Advance Research and Innovative Ideas in Education (IJARIIE)*, *5*(1), 642–651. https://www.researchgate.net/publication/331210394

Parvin, R. H., & Salam, S. F. (2015). The effectiveness of using technology in English language classrooms in government primary schools in Bangladesh. *FIRE: Forum*

*for International Research in Education, 2*(1), 47–59. https://files.eric.ed.gov/fulltext/EJ1133796.pdf

Pirani, S., & Hussain, N. (2019). Technology is a tool for learning: Voices of teachers and parents of young children. *Journal of Education & Social Sciences*, *7*(1), 55–66. https://www.researchgate.net/publication/333872849

Poth, R. D. (2023, November 16). Developing students' digital citizenship skills. *Edutopia*. https://www.edutopia.org/article/teaching-digital-citizenship-skills/

Rahaman, M. M., & Akter, N. (2017). ICT used in education sector considering primary and secondary level schools in rural areas: A study of Sylhet division in Bangladesh. *IOSR Journal of Business and Management*, *19*(4), 1–6. https://doi.org/10.9790/487X-1904020106

Rasmitadila, R., Aliyyah, R. R., Rachmadtullah, R., Samsudin, A., Syaodih, E., Nurtanto, M., & Tambunan, A. R. S. (2020). The perceptions of primary school teachers of online learning during the COVID-19 pandemic period. *Journal of Ethnic and Cultural Studies*, *7*(2), 90–109. https://www.jstor.org/stable/48710085

Romke, R. A. (2013). Digital divide in primary schools of Bangladesh. *ASA University Review*, *7*(2), 233–240. https://www.researchgate.net/publication/374168701

Shohel, M. M. C., & Kirkwood, A. (2012). Using technology for enhancing teaching and learning in Bangladesh: Challenges and consequences. *Learning Media and Technology, 37*(4), 414–428. https://doi.org/10.1080/17439884.2012.671177

Simuforosa, M. (2013). The impact of modern technology on the educational attainment of adolescents. *International Journal of Education and Research*, *1*(9), 1–8. https://www.ijern.com/journal/September-2013/23.pdf

Sindakis, S., & Showkat, G. (2024). The digital revolution in India: Bridging the gap in rural technology adoption. *Journal of Innovation and Entrepreneurship, 13*, Article 29. https://doi.org/10.1186/s13731-024-00380-w

Sulasmi, E. (2022). Primary school teachers digital literacy: An analysis on teachers skills in using technological devices. *Journal of Innovation in Educational and Cultural Research*, *3*(2), 140–145. https://doi.org/10.46843/jiecr.v3i2.81

Sultana, M., & Haque, M. S. (2018). The cause of low implementation of ICT in education sector considering higher education: A study on Bangladesh. *Canadian Social Science*, *14*(12), 67–73. https://doi.org/10.3968/10804

Tahir, R., & Arif, F. (2016). Technology in primary schools: Teachers' perspective towards the use of mobile technology in children education. In L. Chen, S. Kapoor, & R. Bhatia (Eds.), *Emerging trends and advanced technologies for computational intelligence: Extended and selected results from the Science and Information Conference 2015* (pp. 103–129). Springer International Publishing.

Tauhiduzzaman, M., Hasan, M. S., & Sheikh, M. Y. (2022). The role of modern technology to improve education in Bangladesh. *Global Journal of Human-Social Science, 22*(11), Version 1. https://globaljournals.org/GJHSS_Volume22/5-The-Role-of-Modern.pdf

Theodorio, A. O., Waghid, Z., & Wambua, A. (2024). Technology integration in teacher education: challenges and adaptations in the post-pandemic era. *Discover Education*, *3*(1). https://doi.org/10.1007/s44217-024-00341-1

Utecht, J., & Keller, D. (2019). Becoming relevant again: Applying connectivism learning theory to today's classrooms. *Critical Questions in Education*, *10*(2), 107–119. https://files.eric.ed.gov/fulltext/EJ1219672.pdf

UNICEF. (2020). *Bangladesh education fact sheets 2020: Analysis for learning and equity using Bangladesh MICS 2019*. UNICEF. https://www.researchgate.net/publication/351619429

UNICEF, Grameenphone Ltd, & Telenor Asia. (2023, October 8). *Grameenphone, Telenor and UNICEF partner to strengthen digital literacy and online safety for 10 million children* [Press release]. https://www.unicef.org/bangladesh/en/press-releases/grameenphone-telenor-and-unicef-partner-strengthen-digital-literacy-and-online

Watson, J. H., & Rockinson-Szapkiw, A. (2021). Predicting preservice teachers' intention to use technology-enabled learning. *Computers & Education, 168*, Article 104207. https://doi.org/10.1016/j.compedu.2021.104207

Whyte, S., & Schmid, E. C. (2018). Classroom technology for young learners. In *The Routledge handbook of teaching English to young learners* (pp. 338–355). Routledge. https://doi.org/10.4324/9781315623672-22

## Appendix

### For teachers:

1.What is your latest educational qualification?

2.What is your perspective on technology (projectors, computer lab,and internet)adoption in primary school?

3. Are you comfortable using technology in the classrooms?(Perceived ease of use)

4.Did you receive any hands-on training on technology usage?

5.How do you think technology can be made relevant to children's learning?

6.What are some of the challenges you face in technology adoption in the classroom?

7.What do you think would be the benefits of using technology in the classroom?(Perceived benefits)

### For school administration:

1.What is your latest educational qualification?

2. Do you use technology in the classrooms?

3.Do you have projectors and computer labs,including wifi connection for the students?

4.Do you provide any training on technology usage to the students or teachers?

5.What is the current range of the amount of the school fund?

6.What are some of the challenges you face in technology adoption in the classroom?(Perceived ease of use)

7.What do you think would be the benefits of using technology in the classroom?(Perceived benefits)