

**The Impact of Online EdTech Usage on Academic Performance: Evidence from Middle
School Students in Bangladesh**

Rownak Jahan Noor

ID: 234023

Master of Arts in Education

Asian University for Women

Course Number: EDUC5999

Course Title: Master's Thesis

Supervisor: Dr. Suparna Das

1 August 2026

Acknowledgement

First and foremost, I would like to express my sincere gratitude to my thesis supervisor, Dr. Suparna Das, for her invaluable guidance, constructive feedback, continuous encouragement, and academic support throughout every stage of this research. Her insightful comments, patience, and expertise greatly contributed to the successful completion of this thesis.

I am also grateful to the faculty members of the Master of Arts in Education programme at the Asian University for Women for providing a stimulating academic environment that strengthened my understanding of educational research and inspired this study.

My heartfelt appreciation goes to all the middle school students and their parents or guardians who voluntarily participated in this research. Their time, cooperation, and honest responses made this study possible.

I would also like to thank my family and friends for their constant encouragement, patience, and emotional support throughout my postgraduate studies. Their confidence in me motivated me to persevere during challenging periods of this research.

Finally, I express my sincere gratitude to everyone who directly or indirectly contributed to the completion of this thesis.

DECLARATION OF AI USE

In accordance with the guidelines of the Asian University for Women, I declare that artificial intelligence (AI) tools were used only as supplementary academic writing and language support during the preparation of this thesis.

Specifically, OpenAI's ChatGPT was used to assist with:

- improving grammar, sentence structure, and academic writing style;
- enhancing clarity, coherence, and organisation of written text;
- suggesting appropriate academic wording and transitions;
- checking consistency in terminology, APA 7th edition referencing style, and citation formatting;
- assisting with proofreading and language refinement; and
- providing general guidance on research presentation and thesis structure.

All research activities, including the identification of the research problem, formulation of the objectives and hypotheses, literature selection, questionnaire development, data collection, statistical analysis using SPSS, interpretation of findings, and final academic judgments, were conducted independently by the researcher under the supervision of Dr. Suparna Das.

The researcher accepts full responsibility for the originality, accuracy, interpretation, and integrity of all contents presented in this thesis.

TABLE OF CONTENTS

Headings	Page Number
Cover Page	1
Acknowledgement	2
Declaration of AI Use	3
List of Tables	7
Abstract	8
Chapter 1: Introduction	
1.1 Background of the Study	10
1.2 Statement of the Problem	13
1.3 Objectives of the Study	15
1.3.1 General Objective	15
1.3.2 Specific Objectives	15
1.4 Research Questions	16
1.5 Research Hypotheses	16
1.6 Significance of the Study	17
1.7 Scope of the Study	18
Chapter 2: Literature Review	
2.1 Introduction	20
2.2 Concept of Educational Technology (EdTech)	21
2.3 Online Educational Technology in School Education	23
2.4 Academic Performance	25
2.5 Theoretical Framework	27
2.6 Empirical Literature	30

2.6.1 International Empirical Studies	30
2.6.2 Empirical Studies in Bangladesh	32
2.7 Research Gap	34
2.8 Conceptual Framework	36
Chapter 3: Materials and Methodology	
3.1 Research Materials	37
3.2 Research Location	40
3.3 Participants	41
3.4 Data Collection	43
3.5 Data Analysis	44
Chapter 4: Results	
4.1 Introduction	47
4.2 Demographic Characteristics of the Participants	47
4.3 Access to Online Educational Technology	50
4.4 Study Habits and Learning Environment	53
4.5 Academic Performance	55
4.6 Challenges and Barriers to Online Learning	56
4.7 Reliability Analysis of the EdTech Effectiveness Scale	58
4.8 Descriptive Statistics of EdTech Effectiveness	59
4.9 Relationship Between EdTech Effectiveness and Current Academic Performance	60
Chapter 5: Discussion	
5.1 Introduction	63
5.2 Discussion of Patterns of Online Educational Technology Usage and Learning Conditions	63

5.3 Discussion of Perceived Effectiveness of Online Educational Technology	65
5.4 Discussion of the Relationship Between EdTech Effectiveness and Current Academic Performance	67
Chapter 6: Conclusion	
6.1 Conclusion	70
6.2 Limitations of the Study	71
6.3 Practical Implications	73
6.4 Recommendations for Future Research	74
References	76
Appendix A: Questionnaire	79
Appendix B: Participant Information Sheet and Consent Form	99

LIST OF TABLES

Table	Page
Table 3.1 Structure of the Research Instrument	38
Table 3.2 Operationalisation of the Study Variables	39
Table 4.1 Demographic Characteristics of the Participants	47
Table 4.2 Access to Online Educational Technology	51
Table 4.3 Study Habits and Learning Environment	54
Table 4.4 Academic Performance of the Participants	55
Table 4.5 Descriptive Statistics of the EdTech Effectiveness Items	57
Table 4.6 Reliability Statistics for the EdTech Effectiveness Scale	58
Table 4.7 Pearson's Correlation Between the EdTech Effectiveness Composite Score and Current Academic Performance	59
Table 4.8 Model Summary for Simple Linear Regression	60
Table 4.9 ANOVA for the Regression Model	61
Table 4.10 Regression Coefficients	61

Abstract

The increasing integration of online Educational Technology (EdTech) into school education has transformed teaching and learning practices worldwide. Although EdTech is widely used in Bangladesh, empirical evidence regarding its relationship with middle school students' academic performance remains limited. This study examined the relationship between perceived EdTech effectiveness and the current academic performance of middle school students in Bangladesh. Specifically, the study investigated students' patterns of EdTech usage, examined the association between perceived EdTech effectiveness and current academic performance, assessed whether perceived EdTech effectiveness significantly predicted academic performance, and developed evidence-based recommendations for improving technology integration in middle school education.

A quantitative cross-sectional research design was employed. Data were collected from 164 students in Grades 5–8 using a structured online questionnaire administered through Google Forms. Descriptive statistics were used to summarise participants' demographic characteristics, technology usage, study habits, academic performance, and challenges associated with online learning. The internal consistency of the EdTech Effectiveness Scale was assessed using Cronbach's alpha, while Pearson's product moment correlation and simple linear regression were conducted to examine the relationship between the study variables.

The findings indicated that students reported generally positive perceptions of online EdTech effectiveness. The EdTech Effectiveness Scale demonstrated excellent internal consistency (Cronbach's $\alpha = .956$). Pearson correlation analysis revealed a statistically significant positive relationship between perceived EdTech effectiveness and current academic performance. Furthermore, simple linear regression analysis showed that perceived EdTech effectiveness significantly predicted students' current academic performance, explaining a substantial proportion of the variance in the dependent variable.

The study concludes that students who perceive online EdTech as more effective are more likely to report better current academic performance. The findings contribute empirical evidence to the growing literature on EdTech in Bangladesh and provide practical implications for educators, school leaders, policymakers, parents, and EdTech providers seeking to promote more effective technology supported learning among middle school students.

INTRODUCTION

1.1 Background of the Study

Education plays a fundamental role in fostering individual development, promoting social progress, and supporting sustainable national development. In the twenty-first century, rapid technological advancement has significantly transformed educational practices by expanding access to learning resources and creating more flexible, interactive, and learner-centred learning environments. The widespread availability of the internet, digital devices, and online educational platforms has enabled students to access educational content beyond the traditional classroom, making learning more accessible regardless of time and location (UNESCO, 2023). Consequently, Educational Technology (EdTech) has become an increasingly important component of contemporary education systems worldwide.

EdTech refers to the ethical practice of facilitating learning and improving performance through the appropriate use of technological processes and resources (Januszewski & Molenda, 2008). In practice, EdTech includes learning management systems, virtual classrooms, educational websites, mobile learning applications, video-based learning platforms, and other digital tools that support teaching and learning. These technologies provide opportunities for students to learn independently, receive immediate feedback, revisit learning materials, and engage in collaborative learning activities. When integrated with effective pedagogical strategies, EdTech has the potential to enhance students' learning experiences and academic outcomes (Lai & Bower, 2020).

The adoption of EdTech accelerated considerably during the COVID-19 pandemic, when schools worldwide shifted to remote learning to ensure educational continuity. Although many

institutions initially adopted online learning as an emergency response, the experience demonstrated the long-term value of digital learning environments and encouraged greater investment in technology-supported education (UNESCO, 2023). Even after schools resumed face-to-face instruction, many educational institutions continued to use online platforms to distribute learning materials, conduct assessments, facilitate communication, and provide supplementary academic support. As a result, EdTech has become an integral part of learning rather than a temporary alternative to classroom instruction.

A substantial body of international research suggests that technology-supported learning can positively influence students' academic achievement when digital tools are integrated with appropriate instructional practices (Means et al., 2013; Tamim et al., 2011). Meta-analytic studies have reported that online and blended learning environments generally produce equal or better learning outcomes than traditional instruction when supported by effective pedagogy (Means et al., 2013; Tamim et al., 2011). However, previous research also indicates that technology alone does not guarantee improved academic performance (Means et al., 2013; Lai & Bower, 2020). The educational benefits of EdTech depend on factors such as students' meaningful engagement with digital resources, instructional quality, learner motivation, and supportive learning environments (Lai & Bower, 2020; Means et al., 2013).

Several educational theories provide a foundation for understanding how EdTech may influence students' learning. The Technology Acceptance Model (TAM) explains that learners are more likely to use educational technologies when they perceive them as useful and easy to use (Davis, 1989). Constructivist Learning Theory suggests that students actively construct knowledge through interaction, exploration, and collaboration, all of which can be supported by technology-enhanced learning environments (Piaget, 1972; Vygotsky, 1978). Similarly,

Self-Regulated Learning Theory proposes that students who effectively plan, monitor, and regulate their own learning tend to achieve better academic outcomes, particularly in technology-supported learning environments where independent learning plays an important role (Zimmerman, 2008). Together, these theoretical perspectives suggest that students' perceptions of the effectiveness of EdTech may influence how successfully they use digital technologies to support their learning.

In Bangladesh, the use of online educational technology has increased substantially over the past decade due to expanding internet connectivity, greater smartphone ownership, and continued investment in digital education. Following the COVID-19 pandemic, schools, private educational institutions, and EdTech providers increasingly adopted online learning platforms to supplement classroom instruction and support students' academic learning. Consequently, many middle school students now use online educational platforms for concept clarification, examination preparation, homework support, and independent study. Nevertheless, disparities in internet access, device availability, parental support, and home learning environments continue to affect students' opportunities to benefit from online learning, particularly across different socioeconomic contexts (Al-Amin et al., 2021; OECD, 2023).

Despite the growing integration of EdTech into school education, empirical evidence regarding its relationship with the academic performance of middle school students in Bangladesh remains limited. Existing studies have largely focused on higher education, technology adoption, or students' experiences during emergency online learning, while comparatively fewer studies have examined how students' perceived effectiveness of EdTech relates to their academic performance under regular educational conditions. Addressing this gap is important because middle school represents a critical stage during which learners develop

independent study habits and increasingly rely on digital resources to support their education. Therefore, this study investigates the relationship between perceived EdTech effectiveness and the current academic performance of middle school students in Bangladesh. By examining students' patterns of EdTech usage and evaluating whether perceived EdTech effectiveness predicts academic performance, the study aims to generate evidence that may support educators, school administrators, policymakers, parents, and EdTech providers in promoting more effective technology-supported learning.

1.2 Statement of the Problem

The rapid expansion of EdTech has transformed teaching and learning practices across the world. Digital learning platforms have become increasingly integrated into formal education by providing students with flexible access to educational resources, interactive learning opportunities, and personalised learning experiences. Numerous international studies have reported that technology-supported learning can positively influence students' academic achievement when it is supported by appropriate pedagogy and meaningful learner engagement (Means et al., 2013; Tamim et al., 2011). Consequently, governments, educational institutions, and private organisations continue to invest in digital education to improve learning quality and accessibility.

In Bangladesh, the use of online educational platforms has increased considerably over the past decade, particularly following the COVID-19 pandemic. Schools, private educational institutions, and EdTech providers have increasingly incorporated digital platforms into teaching and learning, enabling students to access supplementary educational resources beyond the classroom. As a result, many middle school students regularly use online educational technologies for concept clarification, homework support, examination preparation, and

independent learning. Despite this growing use of digital learning resources, there remains limited empirical evidence regarding whether students who perceive EdTech as effective also demonstrate better academic performance in the Bangladeshi middle school context (Al-Amin et al., 2021).

Most existing studies conducted in Bangladesh have focused on higher education, technology acceptance, online learning experiences during the COVID-19 pandemic, or the challenges associated with digital education. Comparatively fewer studies have examined the relationship between students' perceived effectiveness of EdTech and their academic performance under regular school conditions. Consequently, educators, school administrators, and policymakers continue to have limited evidence regarding the educational value of routine EdTech use among middle school students.

Another limitation in previous research is that educational technology has frequently been measured using simple indicators such as technology access or frequency of use. Although these measures describe students' exposure to technology, they provide limited information about whether learners perceive EdTech as supporting their understanding, motivation, participation, confidence, task completion, and overall learning. Since students' perceptions of educational effectiveness may better reflect the quality of their learning experiences, examining perceived EdTech effectiveness as a composite construct may provide a more comprehensive understanding of how online educational technology relates to academic performance.

Addressing this gap is particularly important because middle school represents a critical stage in students' educational development. During this period, learners gradually become more independent, develop long-term study habits, and increasingly rely on digital resources to

support their learning. Understanding whether students who perceive EdTech as more effective also report better academic performance may provide valuable evidence for improving technology integration within school education.

Therefore, this study examines the relationship between perceived EdTech effectiveness and the current academic performance of middle school students in Bangladesh. Specifically, the study investigates students' patterns of EdTech usage, examines whether perceived EdTech effectiveness is significantly associated with current academic performance, and determines whether perceived EdTech effectiveness significantly predicts students' academic performance. The findings are expected to contribute empirical evidence that supports educators, school leaders, policymakers, parents, and EdTech providers in making informed decisions regarding the effective use of digital technologies in middle school education.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this study is to examine the relationship between perceived EdTech effectiveness and the academic performance of middle school students in Bangladesh.

1.3.2 Specific Objectives

To achieve the general objective, this study aims to:

1. Examine the patterns and extent of EdTech usage among middle school students in Bangladesh.
2. Determine the relationship between perceived EdTech effectiveness and students' current academic performance.
3. Examine whether perceived EdTech effectiveness significantly predicts students' current academic performance.

4. Provide evidence-based recommendations for promoting the effective integration of EdTech in middle school education in Bangladesh.

1.4 Research Questions

The study is guided by the following research questions:

RQ1. What are the patterns and extent of EdTech usage among middle school students in Bangladesh?

RQ2. Is there a statistically significant relationship between perceived EdTech effectiveness and students' current academic performance?

RQ3. Does perceived EdTech effectiveness significantly predict students' current academic performance?

RQ4. What recommendations can be proposed to enhance the effective integration of EdTech in middle school education in Bangladesh?

1.5 Research Hypotheses

The hypotheses of this study are developed based on the Technology Acceptance Model (Davis, 1989), Constructivist Learning Theory (Piaget, 1972; Vygotsky, 1978), Self-Regulated Learning Theory (Zimmerman, 2008), and previous empirical studies that have reported positive associations between meaningful educational technology use and students' academic achievement (Lai & Bower, 2020; Means et al., 2013; Tamim et al., 2011).

Hypothesis 1

Null Hypothesis (H_{01}): There is no statistically significant relationship between perceived EdTech effectiveness and the current academic performance of middle school students in Bangladesh.

Alternative Hypothesis (H_{11}): There is a statistically significant positive relationship between perceived EdTech effectiveness and the current academic performance of middle school students in Bangladesh.

Hypothesis 2

Null Hypothesis (H_{02}): Perceived EdTech effectiveness does not significantly predict the current academic performance of middle school students in Bangladesh.

Alternative Hypothesis (H_{12}): Perceived EdTech effectiveness significantly predicts the current academic performance of middle school students in Bangladesh.

The first hypothesis will be examined using Pearson's product-moment correlation analysis to determine whether a statistically significant relationship exists between perceived EdTech effectiveness and current academic performance. The second hypothesis will be tested using simple linear regression analysis to evaluate whether perceived EdTech effectiveness significantly predicts students' academic performance. These hypotheses directly correspond to the study's research questions and are consistent with the analytical procedures described in Chapter 3 and reported in Chapter 4.

1.6 Significance of the Study

As EdTech continues to become an integral component of school education, there is an increasing need for empirical evidence regarding its contribution to students' academic learning. This study contributes to the existing literature by examining the relationship between perceived EdTech effectiveness and the academic performance of middle school students in Bangladesh. By focusing on this educational stage, the study addresses an important gap in the national literature, where previous research has primarily concentrated on higher education or emergency online learning during the COVID-19 pandemic.

From a theoretical perspective, the study extends the application of the Technology Acceptance Model (Davis, 1989), Constructivist Learning Theory (Piaget, 1972; Vygotsky, 1978), and Self-Regulated Learning Theory (Zimmerman, 2008) within the context of middle school education in Bangladesh. The findings are expected to enhance understanding of how students' perceptions of EdTech effectiveness relate to their academic performance and provide evidence that may support future research on technology-supported learning.

From a practical perspective, the findings may assist teachers and school administrators in making informed decisions regarding the integration of digital learning resources into classroom instruction and independent learning. Understanding students' perceptions of EdTech effectiveness may help educators adopt strategies that encourage meaningful engagement with technology rather than simply increasing technology use. The findings may also support policymakers and educational planners in developing evidence-based initiatives that promote effective and equitable technology integration in schools. Furthermore, parents and EdTech developers may benefit from the findings by gaining a clearer understanding of the factors that contribute to productive technology-supported learning among middle school students.

Finally, this study provides a foundation for future research on Educational Technology in Bangladesh. The methodological approach, particularly the use of a composite measure of perceived EdTech effectiveness and its relationship with academic performance, may serve as a useful reference for studies conducted in different educational settings or with additional variables influencing students' learning outcomes.

1.7 Scope of the Study

This study investigates the relationship between perceived EdTech effectiveness and the current academic performance of middle school students in Bangladesh. Specifically, the study

focuses on students enrolled in Grades 5–8 who use online educational technologies to support their academic learning. It examines students' patterns of EdTech usage, their perceptions of EdTech effectiveness, and the relationship between perceived EdTech effectiveness and current academic performance.

The study is limited to middle school students in Bangladesh and therefore does not include learners from primary, secondary, or higher education. In addition, it focuses exclusively on students' perceptions of EdTech and does not examine other factors that may influence academic performance, such as parental involvement, teacher characteristics, school resources, or socioeconomic status. Consequently, the findings should be interpreted within the context of Bangladeshi middle school education and may not be generalisable to other educational levels or national contexts. Nevertheless, the study provides valuable empirical evidence regarding the role of perceived EdTech in supporting students' academic learning and contributes to the growing body of EdTech research in Bangladesh.

LITERATURE REVIEW

2.1 Introduction

The increasing integration of digital technology into education has transformed teaching and learning practices across the world. EdTech has become an important component of modern education by enabling students to access learning resources, communicate with teachers, complete academic tasks, and participate in learning beyond the traditional classroom. The widespread adoption of online learning during the COVID-19 pandemic further accelerated the use of digital platforms such as Google Classroom, Zoom, Microsoft Teams, and other web-based learning applications. Although many educational institutions have resumed face-to-face instruction, online educational technology continues to play a significant role in supporting teaching, learning, assessment, and student engagement (UNESCO, 2023; OECD, 2023).

EdTech has attracted considerable attention from researchers because of its potential to improve students' learning experiences and academic outcomes. Previous studies suggest that effective use of EdTech can increase learning motivation, classroom participation, collaboration, self-directed learning, and access to educational resources (Tamim et al., 2011; Means et al., 2013). However, research findings also indicate that the effectiveness of EdTech depends on several factors, including students' digital competence, teachers' instructional practices, technological infrastructure, internet accessibility, and institutional support (UNESCO, 2023). Consequently, simply providing access to technology does not guarantee improved academic performance.

In Bangladesh, the use of EdTech expanded rapidly during the COVID-19 pandemic as schools and higher education institutions shifted to virtual instruction. Although this transition created opportunities for educational continuity, it also exposed challenges related to digital inequality, limited internet access, inadequate technological resources, and varying levels of digital readiness among teachers and students (Al-Amin et al., 2021). Most existing studies conducted in Bangladesh have focused on higher education and emergency remote teaching, while relatively little empirical evidence is available regarding middle school students' experiences with EdTech. This indicates a need for further research that examines how students perceive the effectiveness of EdTech and whether such perceptions are associated with their academic performance.

The present study investigates the relationship between perceived EdTech effectiveness and current academic performance among middle school students in Bangladesh. To establish the theoretical and empirical foundation of the study, this chapter reviews the relevant literature. It first discusses the concept of EdTech followed by the concept of academic performance. The chapter then presents the theoretical framework underpinning the study, reviews relevant international and Bangladeshi empirical studies, identifies the existing research gap, and concludes with the conceptual framework guiding the research.

2.2 Concept of Educational Technology (EdTech)

EdTech refers to the systematic application of technological resources, instructional strategies, and educational theories to facilitate teaching, learning, and performance improvement. Rather than focusing solely on digital devices or software, educational technology encompasses the design, development, implementation, management, and evaluation of learning processes that utilise appropriate technological resources to achieve educational objectives. The

Association for Educational Communications and Technology (AECT) defines educational technology as “the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources” (Januszewski & Molenda, 2008). This definition highlights that technology should be integrated into education with clear pedagogical purposes rather than being used merely as a technological innovation.

The concept of EdTech has evolved considerably over the past few decades. Earlier perspectives primarily viewed technology as audiovisual equipment used to support classroom instruction. Contemporary perspectives, however, recognise educational technology as a learner-centred approach that integrates digital technologies with evidence-based teaching practices to enhance students' learning experiences. According to UNESCO (2023), educational technology includes digital platforms, online learning environments, learning management systems, mobile applications, artificial intelligence, and other technological resources that support teaching, assessment, collaboration, and student engagement. Importantly, UNESCO emphasises that technology should complement effective pedagogy and strengthen, rather than replace, the role of teachers.

EdTech offers several potential educational benefits when appropriately implemented. It enables flexible access to learning resources, promotes interactive and collaborative learning, facilitates timely feedback, supports personalised instruction, and encourages students to become more active participants in the learning process. Previous research has also shown that technology-enhanced learning environments can improve students' motivation, engagement, and knowledge acquisition when supported by appropriate instructional design (Tamim et al., 2011; Means et al., 2013). Nevertheless, these benefits are not guaranteed, as the effectiveness of

EdTech depends on factors such as teachers' pedagogical competence, students' digital literacy, technological infrastructure, and institutional support.

In the context of the present study, EdTech refers specifically to online EdTech used to support middle school students' learning. The study focuses on students' perceived effectiveness of these technologies in improving their understanding, motivation, participation, study habits, examination preparation, and overall learning support. This perspective is consistent with the view that the educational value of technology should be assessed not by its availability alone, but by the extent to which it contributes to meaningful learning and improved academic performance.

2.3 Online Educational Technology in School Education

EdTech refers to the use of internet-based digital platforms and applications to facilitate teaching, learning, communication, assessment, and academic support. Unlike traditional classroom instruction, online educational technology enables students to access educational resources beyond the physical classroom through learning management systems (LMS), virtual classrooms, educational applications, and digital assessment platforms. Over the past decade, the integration of these technologies into school education has increased substantially, particularly following the COVID-19 pandemic, which accelerated the digital transformation of education worldwide. According to the OECD (2023), digital education is no longer viewed merely as the use of technological devices but as the creation of an effective digital education ecosystem where technology supports teaching, learning, assessment, and educational management.

In school education, EdTech is commonly implemented through synchronous and asynchronous learning approaches. Synchronous learning allows teachers and students to interact in real time using platforms such as Zoom, Google Meet, and Microsoft Teams, whereas

asynchronous learning enables students to access recorded lectures, digital learning materials, online assignments, and discussion forums at their own pace. The combination of these approaches provides greater flexibility and encourages students to review learning materials whenever necessary, thereby supporting continuous learning beyond school hours. UNESCO (2023) argues that when appropriately integrated into classroom instruction, digital technologies can improve learning opportunities by increasing access to educational resources, strengthening collaboration, and providing timely feedback. However, technology itself does not improve learning unless it is supported by effective pedagogy and meaningful classroom practices.

One of the major advantages of online educational technology is its ability to promote student-centred learning. Digital learning environments provide students with opportunities to explore learning materials independently, participate in interactive activities, monitor their own progress, and communicate with teachers and peers. Previous research has shown that technology-enhanced instruction can improve student engagement, learning motivation, and academic achievement when it is integrated with appropriate instructional strategies rather than being used solely for content delivery (Means et al., 2013; Tamim et al., 2011). These findings suggest that the educational value of technology depends not only on its availability but also on how effectively it is used to support learning.

Despite these potential benefits, several challenges influence the successful implementation of EdTech in school education. Limited internet connectivity, unequal access to digital devices, insufficient digital literacy, and inadequate teacher training may reduce students' opportunities to benefit from technology-supported learning. Furthermore, excessive dependence on digital platforms without effective instructional planning may decrease students' attention, interaction, and learning motivation. Consequently, recent educational literature emphasises that

technology should complement, rather than replace, quality teaching practices and meaningful teacher-student interaction (OECD, 2023; UNESCO, 2023).

Within the context of Bangladesh, EdTech has become increasingly common in school education through platforms such as Google Classroom, Zoom, Facebook groups, YouTube, and other digital learning applications. Nevertheless, differences in technological access and educational support continue to influence students' learning experiences. Therefore, understanding how students perceive the effectiveness of online educational technology is important for determining whether these technologies contribute to improved academic performance. Consistent with this perspective, the present study examines students' perceived effectiveness of EdTech, rather than merely measuring the frequency of technology use, as a predictor of their current academic performance.

2.4 Academic Performance

Academic performance refers to the extent to which students achieve their intended educational outcomes through learning activities and academic assessments. It is commonly regarded as an important indicator of educational success because it reflects students' knowledge, skills, and competencies acquired over a specific period of study. Academic performance is typically evaluated using examination scores, grade point averages (GPA), classroom assessments, assignment completion, and teachers' evaluations. In educational research, it is frequently used as the dependent variable to examine the influence of various cognitive, behavioural, social, and technological factors on students' learning outcomes (York et al., 2015).

Academic performance is influenced by multiple interrelated factors rather than a single determinant. Previous studies have identified students' motivation, learning strategies,

self-regulation, classroom engagement, parental support, socio-economic background, teacher quality, and access to learning resources as significant contributors to academic achievement (Sirin, 2005; Zimmerman, 2008). In recent years, educational technology has also emerged as an important factor because digital learning environments can improve students' access to educational resources, increase learning flexibility, facilitate communication with teachers, and provide opportunities for independent learning. However, research suggests that technology contributes to academic performance only when it is integrated with effective instructional practices and actively supports students' learning processes (Means et al., 2013).

The measurement of academic performance varies depending on the objectives and design of a study. While some researchers use official examination records or grade point averages, others employ students' self-reported academic performance, particularly when institutional records are inaccessible or when the research focuses on students' perceptions and learning experiences. Previous educational research has shown that self-reported academic performance is generally considered a reliable proxy for actual academic achievement when respondents are assured of confidentiality and the data are collected through structured questionnaires (Kuncel et al., 2005). Consequently, self-reported academic performance has been widely used in educational and behavioural research.

In the present study, current academic performance is used as the dependent variable and is measured through students' self-reported academic achievement. This measure is appropriate because the study seeks to examine whether students who perceive EdTech as more effective also report better academic performance. Accordingly, academic performance is conceptualised as students' perceived level of current academic achievement, allowing the study to investigate

its relationship with perceived EdTech effectiveness using Pearson product-moment correlation and simple linear regression analyses.

2.5 Theoretical Framework

The present study is grounded in three complementary theoretical perspectives: the Technology Acceptance Model (TAM), Constructivist Learning Theory, and Self-Regulated Learning Theory. Together, these theories provide a comprehensive framework for understanding how students' perceptions of online educational technology may influence their academic performance. While TAM explains students' acceptance and perceived usefulness of educational technology, Constructivist Learning Theory emphasises active knowledge construction through meaningful learning experiences, and Self-Regulated Learning Theory highlights learners' ability to manage and monitor their own learning. The integration of these theories provides a suitable conceptual foundation for examining the relationship between perceived EdTech effectiveness and academic performance among middle school students.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), proposed by Davis (1989), is one of the most widely used theories for explaining individuals' acceptance and use of information technology. According to TAM, two key beliefs; perceived usefulness and perceived ease of use; influence users' attitudes towards technology, which subsequently affect their intention to use and actual use of technological systems. Perceived usefulness refers to the extent to which individuals believe that using a particular technology enhances their performance, whereas perceived ease of use refers to the degree to which technology is considered easy to understand and operate (Davis, 1989).

In educational settings, TAM has been extensively applied to explain students' acceptance of online learning platforms, learning management systems, and other digital learning technologies. Research suggests that students are more likely to engage with EdTech when they perceive them as useful for improving learning, increasing efficiency, and supporting academic success. Conversely, if students perceive technology as difficult to use or ineffective, they are less likely to benefit from technology enhanced learning environments.

The present study aligns closely with TAM because it focuses on students' perceived effectiveness of online educational technology. Rather than measuring the frequency of technology use, the study examines whether students believe that EdTech enhances their understanding, motivation, participation, study habits, examination preparation, and overall learning. These perceptions reflect the concept of perceived usefulness proposed in TAM and are expected to influence students' academic performance.

Constructivist Learning Theory

Constructivist Learning Theory, primarily associated with Piaget (1972) and later expanded by Vygotsky (1978), proposes that learners actively construct knowledge through interaction with their environment rather than passively receiving information from teachers. Learning occurs when students engage in meaningful activities, solve problems, collaborate with others, and connect new knowledge with their prior experiences.

EdTech supports constructivist learning by providing students with opportunities to explore digital resources, participate in collaborative discussions, access multimedia learning materials, and receive immediate feedback. Interactive learning environments encourage students to become active participants in the learning process instead of passive recipients of information. Features such as discussion forums, collaborative assignments, educational videos, simulations,

and interactive quizzes can enhance students' conceptual understanding and promote deeper learning.

From a constructivist perspective, the educational value of technology depends on how effectively it facilitates active learning and meaningful engagement. Therefore, students who perceive EdTech as supportive of their learning are expected to demonstrate higher levels of academic achievement. This theoretical perspective complements the objectives of the present study by explaining how technology enhanced learning experiences may contribute to improved academic performance.

Self-Regulated Learning Theory

Self-Regulated Learning (SRL) Theory, developed by Zimmerman (2008), emphasises learners' active role in planning, monitoring, and evaluating their own learning processes. According to this theory, successful learners set academic goals, manage their study time, monitor their progress, employ appropriate learning strategies, and reflect on their learning outcomes. Self-regulated learning is particularly important in digital learning environments because students often have greater responsibility for organising and completing learning activities independently.

EdTech provides various tools that can support self-regulated learning. Digital calendars, recorded lessons, online assignments, progress tracking systems, and immediate feedback enable students to organise their studies more effectively and monitor their academic progress. Students who use these resources strategically are generally more capable of maintaining motivation, completing academic tasks, and achieving better learning outcomes.

In the context of the present study, students who perceive EdTech as helpful for organising their learning, completing assignments, preparing for examinations, and improving

study habits are expected to report higher academic performance. Thus, Self-Regulated Learning Theory explains one of the possible mechanisms through which perceived EdTech effectiveness may contribute to students' educational success.

Integration of the Theoretical Framework

Although each theory explains different aspects of technology-supported learning, together they provide a comprehensive framework for the present study. TAM explains why students are willing to engage with EdTech by focusing on its perceived usefulness. Constructivist Learning Theory explains how meaningful interaction with digital learning environments facilitates knowledge construction and active learning. Self-Regulated Learning Theory further explains how students' ability to manage and monitor their own learning influences the educational benefits they obtain from technology. Collectively, these theories support the assumption that students who perceive EdTech as effective are more likely to engage actively in learning, develop productive study behaviours, and demonstrate better academic performance. Accordingly, these theoretical perspectives provide the foundation for examining the relationship between perceived online educational technology effectiveness and current academic performance in the present study.

2.6 Empirical Literature

2.6.1 International Empirical Studies

The integration of EdTech into teaching and learning has attracted considerable attention among researchers worldwide. Numerous empirical studies have examined whether digital technologies improve students' academic performance, engagement, and learning experiences. Overall, international evidence suggests that online educational technology can positively

influence academic outcomes when it is supported by effective instructional design, active learner participation, and appropriate teacher guidance.

One of the most influential studies in this field is the second-order meta-analysis conducted by Tamim et al. (2011). By synthesizing findings from more than one thousand empirical studies, the authors found that EdTech has a positive and statistically significant effect on students' learning outcomes. The study emphasized that technology contributes most effectively to learning when it is integrated with sound pedagogical practices rather than used as a replacement for classroom instruction.

Similarly, Means et al. (2013) examined the effectiveness of online and blended learning through a meta-analysis of empirical research. Their findings indicated that students participating in online or blended learning environments generally demonstrated better academic performance than those receiving exclusively face-to-face instruction. The researchers attributed these improvements to increased learner interaction, flexible access to learning materials, and opportunities for self-paced learning.

Beyond individual empirical studies, international policy reports also support the educational value of digital technology while emphasizing the conditions necessary for its effective implementation. The OECD Digital Education Outlook 2023 highlights that digital technologies can enhance personalised learning, facilitate collaboration, and improve access to educational resources. However, the report stresses that technology alone does not guarantee improved learning outcomes. Rather, its effectiveness depends on teacher competence, appropriate instructional design, reliable digital infrastructure, and equitable access to technological resources.

Likewise, the UNESCO Global Education Monitoring Report 2023 concludes that technology should function as a tool to support teaching and learning instead of replacing teachers. While digital technologies can expand educational opportunities and increase access to learning resources, their educational benefits depend largely on how they are integrated into pedagogy. The report also cautions that unequal access to digital devices, internet connectivity, and digital literacy may widen educational inequalities if these challenges remain unaddressed.

Collectively, international literature demonstrates that EdTech has substantial potential to improve students' academic performance and learning experiences. Nevertheless, these positive outcomes are consistently associated with effective pedagogy, learner engagement, teacher preparedness, and equitable access to digital resources rather than with the mere availability of technology. These findings provide an important theoretical and empirical foundation for examining the relationship between perceived EdTech effectiveness and academic performance among middle school students in Bangladesh.

2.6.2 Empirical Studies in Bangladesh

Research on EdTech in Bangladesh has expanded considerably over the past few years, particularly following the COVID-19 pandemic. Most empirical studies have focused on higher education, investigating students' readiness, participation, learning experiences, and challenges associated with online learning. Although these studies provide valuable insights into technology-supported education, evidence concerning middle school students remains limited.

One of the earliest large-scale studies was conducted by Al-Amin et al. (2021), who surveyed 844 university students from different higher educational institutions in Bangladesh. The findings revealed that students generally recognized the importance of online education in ensuring continuity of learning during the pandemic. However, they experienced several barriers,

including poor internet connectivity, limited access to digital devices, frequent electricity disruptions, reduced classroom interaction, and difficulty understanding course content through online platforms. These challenges negatively affected students' participation and overall learning experiences. The authors concluded that improving technological infrastructure and ensuring greater digital accessibility are essential for enhancing the effectiveness of online education in Bangladesh.

Similarly, Hosen et al. (2022) examined the impact of the COVID-19 pandemic on tertiary education in Bangladesh through interviews and questionnaire data collected from university students. The study reported that although online learning enabled educational activities to continue during institutional closures, many students experienced decreased motivation, psychological stress, financial hardship, and technological limitations. These factors collectively influenced students' learning experiences and academic engagement, indicating that successful implementation of online education requires both technological support and appropriate institutional policies.

From the teachers' perspective, Ahmmed et al. (2022) investigated the effectiveness of a need-based teacher training programme designed to improve online teaching in primary and secondary educational institutions. Using a mixed-method approach, the researchers found that many teachers initially faced challenges related to digital skills, online classroom management, internet connectivity, and preparation of instructional materials. However, after receiving structured training, teachers demonstrated greater confidence, improved instructional practices, and enhanced ability to conduct online classes effectively. The findings highlight that teacher preparedness plays a critical role in determining the success of technology-supported education.

Overall, empirical evidence from Bangladesh indicates that EdTech has considerable potential to support teaching and learning when adequate technological infrastructure, institutional support, and teacher competence are available. Nevertheless, the existing literature is largely concentrated on higher education and the emergency transition to online learning during the COVID-19 pandemic. Empirical studies examining middle school students' perceptions of online educational technology effectiveness and its relationship with academic performance remain scarce. Therefore, the present study addresses this important gap by investigating whether students' perceived effectiveness of EdTech influences their current academic performance among middle school students in Bangladesh.

2.7 Research Gap

The review of international and Bangladeshi literature indicates that EdTech has become an important area of educational research. Existing studies generally report that technology supported learning can enhance students' engagement, motivation, collaboration, and academic performance when it is integrated with effective pedagogical practices (Means et al., 2013; Tamim et al., 2011). However, the literature also demonstrates that the effectiveness of educational technology depends on students' perceptions, teacher competence, technological infrastructure, and the quality of instructional design rather than technology alone.

Despite these contributions, several important gaps remain. First, although international research on EdTech is extensive, much of it has been conducted in developed countries and higher education settings. Comparatively fewer studies have focused specifically on middle school learners, whose developmental characteristics and learning needs differ from those of university students. Recent reviews have also highlighted the need for more evidence on effective online pedagogy for middle-grade students.

Second, the Bangladeshi literature remains relatively limited. Most empirical studies have examined online learning during the COVID-19 pandemic and have concentrated primarily on university students. Their main focus has been students' readiness, satisfaction, engagement, challenges, or access to digital learning, rather than school-level learners or long-term educational outcomes.

Third, previous Bangladeshi studies have rarely examined students' perceived effectiveness of EdTech as an independent construct. Instead, researchers have generally investigated technology adoption, online learning experiences, or barriers to participation. Consequently, limited evidence exists regarding whether students who perceive EdTech as more effective also demonstrate better academic performance.

Finally, few studies have examined this relationship among middle school students in Bangladesh using simple correlational and predictive analyses. Most existing studies have employed more complex models to explain satisfaction, engagement, or technology acceptance, while comparatively little attention has been given to the direct association between perceived EdTech effectiveness and current academic performance.

To address these gaps, the present study investigates the relationship between perceived EdTech effectiveness and current academic performance among middle school students in Bangladesh. Using descriptive statistics, Pearson product–moment correlation, and simple linear regression, the study provides empirical evidence on whether students' perceptions of EdTech are significantly associated with their academic performance. By focusing on middle school learners within the Bangladeshi context, the study extends the existing literature and contributes evidence from an educational level that has received comparatively limited research attention.

2.8 Conceptual Framework

The conceptual framework of the present study is developed from the Technology Acceptance Model (Davis, 1989), Constructivist Learning Theory (Piaget, 1972; Vygotsky, 1978), and Self-Regulated Learning Theory (Zimmerman, 2008). Collectively, these theories suggest that students who perceive EdTech as useful and supportive are more likely to engage actively in learning, regulate their study behaviours effectively, and achieve better academic outcomes.

Accordingly, the study proposes that Perceived EdTech Effectiveness serves as the independent variable, while Current Academic Performance serves as the dependent variable. Perceived online educational technology effectiveness is measured through students' perceptions regarding whether online educational technology improves their understanding, learning motivation, classroom participation, study habits, concentration, confidence, task completion, examination preparation, and overall learning support. Current academic performance reflects students' self-reported level of academic achievement.

Based on this framework, the study hypothesises that students with more positive perceptions of EdTech effectiveness are more likely to report higher levels of current academic performance. This conceptual relationship provides the foundation for the statistical analyses presented in the subsequent chapters.

MATERIALS AND METHODOLOGY

This chapter describes the materials and methodological procedures used to investigate the relationship between students' perceptions of EdTech effectiveness and their current academic performance. It presents the research instrument, research location, participant selection, data collection procedures, and statistical techniques used to analyse the collected data.

3.1 Research Materials

The primary research instrument used in this study was a structured questionnaire designed to collect quantitative data from middle school students in Bangladesh. The questionnaire was prepared in both English and Bangla to ensure that participants could clearly understand the questions and provide accurate responses. It was administered online through Google Forms.

The research instrument consisted of 35 items organised into six sections. Section A collected participants' demographic information. Section B examined students' access to technology and their use of online Educational Technology. Section C focused on students' study habits and learning environments. Section D measured students' perceptions of the effectiveness of online EdTech. Section E collected information related to students' academic performance, while Section F examined the challenges and barriers students experienced when participating in online learning. The structure of the questionnaire is presented in Table 3.1.

Table 3.1: Structure of the Research Instrument

Section	Construct	Item Numbers	Number of Items	Measurement Scale
A	Demographic Information	1–9	9	Categorical and multiple-choice responses
B	Access to Technology and EdTech Usage	10–14	5	Categorical and multiple-choice responses
C	Study Habits and Learning Environment	15–18	4	Categorical and multiple-choice responses
D	Perceived Online Educational Technology (EdTech) Effectiveness	19–28	10	Five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)
E	Academic Performance	29–32	4	Categorical, ordinal, and multiple-response items

F	Challenges and Barriers to Online Learning	33–35	3	Five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)
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Note. The questionnaire contained a total of 38 items.

The questionnaire included both categorical and scaled response items. The ten items in Section D were measured using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. These items assessed students' perceptions of different aspects of EdTech, including its usefulness, accessibility, contribution to understanding lessons, support for independent learning, and influence on motivation and academic learning.

The ten Likert-scale items in Section D were combined to create the composite variable EdTech Effectiveness (`edtech_effectiveness`). This composite variable served as the independent variable in the correlation and regression analyses. The variable 'current_performance', which represented students' self-reported current academic performance, served as the dependent variable in the regression analysis. The operationalisation of these variables is presented in Table 3.2.

Table 3.2: Operationalisation of the Study Variables

Variable	Variable Type	Measurement
EdTech Effectiveness (<code>edtech_effectiveness</code>)	Independent variable	Composite variable computed from the ten Likert-scale items measuring students' perceived effectiveness of online Educational Technology (Items 19–28)
Current Performance (<code>current_performance</code>)	Dependent variable	Students' self-reported current academic performance, as measured by the questionnaire

		and used as the dependent variable in the regression analysis
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To establish the content validity of the research instrument, the questionnaire was reviewed by the researcher's thesis supervisor prior to data collection. The review focused on the relevance, clarity, wording, and alignment of each questionnaire item with the research objectives and study constructs. Based on the thesis supervisor's feedback, revisions were made to improve the organisation, wording, and overall clarity of the instrument. Although a separate pilot study was not conducted, this expert review helped ensure that the questionnaire adequately represented the constructs under investigation and was appropriate for addressing the objectives of the study.

The internal consistency of the ten Likert-scale items used to construct the composite variable 'edtech_effectiveness' was examined using Cronbach's Alpha. The analysis produced a Cronbach's Alpha coefficient of .956, indicating excellent internal consistency. This result suggested that the ten items reliably measured students' perceived effectiveness of EdTech and were appropriate for creating the composite variable used in the subsequent correlation and regression analyses.

3.2 Research Location

The study was conducted in Bangladesh and focused on middle school students enrolled in Grades 5–8. Rather than being confined to a single school or locality, the study included participants from urban, semi-urban, and rural areas to obtain a broader understanding of students' experiences with EdTech. The inclusion of participants from different geographical settings increased the diversity of the sample and enabled the study to reflect variations in access to digital technologies and online learning opportunities across different communities.

The questionnaire was administered online using Google Forms, allowing eligible participants from different regions of Bangladesh to complete the survey regardless of their geographical location. The survey link was distributed electronically through educational networks and digital communication channels commonly used by students and their parents. This approach enabled the researcher to reach participants efficiently while maintaining a standardised data collection procedure for all respondents.

Bangladesh has experienced a rapid expansion of digital learning opportunities in recent years; however, disparities in internet connectivity, access to digital devices, and educational resources continue to exist across different residential settings. Students living in urban areas generally have greater access to technological resources than those residing in semi-urban or rural communities. Therefore, including participants from different geographical locations allowed the study to capture a wider range of experiences with EdTech and enhanced the contextual relevance of the findings.

Although the study did not aim to compare students across geographical regions, collecting data from participants residing in different areas contributed to the diversity of the sample and strengthened the applicability of the findings within the context of middle school education in Bangladesh.

3.3 Participants

The target population for this study consisted of middle school students in Bangladesh who had experience using EdTech as part of their learning. To ensure that participants could provide relevant information related to the research objectives, the study included only students enrolled in Grades 5–8 who had used at least one online educational platform during the six

months preceding the survey. Students who had not used any online educational platform during this period were not eligible to participate.

A convenience sampling technique was employed to recruit participants. This non-probability sampling method was considered appropriate because it enabled the researcher to recruit students who met the inclusion criteria within the available time frame. As the study was conducted through an online survey, convenience sampling also facilitated access to participants from different educational settings and residential areas across Bangladesh.

The final sample consisted of 164 students. Demographic information was collected regarding gender, age, grade level, school type, residential area, monthly family income, and parents' educational qualifications. These variables were used to describe the characteristics of the participants and provide contextual information about the study sample. They were not treated as primary variables in the hypothesis testing.

Participation was voluntary, and parental or guardian consent and student assent were obtained before participation. To protect participants' privacy, no personally identifiable information, such as names, telephone numbers, or email addresses, was collected. All responses were treated confidentially and analysed in aggregate form.

The sample size of 164 participants was considered adequate for the statistical analyses conducted in this study, including descriptive statistics, reliability analysis, Pearson's product moment correlation, and simple linear regression. The sample provided sufficient data to examine the relationship between perceived EdTech effectiveness and current academic performance among middle school students in Bangladesh.

3.4 Data Collection

Data were collected using a structured online questionnaire administered through Google Forms. An online survey was selected because it provided an efficient and accessible means of reaching middle school students from different geographical locations across Bangladesh. It also ensured that all participants received the same questionnaire and completed it through a standardised procedure.

Data collection took place over a ten-day period from 11 July to 20 July 2026. During this period, the survey link was distributed electronically through educational networks and digital communication channels commonly used by students and their parents or guardians. Participants accessed the questionnaire using internet-enabled devices such as smartphones, tablets, laptops, or desktop computers. Google Forms automatically recorded and stored the responses in a digital format, which facilitated data management and reduced the possibility of manual data-entry errors.

Before beginning the questionnaire, participants were presented with an introductory statement explaining the purpose of the study, the voluntary nature of participation, the intended use of the collected information, and the confidentiality of their responses. They were informed that the research was being conducted as part of the requirements for the Master of Arts in Education programme at the Asian University for Women and that the information would be used solely for academic research purposes.

As the participants were minors, parental or guardian consent was obtained before participation, and student assent was also secured. Participants were informed that they could discontinue the survey at any time without penalty or adverse consequences.

A screening question at the beginning of the questionnaire asked whether the student had used any online educational platform during the previous six months. Only students who answered “Yes” were permitted to proceed to the remaining sections. This procedure ensured that all respondents met the eligibility criteria and had relevant experience with EdTech.

All required questions had to be completed before submission. Consequently, every submitted questionnaire contained complete responses, and no cases were excluded because of missing data. At the end of the data collection period, 164 valid responses had been obtained.

Following data collection, the responses were downloaded from Google Forms and organised in Microsoft Excel for preliminary coding and verification. The dataset was then imported into the Statistical Package for the Social Sciences (SPSS) for analysis. Before conducting the statistical analyses, the researcher reviewed the dataset to ensure coding accuracy, consistency, and completeness. All 164 responses were retained for analysis.

3.5 Data Analysis

The quantitative data collected through the questionnaire were analysed using the SPSS. Prior to conducting the statistical analyses, the dataset was screened for completeness and coding accuracy. Responses were coded according to their respective measurement scales, and the dataset was examined to identify any inconsistencies or missing values. As all questionnaires had been completed in full through Google Forms, no cases required exclusion because of incomplete responses.

Descriptive statistics were first employed to summarise the characteristics of the participants and the variables included in the study. Frequencies and percentages were used to describe categorical variables such as gender, grade level, school type, residential area, family income, and parents' educational qualifications. Means and standard deviations were calculated for the continuous and composite variables to provide an overall description of participants' responses and the distribution of the study variables.

Reliability analysis was conducted for the ten Likert-scale items used to construct the composite variable EdTech Effectiveness. The analysis produced a Cronbach's Alpha coefficient of .956, indicating excellent internal consistency. This result suggested that the items reliably measured students' perceived effectiveness of EdTech and were appropriate for creating the composite variable used in the subsequent correlation and regression analyses.

To examine the relationship between the study variables, Pearson product-moment correlation analysis was conducted. This analysis was selected because it is appropriate for determining the strength and direction of the linear relationship between two quantitative variables. In the present study, Pearson correlation was used to examine the relationship between the composite variable 'edtech_effectiveness' and students' 'current_performance'.

Following the correlation analysis, simple linear regression was performed to determine whether students' perceived EdTech effectiveness significantly predicted their current academic performance. In the regression model, the composite variable 'edtech_effectiveness' was specified as the independent variable, whereas 'current_performance' was specified as the dependent variable. The analysis was conducted to determine whether students' perceived effectiveness of EdTech significantly predicted their current academic performance and to identify the proportion of variance in current performance explained by the regression model.

For all inferential statistical analyses, the level of statistical significance was set at $p < .05$. Results with probability values below this threshold were considered statistically significant. The findings obtained from the descriptive statistics, reliability analysis, Pearson product–moment correlation, and simple linear regression are presented and interpreted in Chapter Four.

The selected statistical techniques were consistent with the quantitative research design and aligned with the objectives of the study. Together, these analyses provided a comprehensive understanding of the participants' characteristics and enabled the researcher to examine the relationship between perceived EdTech effectiveness and current academic performance among middle school students in Bangladesh.

RESULTS

4.1 Introduction

This chapter presents the findings of the study based on data collected from 164 middle school students in Bangladesh. The results are organized according to the research objectives presented in Chapter One. The chapter begins with a description of the demographic characteristics of the participants, followed by findings related to students' access to EdTech, study habits, academic performance, and challenges associated with the use of EdTech. Descriptive statistics are then presented to summarize participants' responses regarding the perceived effectiveness of EdTech and related barriers. Finally, the reliability of the EdTech Effectiveness Scale is reported, followed by Pearson correlation and simple linear regression analyses to examine the relationship between students' perceived effectiveness of EdTech and their current academic performance.

4.2 Demographic Characteristics of the Participants

The demographic characteristics of the participants are presented in Table 4.1. A total of 164 middle school students participated in this study. The demographic information includes gender, age, grade level, school type, place of residence, monthly family income, and parents' educational qualifications.

Table 4.1: Demographic Characteristics of the Participants (N = 164)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	102	62.2
	Female	62	37.8
	10 years	2	1.2

Age	11 years	50	30.5
	12 years	81	49.4
	13 years	25	15.2
	14 years	6	3.7
Grade Level	Grade 5	29	17.7
	Grade 6	59	36.0
	Grade 7	37	22.6
	Grade 8	39	23.8
Type of School	Government School	44	26.8
	Private Bangla Medium School	84	51.2
	English Medium School	31	18.9
	Madrasa	3	1.8
	Other	2	1.2
Residential Area	Urban	82	50.0
	Semi-Urban	44	26.8
	Rural	38	23.2
Approximate Monthly Family Income	Below 15,000 BDT	4	2.4
	15,000–30,000 BDT	31	18.9
	30,001–50,000 BDT	54	32.9
	Above 50,000 BDT	75	45.7
Highest Educational Qualification of Father/Guardian	Secondary Education	5	3.0
	Higher Secondary Education	26	15.9
	Undergraduate Degree or Above	133	81.1
	Primary Education	1	0.6

Highest Educational Qualification of Mother/Guardian	Secondary Education	5	3.0
	Higher Secondary Education	31	18.9
	Undergraduate Degree or Above	127	77.4

Note. Data derived from the participants' demographic responses. Percentages are based on the total number of participants. Categories with zero responses (e.g., No formal education and I don't know for parental education; Prefer not to say for monthly family income) are not presented in the table because no participant selected these response options. School type, residential area, income, and parental education categories are based on the questionnaire used in this study.

Table 4.1 shows that the study included 164 middle school students, of whom 102 (62.2%) were male and 62 (37.8%) were female. With respect to age, the largest proportion of participants was 12 years old (49.4%), followed by 11 years (30.5%), 13 years (15.2%), and 14 years (3.7%), while only 1.2% of the participants were 10 years old.

Regarding grade level, Grade 6 students constituted the largest group (36.0%), followed by Grade 8 (23.8%), Grade 7 (22.6%), and Grade 5 (17.7%). Overall, the demographic profile indicates that the sample included participants from different age groups and grade levels, providing representation across the targeted middle school population included in this study.

Table 4.1 (continued) presents the educational and socioeconomic characteristics of the participants. More than half of the respondents (51.2%) attended Private Bangla Medium Schools, followed by Government Schools (26.8%) and English Medium Schools (18.9%). Only a small proportion of participants studied in Madrasas (1.8%) or other educational institutions (1.2%), indicating that the sample primarily represented students enrolled in mainstream school systems.

Regarding residential area, 50.0% of the participants lived in urban areas, while 26.8% resided in semi-urban areas and 23.2% came from rural areas, suggesting that the study included respondents from diverse geographical settings. In terms of socioeconomic background, the largest proportion of participants (45.7%) reported a monthly family income of above 50,000 BDT, followed by 30,001–50,000 BDT (32.9%), 15,000–30,000 BDT (18.9%), and below 15,000 BDT (2.4%).

The findings also indicate relatively high parental educational attainment among the participants. Most fathers or guardians (81.1%) had completed an undergraduate degree or above, while 15.9% had completed higher secondary education and 3.0% had completed secondary education. Similarly, 77.4% of mothers or guardians had attained an undergraduate degree or above, followed by 18.9% with higher secondary education, 3.0% with secondary education, and 0.6% with primary education. Overall, the demographic profile suggests that the participants represented a range of educational institutions, residential locations, and socioeconomic backgrounds, although the majority came from comparatively well-educated families.

4.3 Access to Online Educational Technology

This section presents the participants' access to EdTech, including the frequency of using EdTech, type of internet connection, ownership of digital devices, primary device used for online learning, and the extent of internet related interruptions experienced during online learning. These findings provide an overview of the technological resources available to the participants and establish the context for understanding their use of online educational technology.

Table 4.2: Access to Online Educational Technology (N = 164)

Variable	Category	n	%
Frequency of using online educational technology	Less than once per week	7	4.3
	Once per week	3	1.8
	2–3 days per week	20	12.2
	4–6 days per week	80	48.8
	Daily	54	32.9
Type of internet connection	Home Wi-Fi	146	89.0
	Mobile Data	18	11.0
Device ownership	Own device	69	42.1
	Shared family device	75	45.7
	No personal device	20	12.2
Primary device used for online learning	Smartphone	89	54.3
	Tablet	19	11.6
	Laptop	56	34.1
Internet-related interruptions during online learning	Never	19	11.6
	Less than once per month	41	25.0
	1–3 times per month	54	32.9
	1–2 times per week	32	19.5
	Almost every day	18	11.0

Table 4.2 presents the participants' access to EdTech and their patterns of technology use. Regarding the frequency of EdTech use, nearly half of the participants (48.8%) reported using

EdTech 4–6 days per week, while 32.9% indicated that they used these platforms daily. In contrast, only 4.3% reported using EdTech less than once per week, and 1.8% used them once per week. These findings indicate that the majority of participants engaged with EdTech on a regular basis.

In terms of internet access, 89.0% of the participants reported using Home Wi-Fi as their primary source of internet connectivity, whereas 11.0% relied on Mobile Data. No participant reported using School Internet, Community Internet, or Other internet sources as their primary means of access. This suggests that most students depended on home-based internet connections for online learning.

Regarding device availability, 45.7% of the participants reported using a shared family device, while 42.1% owned a personal device for online learning. A smaller proportion (12.2%) indicated that they did not have their own device. With respect to the primary device used for online learning, smartphones were the most commonly used devices (54.3%), followed by laptops (34.1%) and tablets (11.6%). No respondents reported using desktop computers or other devices as their primary learning device. These findings demonstrate that mobile devices, particularly smartphones, played a central role in supporting students' participation in online learning.

The findings also reveal that internet related interruptions varied among the participants. The largest proportion (32.9%) reported experiencing interruptions 1–3 times per month, followed by 25.0% who experienced interruptions less than once per month. Meanwhile, 19.5% reported interruptions 1–2 times per week, 11.6% experienced no interruptions, and 11.0% encountered interruptions almost every day. Overall, the results suggest that although most

participants had regular access to EdTech, internet connectivity problems continued to affect the online learning experience of a proportion of students.

4.4 Study Habits and Learning Environment

This section presents the participants' study habits and learning environment, including whether they received private tutoring, the amount of time they spent using EdTech each day outside school hours, the level of parental support for using online educational platforms, and the frequency of household distractions during online learning. These factors provide additional context for understanding students' learning experiences and their use of EdTech.

Table 4.3: Study Habits and Learning Environment (N = 164)

Variable	Category	n	%
Private tutoring	Yes	109	66.5
	No	55	33.5
Daily time spent using online educational technology	Less than 1 hour	12	7.3
	1–2 hours	69	42.1
	More than 2–3 hours	56	34.1
	More than 3 hours	27	16.5
Parental support for using online educational platforms	Less Supportive	3	1.8
	Neutral	14	8.5
	Supportive	58	35.4
	Very Supportive	89	54.3
Household distractions during online learning	Never	77	47.0
	Less than once per week	28	17.1
	Once a week	8	4.9
	Several times a week	35	21.3

	Every day	16	9.8
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Table 4.3 presents the participants' study habits and learning environment. Regarding private tutoring, 66.5% of the participants reported receiving private tutoring, whereas 33.5% indicated that they did not receive any private tutoring. This suggests that private tutoring was common among the middle school students included in this study.

With respect to the amount of time spent using EdTech outside school hours, the largest proportion of participants (42.1%) reported spending 1–2 hours per day using online educational platforms. In addition, 34.1% spent more than 2–3 hours daily, while 16.5% reported spending more than 3 hours. Only 7.3% spent less than one hour per day using EdTech. These findings indicate that most participants devoted at least one hour each day to online learning activities beyond their regular school schedule.

Parental support for using online educational platforms was generally positive. More than half of the participants (54.3%) described their parents or guardians as very supportive, while 35.4% reported receiving supportive encouragement. A relatively small proportion reported neutral (8.5%) or less supportive (1.8%) responses, and none of the participants reported receiving no support from their parents or guardians. These findings suggest that parental encouragement for the use of EdTech was widespread among the participants.

Regarding the home learning environment, 47.0% of the participants reported that they never experienced household distractions during online learning. Meanwhile, 17.1% reported experiencing distractions less than once per week, 4.9% experienced distractions once a week, 21.3% experienced distractions several times a week, and 9.8% reported distractions every day. Overall, the findings suggest that although many participants studied in relatively distraction-free

environments, a considerable proportion experienced household interruptions that could affect their online learning experience.

4.5 Academic Performance

This section presents the participants' self-reported academic performance before using EdTech, after using EdTech, and their perceived change in academic performance following the use of EdTech. The current academic performance variable is not presented in this descriptive section because it is used as the dependent variable in the Pearson correlation and simple linear regression analyses presented later in this chapter.

Table 4.4: Academic Performance of the Participants (N = 164)

Variable	Category	n	%
Academic performance before using online educational technology	Very Poor	6	3.7
	Poor	8	4.9
	Average	21	12.8
	Good	41	25.0
	Very Good	88	53.7
Academic performance after using online educational technology	Very Poor	2	1.2
	Poor	4	2.4
	Average	11	6.7
	Good	35	21.3
	Very Good	112	68.3
Perceived change in academic performance	No Improvement	4	2.4
	Slight Improvement	12	7.3
	Moderate Improvement	99	60.4

	Significant Improvement	49	29.9
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Table 4.4 presents the participants' self-reported academic performance before and after using EdTech, as well as their perceived change in academic performance. Before using EdTech, more than half of the participants (53.7%) rated their academic performance as very good, while 25.0% considered their performance good. Smaller proportions reported their performance as average (12.8%), poor (4.9%), or very poor (3.7%).

After using online educational technology, the proportion of participants reporting very good academic performance increased to 68.3%, whereas 21.3% reported good performance. The percentages reporting average (6.7%), poor (2.4%), and very poor (1.2%) performance were comparatively lower. These descriptive findings indicate that participants generally reported better academic performance after using EdTech.

Participants also reported improvements in their academic performance following the use of online educational technology. The majority (60.4%) perceived a moderate improvement, while 29.9% reported a significant improvement. Only 7.3% indicated slight improvement, and 2.4% reported no improvement. Overall, these findings suggest that most participants perceived positive changes in their academic performance after using EdTech.

4.6 Descriptive Statistics of EdTech Effectiveness

This section presents the descriptive statistics for the ten items used to measure participants' perceptions of the effectiveness of EdTech. The mean and standard deviation of each item are reported to provide an overview of students' responses regarding different aspects of EdTech. Higher mean scores indicate more positive perceptions of the effectiveness of EdTech.

Table 4.5: Descriptive Statistics of EdTech Effectiveness Items (N = 164)

Statement	Mean	SD
Online learning helps me understand lessons better.	3.93	0.934
Online learning makes studying more interesting.	3.79	0.962
I study more because of online educational platforms.	3.73	0.942
Online educational platforms help me complete academic tasks more effectively.	3.80	0.996
Online learning encourages me to participate more actively in learning.	3.88	1.038
Online learning helps me concentrate better during study.	3.59	1.039
Online educational platforms reduce my dependence on private tutoring.	3.66	1.053
Online educational platforms are easy to use.	3.92	0.972
Online educational platforms help improve my examination performance.	3.79	0.988
Online learning makes me more confident in my studies.	3.73	1.004

Table 4.5 presents the descriptive statistics for the ten items measuring participants' perceptions of the effectiveness of EdTech. The mean scores ranged from 3.59 to 3.93, indicating that participants generally expressed positive perceptions of EdTech across all measured dimensions. All ten items obtained mean scores above the neutral point of the five-point response scale, suggesting that participants tended to agree with the statements regarding the educational benefits of online learning.

Among the ten statements, "Online learning helps me understand lessons better" recorded the highest mean score ($M = 3.93$, $SD = 0.934$), followed closely by "Online educational platforms are easy to use" ($M = 3.92$, $SD = 0.972$) and "Online learning encourages me to

participate more actively in learning" ($M = 3.88$, $SD = 1.038$). These findings indicate that participants viewed EdTech as particularly beneficial for improving lesson comprehension, ease of use, and active engagement in learning.

The lowest mean score was observed for "Online learning helps me concentrate better during study" ($M = 3.59$, $SD = 1.039$), although the average response still fell within the Agree category. Similarly, participants reported positive perceptions regarding reduced dependence on private tutoring ($M = 3.66$, $SD = 1.053$), increased study time ($M = 3.73$, $SD = 0.942$), greater confidence in learning ($M = 3.73$, $SD = 1.004$), and improved examination performance ($M = 3.79$, $SD = 0.988$). Overall, the descriptive statistics indicate that participants generally perceived EdTech as an effective support for their learning experiences.

4.7 Reliability Analysis

Before conducting the Pearson correlation and simple linear regression analyses, the internal consistency reliability of the EdTech Effectiveness scale was assessed using Cronbach's alpha. The scale consisted of ten items measuring participants' perceptions of the effectiveness of EdTech. Cronbach's alpha was calculated to determine the extent to which the items consistently measured the same underlying construct. A Cronbach's alpha coefficient of .70 or above is generally considered acceptable for research purposes (Hair et al., 2019).

Table 4.6: Reliability Statistics for the EdTech Effectiveness Scale

Measure	Value
Cronbach's Alpha	.956
Number of Items	10

Table 4.6 presents the reliability statistics for the EdTech Effectiveness scale. The analysis yielded a Cronbach's alpha coefficient of .956 for the ten-item scale, indicating excellent

internal consistency reliability. This result suggests that the questionnaire items were highly consistent in measuring participants' perceptions of the effectiveness of EdTech.

The obtained reliability coefficient substantially exceeds the commonly accepted threshold of .70 (Hair et al., 2019), indicating that the scale is highly reliable for research purposes. Therefore, the composite EdTech Effectiveness score derived from the ten questionnaire items was considered appropriate for use in the subsequent Pearson correlation and simple linear regression analyses.

4.8 Pearson Correlation Analysis

Pearson's product-moment correlation analysis was conducted to examine the relationship between the EdTech Effectiveness composite score and Current Academic Performance. The EdTech Effectiveness composite score was computed by averaging participants' responses to the ten questionnaire items (Q19–Q28) presented in Table 4.5. Higher composite scores indicate higher perceived effectiveness of online educational technology. Pearson's correlation coefficient was used to assess the strength and direction of the linear relationship between the two variables. A p-value less than .05 was considered statistically significant (Field, 2018).

Table 4.7: Pearson Correlation Between the EdTech Effectiveness Composite Score and Current Academic Performance (N = 164)

Variables	Pearson's <i>r</i>	Sig. (2-tailed)	N
edtech_effectiveness (Composite Score: Mean of Q19–Q28) and Current Academic Performance	.285	< .001	164

Note. EdTech Effectiveness represents the composite mean score of the ten questionnaire items (Q19–Q28). Higher scores indicate higher perceived effectiveness of EdTech.

Table 4.7 presents the Pearson correlation analysis between the EdTech Effectiveness composite score and Current Academic Performance. The analysis revealed a positive and statistically significant correlation between the two variables ($r = .285$, $p < .001$). This indicates that participants who reported higher perceived effectiveness of EdTech also tended to report higher levels of current academic performance.

The correlation coefficient of .285 indicates a weak positive relationship between the two variables. Although the strength of the relationship is relatively modest, the statistically significant p-value ($< .001$) indicates that the observed relationship is unlikely to have occurred by chance (Field, 2018). Therefore, the findings provide evidence of a statistically significant positive association between the perceived effectiveness of EdTech and current academic performance among the participants.

4.9 Simple Linear Regression Analysis

Simple linear regression analysis was conducted to examine whether the EdTech Effectiveness composite score significantly predicted Current Academic Performance among middle school students. The EdTech Effectiveness composite score was computed by averaging participants' responses to the ten questionnaire items (Q19–Q28) presented in Table 4.5. In this analysis, Current Academic Performance served as the dependent variable, while EdTech Effectiveness served as the independent variable. The results of the regression analysis are presented in Tables 4.8, 4.9, and 4.10.

Table 4.8: Model Summary for Simple Linear Regression (N = 164)

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	.285	.081	.075	.718

Note. Predictor: EdTech Effectiveness (Composite Score: Mean of Q19–Q28). Dependent Variable: Current Academic Performance.

Table 4.9: ANOVA for the Regression Model

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	7.372	1	7.372	14.282	< .001
Residual	83.622	162	.516		
Total	90.994	163			

Note. Dependent Variable: Current Academic Performance. Predictor: EdTech Effectiveness (Composite Score: Mean of Q19–Q28).

Table 4.10: Regression Coefficients

Predictor	B	Std. Error	β	t	Sig.
Constant	3.038	.259	—	11.732	< .001
edtech_effectiveness	.253	.067	.285	3.779	< .001

Note. Dependent Variable: Current Academic Performance (current_performance).

Regression Equation

The regression equation derived from the analysis is:

$$\text{Current Academic Performance} = 3.038 + 0.253 \times \text{EdTech Effectiveness}$$

Table 4.8 presents the model summary of the simple linear regression analysis. The regression model produced a correlation coefficient of $R = .285$, indicating a positive relationship between edTech_Effectiveness and current_performance. The coefficient of determination ($R^2 = .081$) indicates that approximately 8.1% of the variation in students' current academic performance was explained by the EdTech Effectiveness composite score. The Adjusted R^2 value of .075 suggests that, after adjusting for the predictor in the model, approximately 7.5% of the variance in current academic performance remained explained by

EdTech Effectiveness. The standard error of the estimate (.718) indicates the average amount by which the observed values differ from the values predicted by the regression model.

Table 4.9 presents the ANOVA results for the regression model. The regression model was statistically significant ($F(1, 162) = 14.282, p < .001$), indicating that the model significantly predicted current academic performance. Therefore, the predictor variable contributed significantly to explaining the variation in the dependent variable.

Table 4.10 presents the regression coefficients. The regression coefficient for EdTech Effectiveness was positive and statistically significant ($B = .253, \beta = .285, t = 3.779, p < .001$). This indicates that, on average, a one-unit increase in the EdTech Effectiveness composite score was associated with a 0.253-unit increase in the predicted Current Academic Performance score. The regression equation,

Current Academic Performance = $3.038 + 0.253 \times \text{EdTech Effectiveness}$,

indicates that the predicted level of current academic performance increases as the perceived effectiveness of EdTech increases. Overall, the findings demonstrate that EdTech Effectiveness was a statistically significant positive predictor of Current Academic Performance among the participants.

DISCUSSION

5.1 Introduction

This chapter discusses the findings presented in Chapter 4 in relation to the research objectives, hypotheses, theoretical framework, and existing literature on EdTech. Unlike the previous chapter, which focused on presenting statistical results, this chapter interprets those findings to explain their educational significance and to determine whether they support the study's hypotheses. The discussion also compares the findings with previous national and international research and considers their implications within the context of middle school education in Bangladesh. Through this interpretation, the chapter aims to provide a deeper understanding of how students' perceptions of EdTech relate to their learning experiences and current academic performance.

5.2 Discussion of Patterns of Online Educational Technology Usage and Learning Conditions

The first objective of this study was to examine the patterns and extent of EdTech usage among middle school students in Bangladesh. The findings indicate that EdTech has become an integral component of students' learning practices rather than a temporary alternative to classroom instruction. Most participants reported using online educational platforms either daily or four to six days per week, suggesting that digital learning has become a regular part of their academic routine. This finding reflects the continuing integration of technology into education beyond the COVID-19 pandemic and is consistent with reports published by UNESCO (2023) and the OECD (2023), which describe EdTech as an increasingly important component of contemporary teaching and learning.

Regular engagement with online educational platforms may provide students with greater flexibility to access learning resources, revisit difficult concepts, complete assignments, and prepare for examinations at their own pace. Such opportunities are particularly valuable for middle school students who are gradually developing independent learning skills. These findings are consistent with the meta-analysis conducted by Means et al. (2013), which concluded that online and blended learning environments can improve learning outcomes by providing learners with greater flexibility, learner control, and opportunities for self-paced study.

The findings also demonstrate that access to technology among the participants was generally favourable. Most students reported having home internet access, while smartphones were the most frequently used devices for learning. Nevertheless, a considerable proportion of students relied on shared family devices rather than personal devices. This finding suggests that access to EdTech should not be viewed simply as the availability of digital devices but also in terms of students' ability to use those devices consistently and without interruption. Students who depend on shared devices may experience limitations in study time, scheduling, and privacy, all of which may influence their learning experiences.

Although internet accessibility appeared relatively strong within the sample, many participants continued to experience occasional connectivity problems. This finding supports earlier Bangladeshi studies reporting that technological infrastructure remains an important challenge for effective online learning (Al-Amin et al., 2021). However, compared with studies conducted during the COVID-19 pandemic, the participants in the present study appeared to experience more stable access to digital learning resources. One possible explanation is that internet infrastructure and digital learning practices have improved since the emergency

transition to online education, allowing students to integrate EdTech more effectively into their everyday learning activities.

The home learning environment also appeared to support students' use of EdTech. Most participants reported receiving encouragement from parents or guardians, while relatively few indicated frequent household distractions during study. Parental support is widely recognised as an important factor influencing students' motivation, persistence, and learning behaviours, particularly among younger learners. Therefore, the findings suggest that the effectiveness of EdTech depends not only on technological access but also on the broader learning environment in which students use these digital resources.

Overall, the findings fulfil the first research objective by demonstrating that the participants had regular access to EdTech and generally favourable learning conditions. At the same time, the findings highlight that differences in device ownership, internet reliability, and home learning environments continue to influence students' opportunities to benefit fully from digital learning. These results reinforce the argument presented in Chapter 2 that effective technology integration requires both technological resources and supportive educational environments rather than simply increasing students' exposure to digital devices.

5.3 Discussion of Perceived Effectiveness of Online Educational Technology

The second objective of this study was to examine students' perceptions of the effectiveness of EdTech in supporting their learning. Overall, the findings indicate that the participants held favourable perceptions of EdTech effectiveness, as all ten items measuring the construct received mean scores above the neutral point of the five-point Likert scale. This

suggests that the participants generally believed that EdTech made positive contributions to their learning experiences rather than functioning merely as an alternative mode of content delivery.

Among the measured dimensions, students reported particularly positive perceptions regarding improved lesson understanding, ease of platform use, and increased participation in learning activities. These findings are consistent with the Technology Acceptance Model (TAM) proposed by Davis (1989), which suggests that users are more likely to adopt and continue using technology when they perceive it as both useful and easy to use. In the present study, students' positive perceptions of usefulness and usability indicate that they generally considered EdTech to be an effective academic resource. Such perceptions may encourage sustained engagement with digital learning platforms and increase students' willingness to incorporate technology into their daily learning practices.

The findings are also consistent with Constructivist Learning Theory, which emphasises that meaningful learning occurs when learners actively engage with information and construct knowledge through interaction and reflection. Digital learning environments provide opportunities for students to revisit recorded lessons, access multimedia learning resources, complete interactive activities, and learn at their own pace. These features may explain why participants perceived EdTech as helpful for understanding academic content and participating more actively in learning activities. Rather than replacing classroom instruction, EdTech appears to have complemented traditional learning by extending opportunities for independent study beyond school hours.

At the same time, the comparatively lower rating for concentration during online study suggests that EdTech may not support every aspect of learning equally. Although the overall perception remained positive, maintaining attention in digital learning environments may be

challenging because of distractions associated with mobile devices, social media, entertainment applications, and interruptions within the home environment. This finding supports UNESCO's (2023) position that technology alone does not guarantee improved learning outcomes; its educational value depends on appropriate pedagogical use and supportive learning conditions. Similarly, the relatively lower agreement regarding reduced dependence on private tutoring indicates that students continue to perceive EdTech as a complementary learning resource rather than a complete substitute for traditional academic support.

Overall, the findings suggest that students' positive perceptions of EdTech extend beyond simple technological access. Instead, participants valued EdTech because it supported lesson comprehension, encouraged participation, increased confidence in learning, and provided flexible opportunities for independent study. These findings reinforce the argument presented in Chapter 2 that the educational effectiveness of technology depends primarily on how learners engage with digital resources rather than on the mere availability of technological devices or online platforms (Means et al., 2013).

5.4 Discussion of the Relationship Between EdTech Effectiveness and Current Academic Performance

The third objective of this study was to examine whether students' perceived EdTech Effectiveness was significantly associated with and predictive of Current Academic Performance. The findings presented in Chapter 4 demonstrated a statistically significant positive correlation between the two variables, while the regression analysis further indicated that EdTech Effectiveness significantly predicted students' current academic performance. Therefore, the findings support both alternative hypotheses of the study, suggesting that students who perceived EdTech as more effective also tended to report better current academic performance.

Although the relationship was statistically significant, the strength of the association was relatively modest. This finding suggests that perceived EdTech Effectiveness contributes positively to students' academic performance but represents only one of several factors influencing learning outcomes. Academic performance is affected by numerous interconnected variables, including students' motivation, self-regulated learning skills, parental support, teaching quality, socioeconomic background, and the broader learning environment. Consequently, the present findings should be interpreted as evidence that EdTech constitutes an important contributor to academic performance rather than its sole determinant.

The findings provide empirical support for the Technology Acceptance Model (Davis, 1989). According to the model, learners are more likely to engage consistently with technologies that they perceive as useful and easy to use. In the present study, students generally regarded EdTech as beneficial for understanding lessons, completing assignments, preparing for examinations, and participating in learning activities. These positive perceptions may encourage more meaningful and sustained use of digital learning resources, thereby contributing to improved academic performance.

The findings also support Self-Regulated Learning Theory (Zimmerman, 2008). Students who perceive EdTech as effective are more likely to organise their study schedules, monitor their own learning progress, revisit instructional materials independently, and take greater responsibility for their academic development. These characteristics are consistent with self-regulated learning behaviours, which have been widely associated with improved educational outcomes. Therefore, EdTechy may contribute to academic performance not only by providing instructional content but also by promoting learner autonomy and independent study habits.

The present findings are generally consistent with previous empirical research. Tamim et al. (2011), in a second-order meta-analysis, concluded that EdTech has an overall positive effect on students' learning outcomes when integrated appropriately into teaching and learning processes. Similarly, Means et al. (2013) reported that blended and online learning environments frequently produce better academic outcomes than traditional face-to-face instruction because they provide greater flexibility, learner engagement, and opportunities for self-paced learning. More recent evidence also indicates that well-designed digital learning environments continue to support positive learning outcomes when combined with appropriate pedagogical practices and learner engagement.

The findings are also broadly consistent with research conducted in Bangladesh, which has highlighted both the opportunities and challenges associated with technology supported education. Previous studies largely focused on emergency online learning during the COVID-19 pandemic and identified internet connectivity, technological infrastructure, and digital readiness as important challenges. The present study extends this literature by examining students' perceptions under post-pandemic educational conditions among middle school students in Grades 5–8. Unlike studies conducted during emergency remote teaching, the present findings suggest that online Educational Technology has become a routine component of students' learning and continues to demonstrate a positive relationship with academic performance.

Overall, the discussion indicates that the educational value of EdTech lies not merely in providing students with access to digital resources but in supporting meaningful learning experiences, learner engagement, and independent study. Consequently, the significant findings obtained from both the correlation and regression analyses strengthen the central argument of

this study that students' positive perceptions of EdTech are associated with better current academic performance among middle school students in Bangladesh.

CONCLUSION

6.1 Conclusion

This study investigated the relationship between perceived EdTech effectiveness and the current academic performance of middle school students in Bangladesh. Using a quantitative research design, data were collected from 164 students enrolled in Grades 5-8 through a structured questionnaire. Descriptive statistics, reliability analysis, Pearson's product moment correlation, and simple linear regression were employed to analyse the data and address the research objectives.

The findings indicate that EdTech has become an important component of students' learning experiences. Most participants reported using online educational platforms regularly and generally perceived EdTech as beneficial for understanding lessons, participating in learning activities, completing academic tasks, and supporting independent study. Although participants also reported challenges related to concentration, device accessibility, and internet connectivity, the overall perception of EdTech effectiveness remained positive. These findings demonstrate that students increasingly regard EdTech as a valuable complement to traditional classroom learning rather than merely an alternative mode of instruction.

The inferential analyses further demonstrated a statistically significant positive relationship between the EdTech Effectiveness composite score and Current Academic Performance. The regression analysis also confirmed that perceived EdTech Effectiveness significantly predicted students' current academic performance. Accordingly, the findings

support the alternative hypotheses proposed in this study and suggest that students who perceive EdTech as more effective are more likely to report better academic performance. At the same time, the relatively modest explanatory power of the regression model indicates that academic performance is influenced by multiple educational, personal, and environmental factors beyond students' perceptions of EdTech alone.

Overall, the study successfully fulfilled all four research objectives. The first objective was achieved by examining the patterns and extent of EdTech usage among middle school students in Bangladesh, which revealed that EdTech had become a regular component of students' learning practices. The second objective was fulfilled by assessing students' perceptions of EdTech effectiveness, with the findings indicating that participants generally perceived EdTech as beneficial for supporting their learning. The third objective was achieved through Pearson's product moment correlation and simple linear regression analyses, which demonstrated that perceived EdTech Effectiveness was significantly associated with and significantly predicted students' Current Academic Performance. Finally, the fourth objective was addressed by providing evidence-based practical implications for educators, parents, school administrators, and policymakers to support the effective integration of EdTech in middle school education in Bangladesh. Collectively, these findings contribute to the growing body of EdTech research in Bangladesh and provide empirical evidence that meaningful and well-supported integration of EdTech can positively support students' academic learning and development.

6.2 Practical Implications

The findings of this study have several practical implications for improving the effective integration of EdTech in middle school education in Bangladesh. First, the positive relationship identified between students' perceived EdTech effectiveness and current academic performance

suggests that schools should promote the purposeful integration of EdTech into regular teaching and learning practices rather than using them only during emergency situations. EdTech should be incorporated as a complementary learning resource that supports classroom instruction, independent learning, and continuous academic engagement.

Second, teachers should receive continuous professional development to enhance their digital pedagogical competencies. The findings indicate that students perceive EdTech as most beneficial when it improves lesson understanding, encourages participation, and supports academic learning. Therefore, teachers should be equipped with the necessary knowledge and skills to design interactive, student-centred learning activities that maximise the educational potential of digital platforms.

Third, parents and guardians should be encouraged to provide appropriate guidance and support for students' use of EdTech at home. Creating a supportive home learning environment, monitoring students' online learning activities, and encouraging responsible use of digital resources may enhance the educational benefits of technology and promote more effective learning behaviours among middle school students.

Finally, educational policymakers and school administrators should continue investing in digital infrastructure and equitable access to online learning resources. Although the participants generally reported favourable access to EdTech, the findings also revealed continuing challenges related to device availability and internet connectivity. Addressing these barriers may contribute to more equitable learning opportunities and enable a greater number of students to benefit from technology supported education. Overall, the findings suggest that effective EdTech integration requires coordinated efforts from teachers, parents, schools, and policymakers to ensure that technology is used meaningfully to support students' academic development.

6.3 Limitations

Despite providing valuable insights into the relationship between perceived EdTech effectiveness and current academic performance among middle school students in Bangladesh, this study has several limitations that should be considered when interpreting the findings.

First, the study employed a convenience sampling technique, which may limit the generalisability of the findings to the broader population of middle school students in Bangladesh. Although participants were recruited from different geographical locations, the sample may not fully represent the diversity of students across all regions and educational settings.

Second, the study relied on self-reported questionnaire data. Consequently, participants' responses may have been influenced by personal perceptions, memory, or social desirability, which could affect the accuracy of the reported information. In particular, the measure of Current Academic Performance was based on students' self-reported academic performance rather than official school records.

Third, the study adopted a cross-sectional research design, with data collected at a single point in time. As a result, the findings identify statistical relationships and predictive associations but do not establish causal relationships between perceived EdTech Effectiveness and academic performance. Changes in students' perceptions and academic outcomes over time were beyond the scope of the present research.

Finally, the study focused exclusively on middle school students in Grades 5-8 who had experience using EdTech. Therefore, the findings may not be directly applicable to students at

the primary, secondary, or higher education levels, or to learners in educational contexts outside Bangladesh.

Despite these limitations, the study provides meaningful empirical evidence regarding students' perceptions of EdTech and their relationship with current academic performance. The findings contribute to the growing body of EdTech research in Bangladesh and provide a useful foundation for future studies in this area.

6.4 Recommendations for Future Research

The present study provides a foundation for future research on the role of EdTech in supporting students' learning and academic performance in Bangladesh. Building upon the findings and limitations of this study, several recommendations are proposed for future research.

First, future studies may employ probability sampling techniques and larger sample sizes to improve the representativeness and generalisability of the findings. Including participants from a wider range of schools and geographical regions would provide a more comprehensive understanding of students' experiences with EdTech across Bangladesh.

Second, future researchers may adopt longitudinal research designs to examine how students' perceptions of EdTech and their academic performance change over time. Such studies would provide stronger evidence regarding the long-term relationship between EdTech use and academic achievement.

Third, future research may incorporate objective measures of academic performance, such as school examination results or official academic records, in addition to students' self-reported responses. This approach would reduce potential response bias and strengthen the validity of the findings.

Finally, future studies may investigate additional factors that influence students' academic performance, including digital literacy, learning motivation, self-regulated learning, parental involvement, teacher support, and socioeconomic characteristics. Researchers may also employ mixed-methods or qualitative approaches to gain a deeper understanding of students' experiences, perceptions, and challenges associated with the use of EdTech. Such investigations would complement the quantitative findings of the present study and contribute to a more comprehensive understanding of Educational Technology integration in middle school education.

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APPENDIX A

Questionnaire: Research Instrument Used for Data Collection

The following questionnaire was used to collect data from middle school students participating in this study.

Dear Participant,

This questionnaire is part of an academic research study conducted for the completion of an MA in Education degree at the Asian University for Women. The purpose of this study is to understand how online Educational Technology (EdTech) usage influences the academic performance of middle school students in Bangladesh.

Your participation is completely voluntary. All information provided will remain confidential and will only be used for academic research purposes. No personally identifiable information will be disclosed in any report or publication.

Please answer all questions honestly. The questionnaire will take approximately 15–20 minutes to complete.

প্রিয় অংশগ্রহণকারী,

এই প্রশ্নমালাটি এশিয়ান ইউনিভার্সিটি ফর উইমেন (AUW)-এ শিক্ষা বিষয়ে (MA in Education) স্নাতকোত্তর ডিগ্রির অংশ হিসেবে পরিচালিত একটি একাডেমিক গবেষণার জন্য প্রস্তুত করা হয়েছে। এই গবেষণার উদ্দেশ্য হলো বাংলাদেশের মধ্য-বিদ্যালয় (Grades 5-8) পর্যায়ের শিক্ষার্থীদের একাডেমিক ফলাফলের ওপর অনলাইন শিক্ষা প্রযুক্তি (EdTech)-এর ব্যবহারের প্রভাব অনুধাবন করা।

আপনার অংশগ্রহণ সম্পূর্ণ স্বেচ্ছাসেবী। আপনি যে তথ্য প্রদান করবেন তা সম্পূর্ণ গোপনীয়ভাবে সংরক্ষণ করা হবে এবং শুধুমাত্র গবেষণার উদ্দেশ্যে ব্যবহার করা হবে। কোনো প্রতিবেদন, উপস্থাপনা বা প্রকাশনায় আপনার নাম বা ব্যক্তিগতভাবে শনাক্ত করা যায় এমন কোনো তথ্য প্রকাশ করা হবে না। অনুগ্রহ করে প্রতিটি প্রশ্নের সৎ ও যথাযথ উত্তর দিন। প্রশ্নমালাটি পূরণ করতে আনুমানিক ১৫-২০ মিনিট সময় লাগবে।

আপনার মূল্যবান সময় ও সহযোগিতার জন্য আন্তরিক ধন্যবাদ।

SECTION A: DEMOGRAPHIC INFORMATION (ব্যক্তিগত ও পারিবারিক তথ্য)

1. Have you used any online educational platform/app for learning during the last six months?

(গত ছয় মাসে কি আপনি পড়াশোনার জন্য কোনো অনলাইন শিক্ষামূলক প্ল্যাটফর্ম বা অ্যাপ ব্যবহার করেছেন?)

☐ Yes (হ্যাঁ)

☐ No (না)

If NO, please stop here. Thank you. If Yes, then go ahead. (যদি উত্তর "না" হয়, তাহলে এখানে প্রশ্নমালা শেষ হবে। ধন্যবাদ। আর যদি উত্তর হ্যাঁ হয় তবে সামনে এগিয়ে যান।)

2. Gender (লিঙ্গ)

☐ Male (ছেলে)

☐ Female (মেয়ে)

☐ Prefer not to say (বলতে অনিচ্ছুক)

3. Age (বয়স)

☐ Below 10 years (১০ বছরের নিচে)

☐ 10–11 years (১০–১১ বছর)

☐ 12–13 years (১২–১৩ বছর)

☐ 14–15 years (১৪–১৫ বছর)

☐ 16 years or above (১৬ বছর বা তার বেশি)

4. Current Grade (বর্তমান শ্রেণি)

- ☐ Grade 5 (পঞ্চম শ্রেণি)
- ☐ Grade 6 (ষষ্ঠ শ্রেণি)
- ☐ Grade 7 (সপ্তম শ্রেণি)
- ☐ Grade 8 (অষ্টম শ্রেণি)

5. Type of School (বিদ্যালয়ের ধরন)

- ☐ Government School (সরকারি বিদ্যালয়)
- ☐ Private Bangla Medium School (বেসরকারি বাংলা মাধ্যম বিদ্যালয়)
- ☐ English Medium School (ইংরেজি মাধ্যম বিদ্যালয়)
- ☐ Madrasa (মাদ্রাসা)
- ☐ Other (Please specify) _____
(অন্যান্য - উল্লেখ করুন) _____

6. Residential Area (বাসস্থান)

- ☐ Urban (শহর)
- ☐ Semi-Urban (উপশহর)
- ☐ Rural (গ্রাম)

7. Approximate Monthly Family Income (পরিবারের আনুমানিক মাসিক আয়)

- ☐ Below 15,000 BDT (১৫,০০০ টাকার কম)
- ☐ 15,000–30,000 BDT (১৫,০০০–৩০,০০০ টাকা)
- ☐ 30,001–50,000 BDT (৩০,০০১–৫০,০০০ টাকা)
- ☐ Above 50,000 BDT (৫০,০০০ টাকার বেশি)
- ☐ I don't know (আমি জানি না)
- ☐ Prefer not to say (বলতে অনিচ্ছুক)

8. Highest Educational Qualification of Father/Guardian (পিতা/অভিভাবকের সর্বোচ্চ শিক্ষাগত যোগ্যতা)

- ☐ No formal education (কোনো প্রাতিষ্ঠানিক শিক্ষা নেই)
- ☐ Primary education (প্রাথমিক শিক্ষা)
- ☐ Secondary education (মাধ্যমিক শিক্ষা)
- ☐ Higher Secondary education (উচ্চ মাধ্যমিক শিক্ষা)
- ☐ Undergraduate degree or above (স্নাতক বা তার বেশি)
- ☐ I don't know (আমি জানি না)

9. Highest Educational Qualification of Mother/Guardian (মাতা/অভিভাবকের সর্বোচ্চ শিক্ষাগত যোগ্যতা)

- ☐ No formal education (কোনো প্রাতিষ্ঠানিক শিক্ষা নেই)
- ☐ Primary education (প্রাথমিক শিক্ষা)
- ☐ Secondary education (মাধ্যমিক শিক্ষা)
- ☐ Higher Secondary education (উচ্চ মাধ্যমিক শিক্ষা)
- ☐ Undergraduate degree or above (স্নাতক বা তার বেশি)
- ☐ I don't know (আমি জানি না)

SECTION B: ACCESS TO TECHNOLOGY AND EDTECH USE (প্রযুক্তি ও EdTech ব্যবহার)

10. How frequently do you use online educational platforms? (আপনি কত ঘন ঘন অনলাইন শিক্ষামূলক প্ল্যাটফর্ম ব্যবহার করেন?)

- ☐ Daily (প্রতিদিন)
- ☐ 4–6 days per week (সপ্তাহে ৪–৬ দিন)
- ☐ 2–3 days per week (সপ্তাহে ২–৩ দিন)

- ☐ Once per week (সপ্তাহে ১ দিন)
- ☐ Less than once per week (সপ্তাহে ১ দিনের কম)

11. How do you usually access the internet for online learning? (অনলাইন শিক্ষার জন্য আপনি সাধারণত কীভাবে ইন্টারনেট ব্যবহার করেন?)

- ☐ Home Wi-Fi (বাসার Wi-Fi)
- ☐ Mobile Data (মোবাইল ডাটা)
- ☐ School Internet (বিদ্যালয়ের ইন্টারনেট)
- ☐ Community Internet (কমিউনিটি ইন্টারনেট)
- ☐ Other (অন্যান্য) (Please specify) _____

12. Do you have your own device for online learning? (অনলাইন শিক্ষার জন্য কি আপনার নিজস্ব ডিভাইস আছে?)

- ☐ Yes (হ্যাঁ)
- ☐ No (না)
- ☐ Shared family device (পরিবারের অন্য সদস্যদের সাথে শেয়ার করা ডিভাইস)

13. Which device do you use most frequently? (আপনি সবচেয়ে বেশি কোন ডিভাইস ব্যবহার করেন?)

- ☐ Smartphone (স্মার্টফোন)
- ☐ Tablet (ট্যাবলেট)
- ☐ Laptop (ল্যাপটপ)
- ☐ Desktop Computer (ডেস্কটপ কম্পিউটার)
- ☐ Other (অন্যান্য) (Please specify) _____

14. How often do internet-related problems interrupt your online learning? (ইন্টারনেট-সংক্রান্ত সমস্যার কারণে আপনার অনলাইন শিক্ষা কত ঘন ঘন ব্যাহত হয়?)

- ☐ Never (কখনও না)
- ☐ Less than once per month (মাসে একবারের কম)
- ☐ 1–3 times per month (মাসে ১–৩ বার)
- ☐ 1–2 times per week (সপ্তাহে ১–২ বার)
- ☐ Almost every day (প্রায় প্রতিদিন)

SECTION C: STUDY HABITS AND LEARNING ENVIRONMENT (পড়াশোনার অভ্যাস ও শিক্ষার পরিবেশ)

15. Do you receive private tutoring? (আপনি কি প্রাইভেট টিউশন বা কোচিং নেন?)

- ☐ Yes (হ্যাঁ)
- ☐ No (না)

16. On average, how much time do you spend using online educational platforms for learning each day outside school hours? (বিদ্যালয়ের বাইরে অনলাইন শিক্ষামূলক প্ল্যাটফর্ম ব্যবহার করে প্রতিদিন গড়ে কত সময় পড়াশোনা করেন?)

- ☐ Less than 1 hour (১ ঘণ্টার কম)
- ☐ 1–2 hours (১–২ ঘণ্টা)
- ☐ More than 2 hours – 3 hours (২ ঘণ্টার বেশি – ৩ ঘণ্টা)
- ☐ More than 3 hours (৩ ঘণ্টার বেশি)

17. How would you describe the support you receive from your parents/guardians regarding your use of online educational platforms? (অনলাইন শিক্ষামূলক প্ল্যাটফর্ম ব্যবহারের ক্ষেত্রে আপনি আপনার অভিভাবকদের কাছ থেকে কী ধরনের সহায়তা পান?)

- ☐ Very Supportive (অত্যন্ত সহায়ক)
- ☐ Supportive (সহায়ক)
- ☐ Neutral (নিরপেক্ষ)
- ☐ Less Supportive (কম সহায়ক)
- ☐ Not Supportive (সহায়ক নন)

18. How often do noise or household distractions interrupt your online learning at home? (বাড়িতে অনলাইন পড়াশোনার সময় শব্দ বা পারিবারিক ব্যাঘাত কত ঘন ঘন আপনার শেখায় বাধা সৃষ্টি করে?)

- ☐ Every day (প্রতিদিন)
- ☐ Several times a week (সপ্তাহে কয়েকবার)
- ☐ Once a week (সপ্তাহে একবার)
- ☐ Less than once per week (প্রতি সপ্তাহে একবারের ও কম)
- ☐ Never (কখনও না)

SECTION D: OPINIONS ABOUT ONLINE LEARNING (অনলাইন শিক্ষার বিষয়ে আপনার মতামত)

Please indicate your level of agreement with the following statements. নিচের বিবৃতিগুলোর সাথে আপনি কতটুকু একমত তা নির্বাচন করুন।

19. Online learning helps me understand lessons better. (অনলাইন শিক্ষা আমাকে পাঠ আরও ভালোভাবে বুঝতে সাহায্য করে।)	☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
20. Online learning makes studying more interesting. (অনলাইন	☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree

শিক্ষা পড়াশোনাকে আরও আকর্ষণীয় করে তোলে।)					
21. Online educational platforms motivate me to study more. (অনলাইন শিক্ষামূলক প্ল্যাটফর্ম আমাকে আরও বেশি পড়াশোনা করতে উৎসাহিত করে।)	☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
22. Online	☐ Strongly	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly

educational platforms help me complete homework and assignments more effectively. (অনলাইন শিক্ষামূলক প্ল্যাটফর্ম আমাকে বাড়ির কাজ ও অ্যাসাইনমেন্ট আরও কার্যকরভাবে সম্পন্ন করতে সাহায্য করে।)	Disagree				Agree
23. I actively participate	☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree

in online classes and learning activities. (আমি অনলাইন ক্লাস ও শেখার কার্যক্রমে সক্রিয়ভাবে অংশগ্রহণ করি।)					
24. I can concentrate well during online learning sessions. (অনলাইন শিক্ষার সময় আমি	☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree

ভালোভাবে মনোযোগ দিতে পারি।)					
25. Online learning has reduced my dependence on private tutoring. (অনলাইন শিক্ষা আমার প্রাইভেট টিউশনের ওপর নির্ভরশীলতা কমিয়েছে।)	☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
26. I find online learning platforms easy to use.	☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree

(আমি অনলাইন শিক্ষামূলক প্ল্যাটফর্ম ব্যবহার করা সহজ মনে করি।)					
27. I feel more confident in my studies after using online educational platforms. (অনলাইন শিক্ষামূলক প্ল্যাটফর্ম ব্যবহারের পর আমি পড়াশোনায়	☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree

আরও আত্মবিশ্বাসী বোধ করি।)					
28. Using online educational platforms has improved my examination performance . (অনলাইন শিক্ষামূলক প্ল্যাটফর্ম ব্যবহার আমার পরীক্ষার ফলাফল উন্নতি করেছে।)	☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree

SECTION E: ACADEMIC PERFORMANCE (শিক্ষাগত ফলাফল)

29. What was your average academic result BEFORE regularly using EdTech? (নিয়মিত EdTech ব্যবহার শুরু করার আগে আপনার গড় শিক্ষাগত ফলাফল কত ছিল?)

- ☐ Below 50% (৫০%-এর নিচে)
- ☐ 50–59% (৫০–৫৯%)
- ☐ 60–69% (৬০–৬৯%)
- ☐ 70–79% (৭০–৭৯%)
- ☐ 80% or above (৮০% বা তার বেশি)

30. What is your CURRENT average academic result? (বর্তমানে আপনার গড় শিক্ষাগত ফলাফল কত?)

- ☐ Below 50% (৫০%-এর নিচে)
- ☐ 50–59% (৫০–৫৯%)
- ☐ 60–69% (৬০–৬৯%)
- ☐ 70–79% (৭০–৭৯%)
- ☐ 80% or above (৮০% বা তার বেশি)

31. Compared to before using EdTech, how has your academic performance changed?

(EdTech ব্যবহার শুরুর আগের তুলনায় আপনার শিক্ষাগত ফলাফল কীভাবে পরিবর্তিত হয়েছে?)

- ☐ Improved significantly (অনেক উন্নতি হয়েছে)
- ☐ Improved slightly (কিছুটা উন্নতি হয়েছে)
- ☐ No change (কোনো পরিবর্তন হয়নি)

- ☐ Declined slightly (কিছুটা থারাপ হয়েছে)
- ☐ Declined significantly (অনেক থারাপ হয়েছে)

32. How would you rate your current academic performance? (আপনি আপনার বর্তমান শিক্ষাগত ফলাফলকে কীভাবে মূল্যায়ন করবেন?)

- ☐ Excellent (চমৎকার)
- ☐ Good (ভালো)
- ☐ Average (মাঝারি)
- ☐ Below Average (গড়ের নিচে)
- ☐ Poor (দুর্বল)

SECTION F: CHALLENGES AND BARRIERS (চ্যালেঞ্জ ও প্রতিবন্ধকতা)

Please indicate your level of agreement with the following statements. নিচের বিবৃতিগুলোর সাথে আপনি কতটুকু একমত তা নির্বাচন করুন।

33. Students from low-income families face more difficulties accessing EdTech.	☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree
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(নিম্ন আয়ের পরিবারের শিক্ষার্থীরা EdTech ব্যবহারে বেশি সমস্যার সম্মুখীন হয়।)					
34. Students in rural areas have less access to online learning opportunities. (গ্রামীণ এলাকার শিক্ষার্থীরা অনলাইন শিক্ষার সুযোগ তুলনামূলকভাবে)	☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree

বে কম পায়।)					
35. Schools should integrate more online learning resources in the future. (ভবিষ্যতে বিদ্যালয়গুলো তে আরও বেশি অনলাইন শিক্ষাসংক্রান্ত উপকরণ যুক্ত করা উচিত।)	☐ Strongly Disagree	☐ Disagree	☐ Neutral	☐ Agree	☐ Strongly Agree

THANK YOU ধন্যবাদ

Thank you very much for your participation and valuable time. Your responses will contribute significantly to this academic research study.

আপনার মূল্যবান সময় ও অংশগ্রহণের জন্য আন্তরিক ধন্যবাদ। আপনার উত্তরসমূহ এই গবেষণার গুরুত্বপূর্ণ অংশ হিসেবে ব্যবহৃত হবে এবং বাংলাদেশের শিক্ষাব্যবস্থা ও EdTech ব্যবহারের বিষয়ে মূল্যবান তথ্য প্রদান করবে।

APPENDIX B

Parents' Consent Form: Document Used to Obtain Informed

The following participant information sheet and parents' consent form were used to obtain informed consent before data collection.

Voluntary Consent Form

Protocol Title: The Impact of Online EdTech Usage on Academic Performance: Evidence from Middle School Students in Bangladesh

(MA THESIS Study)

Principal Investigator: Rownak Jahan Noor

Organization: Asian University for Women

Hello, I am Rownak Jahan Noor, an MA in Education student at the Asian University for Women in Chattogram, Bangladesh. I am conducting a research study on the impact of online EdTech usage on the academic performance of middle school students in Bangladesh.

Your child is being invited to participate in this research study. Before you decide whether to allow your child to participate, please read the following information carefully.

আমি রওনক জাহান নূর, এশিয়ান ইউনিভার্সিটি ফর উইমেন (AUW), চট্টগ্রামের MA in Education প্রোগ্রামের একজন শিক্ষার্থী। আমি বাংলাদেশের মধ্য-বিদ্যালয় (Grade 5–8) পর্যায়ের শিক্ষার্থীদের একাডেমিক ফলাফলের ওপর অনলাইন শিক্ষা প্রযুক্তি (EdTech)-এর প্রভাব নিয়ে একটি গবেষণা পরিচালনা করছি।

আপনার সন্তানকে এই গবেষণায় অংশগ্রহণের জন্য আমন্ত্রণ জানানো হচ্ছে। আপনার সন্তানকে অংশগ্রহণের অনুমতি দেওয়ার আগে অনুগ্রহ করে নিচের তথ্যগুলো মনোযোগ দিয়ে পড়ুন।

Purpose of the research (গবেষণার উদ্দেশ্য)

The purpose of this research is to understand how the use of online educational technology (EdTech) platforms affects the academic performance of middle school students. The study also aims to explore how factors such as socio-economic background, access to digital resources, and learning environment influence students' use of EdTech and learning outcomes. Your participation in this study will help generate information that may contribute to improving digital learning strategies and educational opportunities for students in Bangladesh.

এই গবেষণার উদ্দেশ্য হলো অনলাইন শিক্ষা প্রযুক্তি (EdTech) শিক্ষার্থীদের একাডেমিক ফলাফলে কী ধরনের প্রভাব ফেলে তা বোঝা। এছাড়াও প্রযুক্তির সুযোগ-সুবিধা, পারিবারিক আর্থ-সামাজিক অবস্থা, অভিভাবকের সহায়তা এবং শিক্ষার পরিবেশ কীভাবে শিক্ষার্থীদের শিক্ষাগত ফলাফলে প্রভাব ফেলে তা বিশ্লেষণ করা। এই গবেষণার ফলাফল বাংলাদেশে ডিজিটাল শিক্ষার সুযোগ ও কার্যকারিতা উন্নয়নে শিক্ষাবিদ, বিদ্যালয় এবং নীতিনির্ধারকদের সহায়তা করতে পারে।

Why Has Your Child Been Invited? কেন আপনার সন্তানকে এই গবেষণায় অংশগ্রহণের জন্য আমন্ত্রণ জানানো হয়েছে?

→ **Your child has been invited because he/she is currently studying in Grades 5–8 and falls within the target group of this research.**

আপনার সন্তান বর্তমানে ৫ম থেকে ৮ম শ্রেণিতে অধ্যয়নরত হওয়ায় এই গবেষণার লক্ষ্যভুক্ত শিক্ষার্থী হিসেবে তাকে অংশগ্রহণের জন্য আমন্ত্রণ জানানো হয়েছে।

What Will Your Child Be Asked to Do? আপনার সন্তানকে কী করতে হবে?

→ **If you provide permission, your child will be asked to complete a questionnaire about:**

- **Access to technology and the internet**
- **Use of online educational platforms**
- **Study habits and learning environment**
- **Learning experiences and engagement**
- **Academic performance and educational challenges**

The questionnaire will take approximately 15–20 minutes to complete. Your child may skip any question that he/she does not wish to answer.

আপনি সম্মতি প্রদান করলে আপনার সন্তানকে একটি প্রশ্নমালা পূরণ করতে বলা হবে, যেখানে নিম্নলিখিত বিষয়গুলো সম্পর্কে প্রশ্ন থাকবে:

- প্রযুক্তি ও ইন্টারনেট ব্যবহারের সুযোগ
- অনলাইন শিক্ষামূলক প্ল্যাটফর্মের ব্যবহার
- পড়াশোনার অভ্যাস ও শিক্ষার পরিবেশ
- শেখার অভিজ্ঞতা ও অংশগ্রহণ
- শিক্ষাগত ফলাফল ও শিক্ষাসংক্রান্ত চ্যালেঞ্জ

প্রশ্নমালাটি পূরণ করতে আনুমানিক ১৫–২০ মিনিট সময় লাগবে। আপনার সন্তান যে কোনো প্রশ্নের উত্তর দিতে অস্বস্তি বোধ করলে তা এড়িয়ে যেতে পারবে।

Risk and Benefit (সম্ভাব্য ঝুঁকি ও উপকারিতা)

There are no anticipated physical risks associated with participation in this study. Some participants may feel slight discomfort while answering questions related to academic performance or educational challenges. However, you may skip any question you do not wish to answer.

Although there are no direct financial benefits for participation, the findings of this study may contribute to improving digital learning systems, educational policies, and access to quality education for students in Bangladesh.

এই গবেষণায় অংশগ্রহণের ফলে কোনো শারীরিক ঝুঁকি প্রত্যাশিত নয়। কিছু শিক্ষার্থী তাদের শিক্ষাগত ফলাফল বা পড়াশোনার সমস্যা বিষয়ক প্রশ্নের উত্তর দিতে সামান্য অস্বস্তি বোধ করতে পারে। তবে অংশগ্রহণ সম্পূর্ণ স্বেচ্ছাসেবী এবং তারা যে কোনো প্রশ্নের উত্তর না দেওয়ার বা যে কোনো সময় অংশগ্রহণ বন্ধ করার অধিকার রাখে।

অংশগ্রহণের জন্য কোনো আর্থিক সুবিধা প্রদান করা হবে না। তবে এই গবেষণার ফলাফল ভবিষ্যতে বাংলাদেশের শিক্ষানীতি, ডিজিটাল শিক্ষা ব্যবস্থা এবং মানসম্মত শিক্ষার সুযোগ উন্নয়নে সহায়ক হতে পারে।

Privacy, anonymity and confidentiality (গোপনীয়তা ও তথ্যের নিরাপত্তা)

All information collected from your child will be kept strictly confidential.

No names or personally identifiable information will be included in any report, presentation, publication, or thesis document. Identification codes will be used instead of names.

Only the researcher will have access to the collected data. All information will be stored securely in password-protected devices and secure cloud storage.

আপনার সন্তানের কাছ থেকে সংগৃহীত সকল তথ্য কঠোরভাবে গোপন রাখা হবে।

কোনো প্রতিবেদন, উপস্থাপনা, প্রকাশনা বা থিসিসে শিক্ষার্থীর নাম বা পরিচয় প্রকাশ করা হবে না। নামের পরিবর্তে কোড নম্বর ব্যবহার করা হবে।

সংগৃহীত তথ্য শুধুমাত্র গবেষকের কাছে সংরক্ষিত থাকবে এবং পাসওয়ার্ড-সুরক্ষিত ডিভাইস ও নিরাপদ ক্লাউড স্টোরেজে রাখা হবে।

Right not to participate and withdraw (অংশগ্রহণ প্রত্যাখ্যান বা প্রত্যাহারের অধিকার)

Your participation in this study is completely voluntary. You have the right to withdraw from the study at any time you wish. You will also be able to withdraw yourself at any time during the study without giving any reason.

আপনার সন্তানের অংশগ্রহণ সম্পূর্ণ স্বেচ্ছাসেবী। আপনি চাইলে আপনার সন্তানকে গবেষণায় অংশগ্রহণের অনুমতি না দিতে পারেন অথবা যে কোনো সময় কোনো কারণ না দেখিয়েই অংশগ্রহণ প্রত্যাহার করতে পারেন। এতে আপনার সন্তানের শিক্ষা, ফলাফল বা বিদ্যালয়ের সঙ্গে সম্পর্কের ওপর কোনো প্রভাব পড়বে না।

Principle of compensation (ক্ষতিপূরণ সংক্রান্ত তথ্য)

Participants will not receive any financial compensation or academic benefit for participating in this study. Participation is entirely voluntary.

এই গবেষণায় অংশগ্রহণের জন্য কোনো আর্থিক পারিশ্রমিক বা একাডেমিক সুবিধা প্রদান করা হবে না।

For further information: If you have any questions regarding this study or your rights as a participant, you may contact the Principal Investigator using the contact information below.

Contact address:

Rownak Jahan Noor

MA in Education

Principal Investigator

Asian University for Women

20/A M.M Ali Road, Chattogram 4000, Bangladesh

Email: __auw234023@auw.edu.bd__

আপনার কি কোনো প্রশ্ন আছে? Yes No

আপনি কি আপনার সন্তানকে এই গবেষণায় অংশগ্রহণের অনুমতি প্রদান করছেন? Yes No

Consent: I acknowledge that the study has been explained to me. I have had the opportunity to ask questions and have received satisfactory answers. By signing below, I voluntarily give permission for my child to participate in this research study.

সম্মতিপত্র: আমি স্বীকার করছি যে গবেষণাটি আমাকে ব্যাখ্যা করা হয়েছে। আমি প্রশ্ন করার সুযোগ পেয়েছি এবং সন্তোষজনক উত্তর পেয়েছি। নিচে স্বাক্ষর করার মাধ্যমে আমি স্বেচ্ছায় আমার সন্তানকে এই গবেষণায় অংশগ্রহণের অনুমতি প্রদান করছি।

Signature of Participants

Date: _____

Signature of Investigator

Date: _____