

Pre-Service Teachers' Insights into the Integration of Mobile Devices as Instructional Aids in Higher Institution

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ABSTRACT The role of mobile technology in education cannot be over-emphasized. However, previous studies have shown that schools have been slow to adopt these devices as instructional tools for teaching and learning. This study adopts the Technology Acceptance Model (TAM) as a conceptual framework to examine the factors influencing pre-service teachers' perceived ease of use and perceived usefulness of mobile technologies, as well as the barriers that might hinder their adoption. The study was guided by three research questions and one hypothesis. A descriptive survey research design was employed. The study population consisted of students from the Faculty of Education, University of Ibadan. A total of 400 pre-service teachers were selected using simple random sampling from four departments: Science and Technology Education, Special Education, Educational Management, and Adult Education. Purposive sampling was used to select these departments, with 100 pre-service teachers chosen from each department. A structured 24-item questionnaire was used to collect data, and the reliability of the instrument was confirmed with a Cronbach's alpha value of 0.75. The findings indicated that pre-service teachers had positive perceptions regarding the ease of use and usefulness of mobile technologies for teaching and learning. However, challenges such as insufficient pedagogical knowledge and lack of proper orientation on integrating mobile technologies into the curriculum were noted as potential barriers. It was recommended that policymakers and curriculum planners should organise training and workshops for both students and teachers on how to effectively integrate mobile technologies into instructional delivery and manage associated challenges.

KEYWORDS: Mobile Technology, Perceived Ease of Use, Pre-service Teachers, Perceived Usefulness, Technology Acceptance Model.

I. INTRODUCTION

The rapid advancement in Information and Communication Technologies (ICT) has led to significant transformations across various sectors, including education. Today, educational institutions are increasingly adopting technology to reform curricula and classroom environments in order to bridge the digital divide. Effective integration of ICT into the educational system is essential for equipping learners with necessary skills and promoting meaningful learning. Lucas (2020) emphasized that true technology integration involves purposeful application, rather than using computers for short or unplanned sessions. Kanaki, Kalogiannakis, Poulakis, and Politis, (2022) describe technology integration as the strategic use of various digital tools such as computers, the Internet, CD-ROMs, and teleconferencing to enhance and support learning. Osakwe, Dlodlo, and Jere, (2017) defined it as a means to foster productivity, communication, research, and cross curricular attainment. The success of technology integration largely depends on teachers' ability to effectively use and apply it in the classroom (Fletcher, 2019). Integrating digital tools into teaching and learning enriches students' experiences and supports a more interactive, engaging, and effective educational process. Akudolu, Aremu, and Larnuren (2017) describe digital tools as instruments for collaboration, data processing, and information sharing. These include mobile technologies such as iPods, smartphones, tablets, and e-readers,

which complement traditional teaching resources rather than replace them (Alsharida, Hammood, and Al-Emran, 2021).

Mobile technology, a key area in educational technology, includes portable digital devices such as smartphones, tablets, and laptops with wireless connectivity (Franklin, 2018). It enables access to Web 2.0 and Web 3.0 tools, messaging services, video conferencing, and social media, facilitating interaction between students and instructors. The increasing availability and affordability of mobile devices and wireless networks have made mobile learning more accessible (Sinaga, Febrianti, and Candra, 2022). Mobile technologies offer flexible, affordable, and interactive learning options. Kumar, and Chand, (2018) describes today's students as "Digital Natives," who prefer active, technology driven learning environments. Mobile devices also help students develop 21st-century skills such as critical thinking, collaboration, creativity, and communication (Drossel, K., Eickelmann, and Gerick, 2017; Lucas, 2020). Despite the pedagogical potential of mobile technologies, their classroom application remains limited. Barriers include inadequate training, limited exposure to instructional technologies, lack of planning time, and classroom management challenges (Alsharida, Hammood, and Al-Emran, 2021). Studies across various countries, including Nigeria, stress the need for targeted ICT training for both pre- and in-service teachers (Adedaja & Abimbade, 2013; Zakaria, Mistima Maat, and Khalid, 2019). Mobile technologies promote inquiry-based learning and encourage learners to be self-directed and innovative (Chinammai, 2015). An essential question remains: do pre-service teachers have a positive perception of mobile technologies, regardless of age or gender? Although existing studies have explored how mobile learning enhances student interaction and engagement, there is still a need to gain more insight into how pre-service teachers perceive these technologies in terms of usefulness, ease of use, and potential obstacles.

This study adopts the Technology Acceptance Model (TAM) by Davis (1989) to assess pre service teachers' perceived ease of use (PEOU), perceived usefulness (PU), and the barriers to mobile technology integration. TAM, based on Fishbein and Ajzen's (1975) Theory of Reasoned Action, posits that beliefs influence attitudes, which affect intentions and usage behavior. According to TAM, both perceived ease of use, perceived usefulness are major factors that influence an individual's intention to use technology. Understanding users' perceptions is key to promoting technology acceptance. Therefore, the technology acceptance model is central to this study's exploration of mobile technology adoption among pre-service teachers. As a result, there is a need to investigate the pre-service teachers' insights into the integration of mobile devices and the barriers hindering its broader adoption in Higher institution The purpose of this study is to investigate pre-service teachers' insights into the integration of mobile devices as instructional aids in higher institution. Specifically, the study aims to

- a) investigate pre-service teachers perceive ease of use of mobile technologies for instructional purposes?
- b) examine pre-service teachers perceive usefulness of mobile technologies for classroom instruction?
- c) identify barriers faced in adopting mobile technologies in classroom settings?

II. RELATED WORKS

The integration of mobile technologies in teacher education has received considerable scholarly attention in recent years due to the increasing ubiquity of smartphones, tablets, and mobile apps in educational environments. Numerous studies highlight the transformative potential of mobile learning (m-learning) in enhancing engagement, collaboration, flexibility, and personalized learning among pre-service teachers. According to Olufemi and Oyelade (2022), mobile learning represents a shift from traditional, fixed educational settings to more dynamic, accessible, and learner-centered modes of learning. The use of mobile devices allows students and teachers to access content on demand, collaborate with peers, and participate in authentic learning experiences beyond the classroom. Atef and Al-Balushi (2020) emphasize that mobile learning supports educational access in developing countries by reducing the infrastructural limitations of conventional teaching methods. Their study found mobile technologies particularly useful in promoting learner autonomy and digital inclusion in resource-constrained environments. From a pedagogical

standpoint, Franklin (2018) asserts that the successful use of mobile devices in teacher education hinges on their alignment with sound instructional design principles. They caution that merely introducing mobile devices into classrooms without clear pedagogical goals may lead to shallow or passive use, rather than deep, reflective learning.

Davis's Technology Acceptance Model (TAM) provides a useful theoretical framework for understanding pre-service teachers' willingness to adopt mobile technologies. The model posits that perceived usefulness and perceived ease of use are the key determinants of technology adoption. Several researchers, including Lucas (2020) and Olalude (2014), have applied TAM to pre-service teacher populations, confirming that positive perceptions of mobile tools significantly influence their intention to use such tools in future teaching practice. However, barriers to mobile integration persist across contexts. Khlaif (2018) identify issues such as institutional policies that restrict mobile use, limited access to wireless internet, and a lack of high-quality educational apps. Additionally, Okeke and Eze (2021) argue that pre-service teachers' beliefs and prior exposure to technology significantly affect their confidence and readiness to implement mobile learning strategies. In sub-Saharan Africa, and Nigeria in particular, contextual challenges are more pronounced. Okeke & Eze (2021) found that infrastructural inadequacies, such as inconsistent power supply and limited internet connectivity, create a hostile environment for mobile learning. Furthermore, some institutions still adopt traditional, lecture-based models that do not encourage digital innovation.

Gender-based disparities have also been observed in several studies. For instance, Atef & Al Balushi (2020) discovered that male pre-service teachers often report higher levels of confidence in using mobile technologies than their female counterparts. This gender gap may be rooted in broader social and cultural factors that shape early access to digital tools and confidence in STEM fields. In the Nigerian context, Adeniran & Akinola (2019) stress the need for curriculum reform to embed digital competencies and mobile learning strategies into teacher education programs. They suggest that professional development workshops and continuous technical support are critical for enabling pre-service teachers to integrate mobile devices effectively in diverse classroom settings. Additionally, Olufemi & Oyelade (2022) note that mobile learning, when properly supported, enhances not only academic performance but also digital literacy and student motivation among Nigerian pre-service teachers. However, they caution that without sustained policy support and capacity-building initiatives, these gains may be limited. Despite the abundance of literature on mobile learning and teacher education, there remains a research gap in understanding pre-service teachers' subjective experiences particularly their perceptions regarding ease of use, usefulness, and the specific obstacles they face in mobile technology adoption. This study seeks to bridge this gap by capturing nuanced insights from Nigerian pre-service teachers, considering both personal and institutional factors, as well as possible gender-based differences.

III. METHODOLOGY

A. Research Design

The study employed a descriptive survey research design. This design is used to collect detailed information about participants' opinions, behaviors, or characteristics. In this context, it was selected to capture a broad understanding of pre-service teachers' perceptions regarding the integration of mobile technologies into teaching and learning processes.

B. Population and Sample

The target population for this study included undergraduate students enrolled in the Faculty of Education at the University of Ibadan. To obtain a representative sample, the researchers employed random sampling, a method that gives every individual in the population an equal chance of being selected. A total of 400 pre-service teachers participated in the study. These individuals were selected randomly from four different

departments within the Faculty of Education University of Ibadan: Science and Technology Education (100 respondents). Special Education (100 respondents). Educational Management (100 respondents). Adult Education (100 respondents). This approach ensured departmental diversity and balanced representation.

C. Research Instrument

The tool used for data collection was a structured questionnaire. It was organized into three distinct sections: Section A gathered demographic data of the respondents. Section B focused on the types and ownership of mobile technologies, aiming to understand what devices participants had access to. Section C contained 24 items measuring respondents’ perceptions of mobile technology use and potential barriers towards mobile technologies usage rated on a 4-point Likert scale: Strongly Agree, Agree, Disagree, Strongly Disagree. This scale allowed respondents to express varying degrees of agreement or disagreement with each statement.

D. Validity and Reliability

To ensure the validity (accuracy) of the instrument, experts in Educational Technology reviewed it. Their role was to verify that the questionnaire effectively measured what it was intended to assess. The reliability (consistency) of the instrument was measured using Cronbach’s Alpha, a statistical tool used to determine internal consistency. The result was 0.75, which indicates an acceptable level of reliability.

E. Method of Data Analysis

Descriptive statistics (frequency and percentages) were used to analyze responses to the research questions. A t-test was conducted to compare gender differences.

F. Research Questions

1. How do pre-service teachers perceive the ease of using mobile technologies for instructional purposes?
2. What are pre-service teachers’ perceptions of the usefulness of mobile technologies for classroom instruction?
3. What barriers do pre-service teachers identify as hindrances to the use of mobile technologies in classroom settings?

G. Research Hypothesis

H₀₁: There is no statistically significant relationship between gender and the perceived usefulness of mobile learning technologies among pre-service teachers.

IV. RESULTS AND DISCUSSION

The data collected from Table 1 reveals that 42.9% of the respondents were male and female 56.3%, constituting 100% of the total responses. This clearly shows that there was a balance representation of pre-service teachers.

Table 1: Distribution of Pre-service Teachers by Gender

Sex	Frequency	Percentage (%)
Male	150	42.9%
Female	197	56.3%
No indication	3	0.9%
Total	350	100%

Source: Field survey, 2025

This implies that 350 pre-service teachers participated in this study out of which 150% were male, 197% were female and 3 of the total population did not indicate their gender.

Table 2: Types of Mobile devices used by the Pre-service Teachers

Mobile Technology	Frequency	Percentage
Notepads	2	0.6
Hand held tablet	125	35.7
Mini laptops	50	14.3
i-pads	5	1.43
i-pod touch	20	5.71
i-Phone	80	22.9
mp 3	61	17.4
e-book reader	30	8.6
Android phone	350	100

Table 2 showed that 2 respondents (0.6%) owned a Notepads, 35.7% had a handheld tablet, 14.3% possessed a mini laptop, 1.43% had an iPad, 5.71% used an iPod Touch, 22.9% owned an iPhone, 17.4% had an MP3 player, and 8.6% used an e-book reader, while all respondents owned an android phone. These findings indicate that each pre-service teacher had access to at least one mobile device. This suggests that learning through mobile devices is feasible, as all pre-service teachers were in possession of one.

Table 3: Result of perceived ease of use of pre-service teachers toward mobile technologies for classroom instruction

S/N	ITEM	SA %	A %	D %	SD %	Mean	Std. Dev
1	Learning to operate mobile technology for teaching and learning would be easy for me	143 (40.9)	167 (47.7)	24 (6.86)	15 (4.29)	1.74	.766
2	Interacting with mobile technology for teaching and learning is often frustrating.	99 (28.3)	83 (23.7)	134 (38.3)	27 (7.71)	2.11	.914
3	My interaction with mobile technology for teaching and learning would be clear & understandable	119 (34)	127 (36.3)	74 (21.1)	29 (8.29)	2.04	.942
4	It would be easy for me to become skillful at using mobile technology for teaching and learning	90 (25.7)	121 (34.6)	108 (30.9)	29 (8.29)	2.22	.926
5	I would find it cumbersome to use mobile technology for teaching and learning	53 (15.1)	108 (30.9)	110 (31.4)	75 (21.4)	2.41	.992
6	It would be easy for me to remember how to perform tasks using mobile technology	48 (13.7)	148 (42.3)	105 (30)	44 (12.6)	2.54	.885
7	Mobile technology would provide helpful guidance in performing teaching and learning activities.	50 (14.3)	116 (33.1)	110 (31.4)	55 (15.7)	2.53	.941
8	Mobile technology is rigid & inflexible to interact with when it comes to teaching and learning	93 (26.6)	85 (24.3)	144 (41.1)	22 (6.29)	2.10	.874
WEIGHTED AVERAGE					2.21		

Source: Field survey, 2025

A. Research Question 1

What is the perceived ease of use of pre-service teachers toward mobile technologies for classroom instruction?

Table 3 presents information on pre-service teachers' perceived ease of using mobile technology for teaching and learning. An analysis of Table 1.1 shows that the pre-service teachers agreed that learning to operate mobile technology for teaching and learning would be easy for them ($x = 1.74$). They also agreed that their interaction with mobile technology would be clear and understandable ($x = 2.11$), it would be easy to become skillful in its use ($x = 2.22$), and they would find it easy to remember how to perform tasks using it ($x = 2.54$). Furthermore, the respondents disagreed with statements suggesting that using mobile technology is often frustrating ($x = 2.11$) or cumbersome ($x = 2.41$). The overall weighted average from the table is 2.21, corresponding to a rating of 55.6%. This indicates that the pre-service teachers had a positive perception of the ease of using mobile technology, which suggests a promising level of expected adoption among the respondents. The findings of this study indicate that pre-service teachers have a positive perception of the ease of use of mobile technology for teaching and learning activities. This aligns with the research conducted by Lucas (2020), which found that students find it easy to learn how to use mobile devices, and this ease of use positively influences their decision to incorporate them into both their daily and academic lives. Additionally, previous studies have shown that effort expectancy directly and positively impacts users' intentions to use mobile services and devices (Osakwe, Dlodlo, and Jere, 2017; Franklin, 2018).

B. Research Question 2

What is the perceived usefulness of pre-service teachers toward mobile technologies for classroom instruction?

Table 4 provides insights into the perceived usefulness of mobile technology for teaching and learning activities among pre-service teachers. A review of Table 1.2 shows that the pre-service teachers agreed that mobile technology would be useful for teaching and learning ($x = 2.66$), that it would help them complete tasks more quickly ($x = 2.22$), enhance their effectiveness in the classroom ($x = 2.20$), give them greater control over their work ($x = 2.10$), and improve the quality of their work ($x = 2.25$). Additionally, the respondents disagreed with statements suggesting that mobile technology would decrease their teaching and learning performance ($x = 2.42$) or make it harder to perform tasks ($x = 2.69$). The weighted average for the table is 2.36, equating to a rating of 59%. This indicates that pre-service teachers have a positive view of the usefulness of mobile technology in teaching and learning, which suggests a favorable level of adoption among the respondents.

The study also reveals that pre-service teachers perceive mobile technology as useful for teaching and learning, which suggests a positive outlook on its potential for enhancing job performance. This finding aligns with the work of Adedoja and Abimbade (2013), who found that although teachers acknowledge limited experience with mobile learning, they recognize its potential to meet their teaching needs and improve collaboration between teachers and students, as well as among students themselves. In mobile learning, performance expectancy indicates that individuals are likely to find the technology useful due to its ability to provide quick access to information at their convenience and on the device of their choice.

C. Research Question 3

What are the barriers that may prevent pre-service teachers from using mobile technology for classroom instruction?

Table 5 outlines the barriers that may hinder pre-service teachers from using mobile technology for classroom instruction. Analyzing Table 1.3 reveals that the pre-service teachers agreed that a lack of adequate pedagogical knowledge to effectively use mobile technology could prevent them from utilizing it ($x = 1.81$). They also noted that the availability of technical support for mobile technology usage in teaching ($x = 2.69$), a lack of proper orientation on integrating mobile technology into the curriculum ($x = 2.37$), and concerns that mobile technology might encourage lazy attitudes toward teaching ($x = 2.20$) are potential barriers. The weighted average for the table is 2.36, which corresponds to a rating of 57.5%. This indicates that the pre-service teachers acknowledged the existence of these issues, which could limit their ability to incorporate mobile technology into teaching and learning activities.

Furthermore, the study highlights that pre-service teachers identified several barriers, including a lack of adequate pedagogical knowledge for effective use of mobile technology, insufficient orientation on how to integrate it into the curriculum, and time constraints for technology integration (Olalude, 2014). According to Lucas (2020), teachers may be reluctant to use technology if technical issues arise frequently and institutions do not prioritise resolving them. Previous studies Sinaga, Febrianti, and Candra, (2022); Kumar and Chand, (2018); Kanaki, Kalogiannakis, Poulakis, and Politis, (2022) have confirmed that the more training and support teachers receive, the more likely they are to view themselves as effective educators and integrate technology. Mueller, (2018) also linked successful technology integration in the classroom to proper training, while Lawless and Pellegrino (2019) suggested that effective training programs encourage educators to use technology in their teaching. This suggests that with sufficient for training, teachers would be more inclined to adopt and integrate mobile technology into their teaching practices.

Table 4: Result of perceived usefulness of pre-service teachers toward mobile technologies for classroom instruction

S/N	ITEM	SA %	A %	D %	SD %	Mean	Std. Dev.
1	I would find mobile technology useful in my teaching and learning.	88 (25.1)	121 (34.6)	71 (20.3)	67 (19.1)	2.66	1.058
2	Using mobile technology would enable me to accomplish teaching and learning activities more quickly.	99 (28.3)	125 (35.7)	77 (22)	49 (14)	2.22	1.009
3	Using mobile technology would increase my teaching and learning productivity.	80 (22.9)	115 (32.9)	100 (28.6)	54 (15.4)	2.37	1.002
4	Using mobile technology would decrease my teaching and learning performance.	83 (23.7)	86 (24.6)	125 (35.7)	51 (14.6)	2.42	1.011
5	Using mobile technology can enhance my effectiveness when performing my classroom tasks.	74 (21.1)	156 (44.6)	80 (22.9)	31 (8.86)	2.20	0.882
6	Using mobile technology would make it difficult to perform my tasks	66 (18.9)	72 (20.6)	113 (32.3)	96 (27.4)	2.69	1.073
7	Using mobile technology would give me greater control over my work	94 (26.9)	148 (42.3)	86 (24.6)	22 (6.29)	2.10	0.870
8	Using mobile technology would improve the quality of the work I do	80 (22.9)	130 (37.1)	107 (30.6)	30 (8.57)	2.25	0.908
WEIGHTED AVERAGE		2.36					

Source: Field survey, 2025

Table 5: Result on barriers that may prevent pre-service teachers from using mobile technology for classroom instruction

SN	ITEM	SA %	A %	D %	SD %	Mean	Std. Dev.
1.	Lack of adequate pedagogical knowledge for effective utilisation of mobile technology for teaching can prevent me from using it.	158 (45.1)	125 (35.7)	37 (10.6)	28 (8)	1.81	.922
2.	Availability of technical support to effectively use mobile technology in the teaching/learning process.	48 (13.7)	160 (45.7)	75 (21.4)	63 (18)	2.69	.927
3.	Administrative support for integration of mobile technology in the teaching/learning process.	101 (28.8)	89 (25.4)	130 (37.1)	28 (8)	2.13	.924
4.	My sight is not good enough for navigation on my mobile devices	94 (26.9)	86 (24.6)	148 (42.3)	22 (6.29)	2.10	.870
5.	Lack of adequate orientation on how to Integrate mobile technology into the curriculum	80 (22.9)	115 (32.9)	100 (28.6)	54 (15.4)	2.37	1.002
6.	Mobile technology may be too technical for me to use	83 (23.7)	86 (24.6)	125 (35.7)	51 (14.6)	2.42	1.011
7.	Teachers may develop lazy attitudes toward teaching if they use mobile technology to teach	74 (21.1)	156 (44.6)	80 (22.9)	31 (8.86)	2.20	.882
8.	It is difficult to develop effective teaching methods by using the mobile technology.	66 (18.9)	113 (32.3)	72 (20.6)	96 (27.4)	2.69	1.073
WEIGHTED AVERAGE		2.30					

Source: Field survey, 2025

D. Testing the Null Hypothesis

There is no significant relationship between gender differences of pre-service teachers and their perceived usefulness of mobile learning technology for teaching and learning.

Table 6: Gender differences of pre-service teacher and their perceived usefulness of mobile learning technology for teaching and learning, Summary of t-test Analysis

Variable	N	Mean	Std. Dev	T	Df	Sig	Remark
Perceived Usefulness of Mobile phone by Pre-service Teachers							Not Sig
Male	137	29.2044	4.08393	.219	300	.567	
Female	165	29.0970	4.36341				

Source: Field survey, 2025

Table 6 indicates that there is no significant difference between male and female pre-service teachers regarding their perceived usefulness of mobile learning technology for teaching and learning (t = 0.219, df

= 300; $P > 0.05$). Therefore, gender does not have a significant impact on pre-service teachers' perceptions of the usefulness of mobile learning technology for teaching and learning. As a result, the null hypothesis is retained. Lastly, the study found that gender does not have a significant impact on pre-service teachers' perceived usefulness of mobile learning technology for teaching and learning. This implies that gender does not influence how pre-service teachers perceive the usefulness of mobile learning technology. This result is consistent with the findings of Bianchi and Phillips (2019), who concluded that gender had no significant effect on the perceived usefulness of mobile technology, supporting the notion that mobile technology is gender-neutral. Saade (2020) also observed that individuals are more likely to use technology when they believe it will enhance their performance.

V. CONCLUSION

This study confirms that pre-service teachers have a generally positive outlook on the use of mobile technologies in classroom instruction. They recognize the ease of using such tools and their usefulness for enhancing teaching effectiveness. However, barriers such as lack of training and institutional support remain challenges. Addressing these limitations through targeted interventions will improve the likelihood of successful integration. Based on the research findings the researcher made the following recommendations:

- a) Policymakers should embed mobile technology use in teacher training curricula.
- b) Regular hands-on training for both students and instructors should be conducted.
- c) Schools should provide technical infrastructure and ongoing support.
- d) Orientation should focus on pedagogical applications of mobile technology.
- e) Education ministries must adopt supportive policies that facilitate mobile learning integration.

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