Predictors of Mobile Learning Acceptance: A Study Based on the Integration of UTAUT and Mobile Learning Acceptance Measures

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ABSTRACT

The purpose of this study was to investigate the predictive factors influencing the acceptance of mobile learning among students in Nigerian Colleges of Education, via the integration of the Unified Theory of Acceptance and Use of Technology (UTAUT) Model and Mobile Learning Acceptance Measures (MLAM) to ascertain their contribution to students' behavioral intention to accept and use mobile learning. The study employed a survey design with a quantitative methodology, utilizing a sample size of 354 participants. The survey instrument, adapted from previous studies, underwent validation for face and content by experts in Educational Technology, as well as pilot testing which proved its reliability with a Cronbach's Alpha coefficient of 0.970. Result of the regression analysis shows that the four UTAUT Predictors namely, Performance Expectancy (β =.310, p < .05), Effort Expectancy (β =.149, p < .05), Social Influence (β =.200, p < .05), Facilitating Conditions (β =.107, p < .05) significantly affects the criterion variable i.e., Behavioural Intention to accept mobile learning. This study also found that the MLAM variables namely, Flexibility has the most significant effect with (β =.529, p < .05) providing 28% variance (R2=.280) in the dependent variable (Behavioural Intention). This was followed by Suitability with (β =.453, p < .05). While Enjoyment (β =.044, p< .05) and Efficiency (β =.034, p > .05) has no significant effect on Behavioural Intention to accept mobile learning. In contrast to the previous studies enjoyment and efficiency variables were not significant predictors to the regression framework. However, this does not rule out the viability and validity of these variables in mobile learning acceptance studies. Similar studies are therefore needed to confirm their significance. The result of the descriptive analysis also shows that, the mean Behavioural Intention level of male students (Mean=2.98; SD = 0.40) is not significantly higher than that of female students (Mean=3.00; SD = 0.38) and the P= 0.813 > 0.05 which indicates that there is no significant difference between male and female Behavioural Intention towards accepting mobile in this context. These results underscore the critical roles of perceived performance benefits, ease of use expectations, social influences from peers and instructors, and the availability of necessary resources and social support in shaping students' attitudes towards mobile learning acceptance. In the light of these, the study offers recommendations for theory and practice and indicates the limitations of the study for future research work.

Keywords: Mobile Learnng, Acceptance, Unified Theory of Acceptance and Use of Technology, Mobile Learning Acceptance Measures.

INTRODUCTION

1.1 Background

Mobile learning (m-learning) has gained significant attention in the field of education due to its potential to enhance teaching and learning experiences. Portability, multimedia integration, ubiquity, interactive functionality, location sensitivity, and rapid expansion of digital communication and computing technologies are some of the significant potentialities that make mobile technologies indispensable in teaching and the learning process (Pachler et al. 2010; Sharma et al.2017). Defined as the acquisition of knowledge facilitated primarily by wireless technologies such as smartphones, tablets, and other portable devices, m-learning offers a

flexible, accessible, and personalized learning experience (Bae et al., 2005; Wai et al., 2018). It represents a significant shift in educational paradigms, integrating the capabilities of mobile technologies into the learning environment.

Mobile learning has evolved dynamically, closely tied to the rise of mobile devices and educational technology (Birt et al., 2023). The proliferation of mobile devices and the rapid expansion of digital communication and computing technologies have catalyzed this transformation, making mobile learning an indispensable part of modern education. Mobile technologies enable learners to access educational content anytime and anywhere, breaking the traditional barriers of time and location associated with conventional learning environments. Hassan (2015) asserted that there are unlimited opportunities in using mobile learning in developing countries giving a wide range of capabilities and applications of these technologies.

In recognition of the enormous benefits of mobile learning technologies in improving the quality of education, several countries integrated mobile learning technologies in their educational practice (UNESCO, 2012; Ismail 2016; Almaiah 2019; Ma 2019). Countries such as Thailand, Singapore, Russian and many European countries were reported as examples of countries where mobile learning has gained remarkable achievements (Traxler and Vosloo., 2014). In Africa, Rwanda, for example has implemented the SMART Classroom initiative under its SMART Rwanda Master Plan to cater for the needs of Rwandan Education system of providing Education for All by the year 2020 (Olufunminiyi, 2017). However, A study by Oyelere (2019) argued that even though mobile learning has gained acceptance in regions across the world, the fullest potential of mobile learning initiatives is yet to be achieved by most third world countries due to contextual and technical constraints that impede the full realization of ample learning opportunities provided by mobile learning technologies.

Furthermore, UNESCO (2012) report on mobile learning systems in African countries revealed that mobile learning implementation did not produce the desired results due to lack of awareness among policymakers, lack of credible research on the usefulness of mobile learning technologies, the mechanical restrictions of portable devices, particularly in remote locations, a convergence of mobile devices which is triggered by the absence of infrastructural facilities and poor internet connectivity. Ndagire (2016) attributed such concerns and challenges to the absence of comprehensive research to support innovations, lack of proper planning and organizational attitudes towards emerging technologies. This indicates that concerns about implementation and application of technologically based systems including mobile learning adoption have not been thoroughly explored and resolved across several countries in Africa. These arguments indicated that several concerns surrounding the implementation of mobile learning systems in most developing countries are yet to be addressed. Hence, the need for rigorous efforts towards appropriate studies on the adoption of mobile learning programs in the continent of Africa.

1.2 State of Mobile Learning in Nigeria

Nigeria recognizes the critical positions of ICTs in sustaining and reforming the country's education system (NITDA, 2019). This understanding propelled the enactment of the Nigeria Communication Policy in 2007, the National Information and Communication Policy 2012, the 2013 National Broadband strategic plan as well as the 2017-2020 Nigerian ICT RoadMap (FMoC, 2017). These gave birth to the country's mobile phone revolution and subsequent eLearning initiatives in the country. Nigeria 's framework for the use of social media or mobile platforms (web 2.0) has recently been signed into law (NITDA 2019) which also provides a significant boost to information sharing and collaborative activities among Nigerians most especially educational institutions. The policy further acknowledged that the information technology led globalization makes it necessary for the country to provides policies, guidelines and strategic frameworks for optimum use, implementation and promotion of ICTs initiatives, applications, and services to drive the nation`s economic sectors and ensuring reliable and cost-effective access to communications networks throughout the country.

A general review of worldwide mobile learning implementation trends reported that the majority of the mobile learning initiatives/projects in Nigeria are school-based or university-based initiatives, while others are being funded by local authorities, states, private organizations, and industry (UNESCO et al. 2012). For instance, a

study by Shehu et al. (2017) discussed some of the mobile learning initiatives in Nigeria such as PHEA-TI mobile learning Project established at the University of Ibadan in partnership with Higher Education in Africa Educational Technology Initiatives. Most of such initiatives/project were aims at providing distance learners with access to educational material so that they can study at their respective locations.

While significant progress has been made in recent decades, especially regarding the provision of enabling policies and the penetration of mobile phones in Nigeria, issues surrounding the successful implementation of mobile learning technologies infrastructure to support teaching and learning remain unresolved due accessibility and connectivity barriers, inadequacy of basic infrastructure and skilled manpower (Ozonuwe 2018; Belle, 2019; Kayode et al. 2019). Shonola and Mike (2014) found that impediments to the effective implementation of mobile learning in Nigeria includes regulatory hurdles, inadequacies in the education curriculum in accommodating innovations, limited funding of the entire education sector, absence of adequate infrastructure, attitudinal barriers, lack of digital knowledge and technical skills, among others. Despite all the prospects of mobile learning technologies there is a general lack of awareness on the potentialities of mobile technologies in educational settings (Shehu et al., 2017).

Understanding the predictors of mobile learning acceptance in this context is essential for developing effective strategies to promote its implementation. Accordingly, Das (2016) suggested that in planning to implement mobile learning system, studies and assessment analysis be undertaken to examine the institutional readiness regarding available infrastructural facilities, academic staff digital know-how and pedagogic skills. Additionally, learners who are the direct beneficiaries of educational opportunities need to be adequately prepared to accept a new system of learning digitally for their academic achievements. Thus, embarking on studies to assess the predictors of mobile learning acceptance in Nigerian Colleges of Education is crucial.

1.3 Problem Statement

Despite the numerous benefits and global trends in mobile learning implementation, its acceptance and implementation in Nigerian educational contexts face significant challenges. These challenges arise from various factors, including limited ICT infrastructure, insufficient digital literacy among students and educators, and socio-economic constraints. Studies indicate that the adoption and use of mobile learning technologies for academic purposes are not widespread among students in Nigerian Colleges of Education (Badan and Igeria, 2018; Oladejo et al., 2018; Chaka and Govender, 2017). Igeria (2018) found that most students in these institutions rarely use their smartphones for academic purposes, instead using them primarily for socialization. Similarly, Chaka and Govender (2017) highlighted the ineffective implementation of mobile learning programs across Nigerian Colleges of Education, with few studies focusing on mobile learning acceptance among students. This gap signifies the need for more rigorous, contextually based studies on mobile learning acceptability in Nigerian Colleges of Education.

Moreover, Ajayi et al. (2019) argued that investigating mobile learning acceptability should begin by assessing institutional preparedness in terms of available infrastructural facilities and the degree of students' willingness to embrace this new approach. Sharma et al. (2017) similarly noted that while the opportunities and capabilities of learning technologies are well documented, the effectiveness of mobile learning in meeting desired objectives largely depends on learners' involvement, interest, commitment, and experience in using these systems. Consequently, examining and interpreting the factors affecting students' intention to embrace mobile learning is essential for planning and implementing mobile learning opportunities in Nigeria. Without a clear understanding of these acceptance factors, efforts to implement mobile learning may not achieve the desired outcomes, thereby limiting the potential benefits for students in Nigerian educational institutions.

1.4 Purpose of the Study

The primary purpose of this study is to identify and analyze the predictors of mobile learning acceptance among students in Nigerian colleges of education, utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT) model as the theoretical framework. By focusing on the key constructs of the UTAUT model namely: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions, this

study aims to provide a comprehensive understanding of the factors that significantly influence students' acceptance and use of mobile learning technologies in Nigerian Colleges of Education contexts. The insights gained from this research will contribute to the development of effective strategies and policies for enhancing mobile learning adoption in Nigerian colleges of education, ultimately improving educational outcomes and accessibility.

1.5 Research Questions

This study is investigated the following research questions:

a) Is there statistically significant difference in Behavioural Intention (Be-In) between Male and Female students' population towards accepting mobile learning?
b) What is the effect of Performance Expectancy (Pe-Ex) on the students Behavioural Intention (Be-In) to accept mobile learning?
c) What is the effect of Effort Expectancy (Ef-Ex) on the students Behavioural Intention (Be-In) to accept mobile learning?
d) What is the effect of Social Influence (So-In) on the students Behavioural Intention (Be-In) to accept mobile learning?
e) What is the effect of Facilitating Conditions (Fa-Co) on the students Behavioural Intention (Be-In) to accept mobile learning?
f) What is the effect of Enjoyment on the students Behavioural Intention (Be-In) to accept mobile learning?
g) What is the effect of Flexibility on the students Behavioural Intention (Be-In) to accept mobile learning?
h) What is the effect of Suitability on the students Behavioural Intention (Be-In) to accept mobile learning?
i) What is the effect of Efficiency on the students Behavioural Intention (Be-In) to accept mobile learning?

LITERATURE REVIEW

2.1 Mobile Learning

Mobile learning, commonly referred to as m-learning, is an educational approach that leverages mobile devices such as smartphones, tablets, and other portable gadgets to facilitate learning anytime and anywhere. M-learning encompasses a broad range of activities, including accessing course materials, participating in interactive lessons, engaging in collaborative projects, and taking assessments. The core idea is to utilize the portability, connectivity, and multimedia capabilities of mobile devices to create flexible, accessible, and personalized learning experiences. This mode of learning is especially valuable in contexts where traditional educational infrastructure is limited, offering an alternative means of delivering education to a wider audience.

2.2 Theoretical Framework

2.2.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

According to Teo (2011) technology acceptance refers to the willingness of users to embrace emerging technologies. Over the years, several attempts were made by scholars to identify significant factors affecting people's decisions and attitudes towards why, how, and why individuals accept emerging innovations. Venkatesh et al., (2003) attempted to investigate descriptive variables influencing technology acceptance or rejection. Following critical evaluations of previous models linked to technology acceptance, the UTAUT model was eventually formulated. The theories whose concepts have been integrated in the UTAUT model include Rational Action Theory, Motivational Model Theory, Planned Behaviour Theory, The Combine TAM and TPB, PC Utilization Model, Invention Diffusion Theory and Social Cognitive Theory (Venkatesh et al. 2003; Venkatesh et al., 2012; Ahmad Abu-Al-Aish and Love, 2013;. This gives UTAUT an extra strength over

existing theories of investigating acceptance of emerging information technologies (Bere, 2014; Mtebe and Raisamo, 2014; Alasmari, 2018).

As illustrated in the UTAUT conceptual framework, three constructs are direct predictors of behavioral intent to embrace Information System (IS) namely Performance Expectancy (Pe-Ex), Effort Expectancy (Ef-Ex) and Social Influence (So-In) construct while one construct (Facilitating Conditions) is a predictor of direct use The dependent variables are the Behavioral Intention (Be-In) and usage behavior. The variables age, gender, experience and voluntariness serves as the moderators (Venkatesh et al. 2003; Chaka and Govender. 2017a). Figure 1 below, illustrated the existing linkages between the UTAUT constructs.

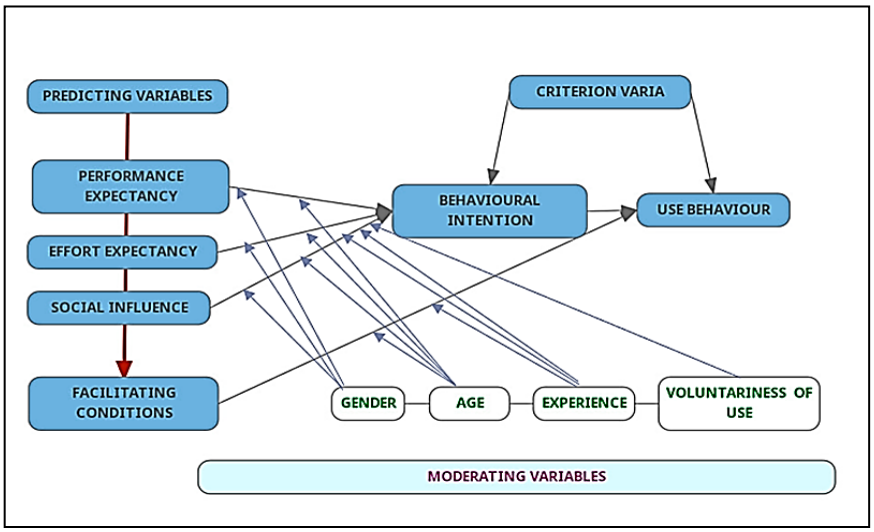

Figure 1: An Illustration of UTAUT Model

2.2.2 Description and Validity of UTAUT Model

a) Behavioral Intention (Be-In)

According to Venkatesh et al. (2003) Be-In is influenced by the Pe-Ex, Ef-Ex and the So-In as well as Fa-Co as predictor of actual usage. Be-In refers to the need for trial, use or an intent to use and decides the actual use directly (Venkatesh et al., 2003). A study to assessing the effect of UTAUT constructs on acceptance behaviour of synchronous collaboration to support peer translation by (Y. C. Liu and Huang 2015) showed that UTAUT model explains 73% of the variation in Behavioral intention. Similarly, a study by Mosunmola et al. (2018) indicated a Cumulative Variance at 65.619 percent (65.619%) indication positive effects of the UTAUT constructs on acceptability behaviour (Be-In).

b) Performance Expectancy (Pe-Ex)

Performance expectancy represents the degree to which an individual believes that using a system will help him or her to attain a gain in job performance (Venkatesh et al., 2012). This means that usefulness, relevance, and usability expected of new technologies is an influencing factor towards its acceptance. Several studies have also shown that Pe-Ex has a significant influence on the Behavioral intention to accept and use mobile technologies for educational purposes (Tey et al. 2018; Julius et al. 2018; Bere 2014; Mohamad and Kassim 2019; Bervell and Umar 2017). Tan (2013) extended the UTAUT model to investigate factors of Website acceptance in Taiwan. Results of the study indicated that the path coefficient between Pe-Ex and Be-In (β = .282, $p < .001$) is positive and significant. In another study, Thongsri et al. (2018) found a positive and significant relationship between Pe-Ex and Be-In ($\beta = 0.209$, $p = 0.01$).

Alshehri (2012) adapted UTAUT model in determining E-government Services acceptability factors in the kingdom of Saudi Arabia. Generally, the model analysis showed that all the standardized path coefficients of the constructs were extremely significant (ranges from 0.34-0.72). Pe-Ex had (0.34, $p < 0.001$) indicating

strong positive effect. In a study, Mtebe & Raisamo (2014) selected 823 students from five institutions of higher education throughout East Africa. Using regression analysis, results showed that all the four UTAUT constructs (Pe-Ex, Ef-Ex, Fa-Co, So-In) had significant positive effects on the acceptance of mobile learning by the students with Cronbach alpha value ranging from 0.763 to 0.884. Pe-Ex being the strongest predictor. Furthermore, Tey and Moses (2018) found strong relation between Pe-Ex and Be-In ($\beta = .19$, $p < .0005$). However, in a study by Liu and Huang (2015) indicated that the path coefficient between Pe-Ex and Be-In was (β 0.14, $p > 0.05$) indicating that Pe=Ex did not have a positive and significant effect on Be-In. Likewise, Mosunmola et al. (2018) studies factors influencing acceptance and implementation of mobile learning in higher education, results of the study indicated that all the UTAUT core constructs significantly predicted Be-In to accept. The path coefficient between Pe-Ex and Be-In (β 0.913, $p > 0.05$) indicated positive and significant effects. Accordingly, Almaiah et al. (2019) employed UTAUT model to investigate mobile learning acceptance among 697 students' samples. Results of the SEM analysis indicated a significant influence of Pe-Ex on Be-In ($\beta = 0.307$, $p < 0.001$).

c) Effort Expectancy (Ef-Ex)

Effort Expectancy according to Venkatesh et al. (2003) refers to the level of perceived simplicity associated with the use of new technology. Raza et al. (2019) believe that technology simplicity tends to increase its rate of acceptance. If an individual perceived that use of mobile devices is effortless and beneficial, it will arouse his/her intention towards acceptance and use.

Several studies found a positive and significant relationship between Ef-Ex and Be-In such Thongsri et al. (2018) with ($\beta = 0.501$, $p = 0.01$), Mosunmola et al. (2018) reporting (β 0.909, $p > 0.05$), Tey and Moses (2018) accounting ($\beta = .32$, $p < .0005$) and Almaiah et al. (2019) with ($\beta = 0.354$, $p < 0.001$). Likewise, Sarfaraz (2017) found that the path coefficient between Ef-Ex and Be-In is significant at (β=0.21, $p<0.05$) which indicating positive influence of Pe=-Ex on Be-In. While, Bashri (2016) showed that the Factor Analysis (the value of KMO) of Ef-Ex was more than 0.870, indicating significant (p=0.000) which explained 60.98 percent (60.98%) of the total variance. A study by Alshehri (2012) showed that all the standardized path coefficients of the UTAUT constructs were extremely significant (ranges from 0.34-0.72), with Ef-Ex had (0.39, $p < 0.001$) indicating high strong positive effect. However, a study by Bervell & Umar (2017) indicated a significant but weak relationship between Ef-Ex and Be-In ($\beta = 0.269$, $p \leq 0.01$). The relation between Pe-Ex and Be-In (0.000782) was not significant at $p <0.01$ as reported by Martins et al. (2018).

d) Facilitating Condition (Fa-Co)

Facilitating Conditions according to Venkatesh et al. (2003) refers to the level at which an individual agrees that there is an organizational and technological infrastructure to facilitate the use of the system (Venkatesh et al., 2012). In previous studies facilitating conditions has been identified as significant factor in affecting intention and actual use of new technology. Examples, Bervell and Umar (2017) proved that there is a positive and significant effect of Fa-Co and Be-In ($\beta = 0.212$, $p \leq 0.01$). Likewise, a study by Liu and Huang (2015) confirmed that the path coefficient between Fa-Co and Be-In was (β 0.47, $p > 0.05$) which demonstrated that Fa-Co had a positive and significant effect on Be-In. Equally, Mosunmola et al. (2018) found that the path coefficient between Fa-Co and Be-In (β 0.830, $p > 0.05$) indicating strongest positive and significant effects. A study by Almaiah et al. (2019) showed a significant influence of Fa-Co on Be-In ($\beta = 0.297$, $p < 0.001$). In consistent with these studies, Raza et al. (2019) statistically indicated that path coefficient between the Pe-Ex and Be-In is positive ($\beta = 0.1150$, p 0.1).

e) Social Influence (So-In)

Social Influence (impacts) according to Venkatesh et al (2003) refers to the level of how much culture or society affects a person intent to adopt and use a new system or modern technologies. Social influence was proved to predicts intention to accept and use technologies. Example, A study by Tey and Moses (2018) demonstrated strong relation between that So-In and Be-In ($\beta = .07$, $p < .05$). A study by L. L. Zhou et al. (2019) also confirm the effect of the So-In construct on Be-In ($\beta = .796$, $p < 0.01$). Furthermore, a study by Liu

and Huang (2015) confirmed that the path coefficient between So-In and Be-In was (β 0.26, p > 0.05) which proved that So-In had a positive and significant effect on Be-In to accept. Another study by L. Liu et al. (2015) shows that all the UTAUT model constructs were positive and statistically significant at the 0.001 level in which the item loadings were greater than 91 percent (91%) > 0.70; indicating acceptable convergent validity of the constructs. Similarly, Mosunmola et al. (2018) found that the path coefficient between Fa-Co and Be-In (β 0.745, p > 0.05) indicated strongest positive and significant effects. However, Almaiah et al. (2019) indicated that the effect of So-In on Be-In was negative (β = 0.054, p < 0.243). Similarly, Sarfaraz (2017) found that the path coefficient between So-In and Be-In is not significant at (β=0.03, p<0.05) indicating a negative relationship between Pe=-Ex on Be-In.

j) Gender

Gender was conceived by Alkharang and Papazafeiropoulou (2010) as a hierarchical separation between women and men embedded both in social institutions and in social practice. Several studies have investigated the moderating effects of gender in the acceptance and technology use (Venkatesh et al., 2003; Venkatesh and Zhang, 2010; Venkatesh et al., 2012; Aliaño et al., 2019; Martins, Farias, et al., 2018 ; Ahmed, 2016; Syed Ahmed and Kabir, 2018). For example, Venkatesh et al. (2012) showed that male users use a computer more than females, thereby highlighting gender as one of the important variables in measuring technology acceptance and usage.

2.2.3 Mobile Learning Acceptance Measures (MLAM)

In a quest to measure the factors influencing mobile acceptance and implementation, Sharma et al. (2017) developed and validated the Mobile Learning Acceptance Measures (MLAM). As conceptualized by Sharma et al. (2017) an acronym MLAM consisted of six factors as direct determinants of mobile learning acceptance namely: Flexibility, Suitability, Enjoyment, Economic and Social Factors (Sharma et al., 2017). The model was validated in two different studies involving students' samples from tertiary students in Oman. The reliability and validity of the variables was measured using composite reliability (CR) and the average variance extracted (AVE) as well as the CR of all the constructs were greater than 0.70 which confirmed the convergent validity as shown in Figure below (Sharma, Sarrab, and Al-Shihi 2017). While the correlated six-factor model (Flexibility, Suitability, Enjoyment, Efficiency, Economic and Social) was fitted to the maximum probability estimate by accounting up to 64% of the variance, proving the internal consistency and item reliability of MLAM measures of mobile learning acceptance.

2.2.4 Description and Validity of MLAM Constructs

a) Enjoyment

The variable Enjoyment refers to the feeling of pleasure because of the use of mobile learning system (Sharma, Sarrab, and Al-Shihi 2017). Sharma et al. (2017) found enjoyment as strong factor in influencing individuals' intention to accept mobile learning with (Cronbach α =0.866, p < 0.001). Others related studies had found the Enjoyment to be a significant factor in influencing technology acceptance (Davis et al., 1989; Teo, 2011; Huang et al., 2007, Sarrab, Al Shibli, et al. 2016, Baki et al., 2018, Al-Adwan et al. 2018).

Tajudeen et al. (2013) studied factors of mobile learning acceptance in developing countries. Study results show the perceived enjoyment of mobile learning devices with beta (β=.172) and p < 0.05 as a positive effect. In agreement with these studies, an empirical study of factors affecting mobile technologies acceptability by (Y. Huang 2014) found enjoyment as a significant predictor of individuals acceptance of mobile learning with (β=0.190, p=0.000). This signifies a strong link between enjoyment associated with emerging technologies and its acceptance.

b) Flexibility

According to Sharma et al. (2017) flexibility means affordances of mobile devices that enable users to have access to information anywhere and at any time. Sharma et al. (2017) showed flexibility as an important factor

in influencing individuals' intention to accept mobile learning with (Cronbach α =0.773, p < 0.001). A study on the use of mobile learning devices in in Teaching and Learning activities in Taiwan conducted by Huang et al. (2019) showed that perceived flexibility advantage afforded by mobile devices positively predicted intention towards acceptance of mobile learning With β = .575, t = 9.221 accounting for 55.6% of variance in perceived intention together other factors.

c) Suitability

According to Sharma et al. 2017) the constructs Suitability represents the appropriateness of utilizing mobile technologies in teaching and learning process. Sharma et al. (2017) found suitability factor as influential in individuals' intention to accept mobile learning with (Cronbach α =0.861, p < 0.001). The Cronbach's α above the required point of 0.70 indicated sufficient internal consistency of the variable. Sarrab, Al Shibli et al. (2016) conducted an empirical study of factors influencing the acceptance of mobile learning in Omanian Higher Education. Findings of the study confirmed positive relationship between mobile learning acceptance and perceived suitability.

d) Efficiency

Efficiency means the efficiency of learning between teachers and students using mobile devices, in particular (Sharma et al., 2017). Sharma et al. (2017) stated indicated efficiency as a key factor influencing individuals' intention to accept mobile learning with (Cronbach α =0.879, p < 0.001). The Cronbach's α above the required point of 0.70 indicated adequate internal consistency of the variable. A survey on mobile learning acceptance by Fan (2014) showed a positive effect of efficiency attributes of mobile technologies and its acceptance for academic purposes.

e) Social Influence

Social factors refers to the influence of other people (peers, parents, friends etc) towards acceptance of mobile learning (Sharma, Sarrab, and Al-Shihi 2017). Sharma et al. (2017) indicated that Social is also a key predictor in mobile learning acceptance with (Cronbach α =0.793, p < 0.001). From the mobile learning angle, related studies proved social factor to be highly significant in affecting acceptance Behavioral intention (Sharma and Govindaluri, 2014; Mosunmola et al., 2018; Tey & Moses, 2018; Sarfaraz, 2017). Findings of a study on modeling students readiness to embrace mobile learning (Al-Adwan et al. 2018) is in agreement with preceding studies that Social factor have a positive effect on mobile learning acceptance.

2.24 Justification for integration of UTAUT and MLAM Models

Over the years, scholars made several attempts to find out the possible factors influencing the acceptance of new technologies among users in diverse situations. From such studies, several models and extensions were developed to investigate variables influencing technology acceptance or rejection among users (Teo, 2011). In the same vein, this study uses the Unified Theory of Acceptance and Use of Technology (UTAUT) model in conjunction with MLAM framework to investigate factors that affect the acceptance of mobile learning among students in Nigerian educational settings.

The UTAUT model is a widely recognized theoretical framework that explains individuals' acceptance and use of technology. The model encompasses four main predictors-Performance Expectancy, Efforts Expectancy, Facilitating Condition and Social Influence. Gender, Age, Experience, and voluntariness were provided in the model to serves as moderating variables (Venkatesh et al. 2003). UTAUT model has been tested and found capable of accounting for nearly 70% of the variance of intention to accept new technologies. The Model was also used extensively to investigate the acceptance of mobile learning by students due to its unfailing ability to explain a large portion of the variables influencing behavioural intention to accept new technology (Bere, 2014).

However, Tarhini et al. (2017; and Almaiah et al. (2019) argued that in principle, several studies employed traditional theories such as Technology Acceptance Model (TAM) and UTAUT to investigate mobile learning

acceptance but failed in providing a full explanation of factors influencing acceptance of mobile learning. Similarly, Saleh Alharbi. (2014); Tey and Moses, (2018) demonstrated that mobile learning settings are quite different from Information System (IS) environment, as a result, several mobile learning studies have extended the UTAUT model with other theories by adding more variables or dropping some variables to suites their specific context with a view to sufficiently identify solutions to contextual problems. Hence, the justification for its integration with the MLAM measures of mobile learning acceptance in this study.

2.2.5 Research Model

Studies utilizing the UTAUT model have modified it by adding new variables or simplifying existing ones to better fit the specific context of their research. This adaptation is necessary because the rate of mobile device penetration and mobile learning adoption varies across different countries (Mtebe & Raisamo, 2014). Similarly, this study has extended the UTAUT model to better align with the context of mobile learning acceptance in Nigeria. The key concepts for the study were proposed in line with the research questions. The conceptual framework proposed a direct relationship between the UTAUT and MLAM Predictors and the Dependent variable (Criterion) variables as illustrated in Figure 2 below:

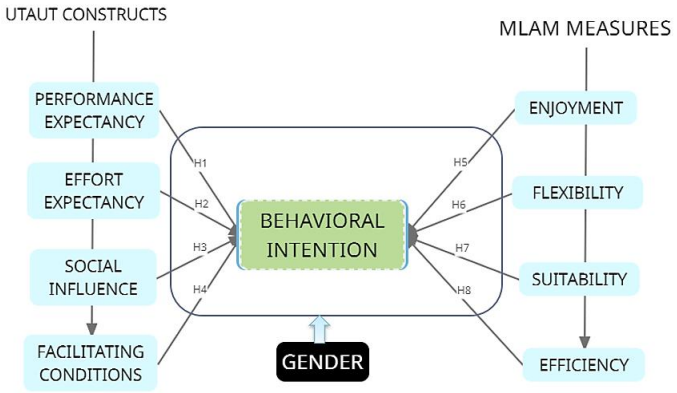

Figure 2: Proposed Research Model

2.2.6 Research Hypotheses

Based on the proposed model, hypotheses were formulated to test the relationships of the constructs and their possible prediction of behavioural intention to accept mobile learning as follows:

a) Performance Expectancy (Pe-Ex)

In the context of this study, Pe-Ex refers to the degree at which students believes that mobile learning is helpful and will enhance his/her academic performance. As shown in the proposed conceptual framework performance expectancy is a direct predictor of Be-In to accept mobile learning. Hence, the null hypothesis is stated as follows:

Null hypothesis 1: *Pe-Ex has no significant effect on Be—In to accept mobile learning.*

b) Efforts Expectancy (Ef-Ex)

In this study, Ef-Ex means the extent to which students considers that using mobile technologies for academic purpose well be less stressful and easy. As shown in the proposed conceptual framework Ef-Ex is a direct predictor of Be-In to accept mobile learning and it will be use in this study to measure the anticipated ease of use and simplicity associated with mobile learning. Hence the following hypothesis is formulated for this variable:

Null hypothesis 2: *Ef-Ex has no significant effect on Be—In to accept mobile learning.*

c) Social Influence (So-In)

In the context of this study, So-In refers to the extent at which students believed that important personalities (Parents, teachers, Authorities) have interest in using mobile technologies for academic purposes. Previous studies have confirmed the positive influence of this variable towards Be-In to accept new information system (Tey and Moses, 2018; Muftah, 2017; Edy Susanto 2019).

As shown in the proposed conceptual framework So-In is a direct predictor of Be-In to accept mobile learning. Hence the following hypothesis is formulated for this variable:

Null hypothesis 3: *So-In has no significant effect on Be—In to accept mobile learning.*

d) Facilitating Condition (Fa-Co)

In this study, Fa-Co construct represents the extent to which students agreed that there are enough infrastructural facilities to support mobile learning. As shown in the proposed research model facilitating conditions is a direct predictor of Be-In to accept mobile learning and it will be use in this study to measure the resources (ICTs skills and facilities, Internets access, stable power supply) available to support mobile learning. Hence the following hypothesis is formulated for this variable:

Null hypothesis 4: *Fa-Co has no significant effect on Be—In to accept mobile learning.*

e) Flexibility

In this study flexibility denotes the degree to which student believed that mobile learning would be helpful in making teaching and learning activities more flexible. That is, learning can occur wherever, whenever and via different platforms and technologies. Hence, the following hypothesis is formulated:

Null hypothesis 5: *Flexibility has no significant effect on Be—In to accept mobile learning.*

f) Suitability

Suitability was conceived as the appropriateness of using portable devices (Smartphones, PDAs and others) for teaching and learning (Sharma et al. 2017;Sarrab et al. 2016). In this study the Suitability construct will be use in this study to measure the appropriateness and worthiness of embracing mobile learning technologies for academic purposes using the following hypothesis:

Null Hypothesis 6: Suitability has no significant effect *on Be—In to accept mobile learning.*

k) Enjoyment

In this context it is seen as the degree to which students believed that mobile learning would yield pleasing and gratifying results. Sharma et al. (2017) believed that enjoyment measure is quite relevant in investigating mobile learning acceptance. Hence, it will be use in this study to measure the expected gratification from the use of mobile learning systems using the following hypothesis:

Null hypothesis 7: *Enjoyment has no significant effect on Be—In to accept mobile learning.*

h) Efficiency

In this study it is considered as the degree to which student believe that mobile learning would improve his/her expertise and proficiency in learning. Sharma et al. (2017) believed that efficiency measure is quite relevant in investigating mobile learning acceptance. Hence, it will be used to measure expected gains in mobile learning in increasing expertise, know-how, capabilities and reducing mistakes among students. To do this, the following hypothesis is formulated for this variable:

Null hypothesis 8: *Efficiency has no significant effect on Be—In to accept mobile learning.*

i) Behavioral Intention (Be-In)

In the context of this study, Be-In is considered as the degree of mobile learning acceptance among students for academic purposes. As illustrated in the figure 2, Be-In represents the criterion variable upon which predictions could be made regarding acceptance of mobile learning among students. In consistent with the UTAUT theory (Venkatesh, Thong, and Xu 2012), this study expects that Be-In would have a significant effects on mobile learning acceptance. Hence, the null hypothesis for this variable is stated as follows:

Null hypothesis 9: *Behavioral Intention (Be-In) has no significant effect on Be—In to accept mobile learning.*

j) Gender

Gender is the range of characteristics pertaining to the state of being male or female. Consistent with the underlaying theory of this study, gender is not a direct predictor of Be-In to accept mobile learning but rather provides a moderating effect. Several studies (Momani & Jamous, 2017; (Venkatesh et al., 2003; (Teo, 2011; Dulloo et al., 2014; Um et al., 2003; Becker et al., 2018; Ajayi et al., 2019b): confirmed that Gender could moderate the effects of predicting variables on the criterion variable. To measure the effect of gender on Be-In the following hypotheses is formulated.

Null hypothesis 10: *There is no statistically significant difference in the population means in terms of Gender.*

RESEARCH METHODOLOGY

This study employed a quantitative survey design to systematically investigate the factors influencing the acceptance of mobile learning among target population utilizing the UTAUT and MLAM variables. This will provide systematic and reliable answers to the research questions, ensuring thorough analysis and valid conclusions.

3.1 Instrumentation

The survey instrument utilized in this study is an adaptation of empirically validated items from previous UTAUT-based technology acceptance model and MLAM scale. The proposed study instrument was designed to measure ten constructs within the research model namely, Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Enjoyment, Flexibility, Suitability, Efficiency, and Behavioral Intention. The instrument consists of two sections: demographic information and statements pertaining to the constructs, each rated on a five-point Likert scale ranging from strongly disagree to strongly agree.

Despite being previously validated in several studies, the instrument underwent additional validation and reliability testing. Content validity was assessed by experts from the Department of Educational Science, Mathematics, and Creative Multimedia at the University of Technology Malaysia, who confirmed the relevance and clarity of the constructs and recommended adding more items for each construct. Using a sample of twelves students, the instrument reliability was assessed using Cronbach's Alpha to measure internal consistency, with acceptable values set at 0.60 or higher. The pilot test yielded a Cronbach's Alpha value of 0.970. which indicates excellent internal consistency among the items of the survey instrument, affirming its reliability for measuring the intended constructs for the study.

3.2 Setting, Population and Sampling

Thew study was conducted at at Adamu Augie College of Education, Argungu, the only public teacher training institution in Kebbi State, North-West Nigeria. The research population comprises all 1,300+ students enrolled in the Nigeria Certificate in Education (NCE) program. The study employs a multistage probability sampling technique to select a representative sample of 354 students, ensuring a balanced gender distribution of 171 males and 171 females for the data collection stage. The sampling technique involved three stages: selecting

departments using simple random sampling, grouping students by gender within the selected department using stratified sampling, and finally, selecting individual students using simple random sampling. This approach ensures a comprehensive and unbiased representation of the target population, facilitating reliable and generalizable findings.

DATA ANALYSIS METHODS

The analysis of the surveyed data was conducted using SPSS 22. An independent sample t-test was employed to address the first research question, which sought to investigate the difference in Behavioral Intentions (Be-In) between male and female students regarding mobile learning acceptance. This test helps determine if there is a statistically significant difference in the means between the two independent groups. Subsequently, multiple regression analysis was performed to predict the extent to which multiple independent variables (Predictors) explain the continuous dependent variable (Criterion). This analysis identifies the most influential predictor variables contributing to Behavioral Intention (Be-In) to accept mobile learning among students. The use of scatterplots and correlations facilitated the examination of direct relationships between predictors and the criterion variable, as well as among the predictors themselves. This comprehensive approach enabled a detailed understanding of the factors influencing mobile learning acceptance among students' population.

FINDINGS

The flow of the data analysis is based on the order of the research questions. The descriptive statistics and inferential (regression analysis) were employed to address the research questions using SPSS 25. The results are presented in the following sub-sections.

4.1 Test of Normality

To conduct the test of significance difference using parametric statistical analysis (Regression included), it is recommended that, one of the most significant requirements is the data to be normally distributed. Similarly, an essential means of determining the normality of data is to conduct two main non-parametric tests (Shapiro-Wilk test and Kolmogorov-Smirnov test). Thus, the test of normality is presented in Table 1.

Table 1: Tests of Normality

	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
Performance Expectancy	.053	342	.020	.994	342	.158
Effort Expectancy	.066	342	.001	.990	342	.020
Social Influence	.059	342	.006	.994	342	.166
Facilitating Conditions	.056	342	.012	.993	342	.119
Enjoyment	.051	342	.031	.994	342	.218
Flexibility	.049	342	.050	.994	342	.178
Suitability	.058	342	.008	.988	342	.006
Efficiency	.040	342	.200*	.995	342	.425
Behavioral Intention	.053	342	.021	.993	342	.099

a. Lilliefors Significance Correction

As presented in the table 1, two normality tests were run. However, in this study, Shapiro-Wilk test statistics was considered in determining the normality. Shapiro-Wilk test is used because the requirement for a data set smaller than 2000 elements for normality can used it and for dataset of 2000 elements and above can use Kolmogorov-Smirnov test (Garson, 2012, Ghasemi and Zahediasl, 2012, Rani Das, 2016). In the case of this study there are only 342 elements, thus Shapiro-Wilk test is used.

The test results showed that, p-value for all the study's variables is higher than 0.05 except for the two variables Suitability and Effort Expectancy whose values are less than 0.05. However, looking at their skewness and kurtosis values, the two variables revealed a normal distribution with the skewness values of .269 and .101 for Suitability and Effort Expectancy, respectively. Similarly, the variables have kurtosis values of -.075 and -.134 for Suitability and Effort Expectancy respectively which are all within the range of of -2.0 to 2.0 for skewness and – 3.0 to 3.0 for kurtosis (Pallant, 2013). Thus, it can be concluded that, the data comes from the normal distribution. Likewise, the graphical illustrations of the data as shown by normal Q-Q Plots proves that the data for all the variables did not violate the normality assumptions. Similarly, the normal Q-Q Plot which is a graphical alternative method of assessing normality is also easier to use when small sample size is involved, showed that in all the cases, the scatter lied close to the diagonal line as possible with no obvious pattern coming away from the line, thus the data can be considered normally distributed.

4.2 Research Questions

Following normality testing, the data analysis proceeds with the analysis of the data based on the order of the research questions as follows:

Research Question 1

As presented in Table 2 below, the independent-samples t-test is used to determine if a difference exists between the means of two independent groups on a continuous dependent variable. More specifically, it will enable the researcher to determine whether the difference between two groups is statistically significant, in this case male and female students' population.

Table 2: Be-In of Male and Female students.

	Gender	N	Mean	SD	df	P-value
	Male	171	2.98	0.40		
Behavioural Intention					340	0.813
	Female	171	3.00	0.38		

The result of the test for differences using the independent sample t-test obtained, as shown in Table 2, shows the t (340) = -0.237 and p *value*= 0.813, $\alpha = 0.05$ for Behavioral Intention. The result of the descriptive analysis shows that, the mean Behavioral Intention level of male students (Mean=2.98; SD = 0.40) is not significantly higher than that of female students (Mean=3.00; SD = 0.38) and the P= 0.813 > 0.05. From these results, it can be inferred that there is no significant difference between male and female Be-In towards accepting mobile learning. The null hypothesis which says there is no statistically significant difference in Be-In between Male and Female students' population towards accepting mobile learning based on gender is accepted since P= 0.813 > 0.05.

Research Question 2

Table 3, 4, and 5 present the result of regression analysis to answer the research question 2.

The *F*-ratio in the ANOVA test presented in Table 3 shows whether the overall regression model is a good fit for the data in this study. The result table reveals that the independent variable statistically significantly

predicts the dependent variable, F (1, 340) = 36.050, $p < .05$. This means that the regression model has a good fit for the data.

Table 3: ANOVA Test

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	4.120	1	4.120	36.050	.000[b]
	Residual	38.861	340	.114		
	Total	42.981	341			

a. Dependent Variable: Behavioral_Intention

b. Predictors: (Constant), Performance Expectancy

The result presented in Table 3 revealed that, the correlation between behavioural Intention and the predictor (Performance Expectancy) is .310. The R^2 value of .096 means that, 9.6% changes in behavioural Intention were explained by Pe-Ex.

Table 4: Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.310[a]	.096	.093	.33808

a. Predictors: (Constant), Performance Expectancy

b. Dependent Variable: Behavioral_Intention

This finding means that Pe-Ex significantly influences Be-In. Further information revealed in Table 5 using the sample size of (n=342), revealed that the Pe-Ex is the main variables for Be-In to accept mobile learning.

Table 5: Coefficient and Significance of the Regression

		Unstandardized Coefficients		**Standardized Coefficients**		
Model		**B**	**Std. Error**	**B**	**t**	**Sig.**
1	(Constant)	2.186	.134		16.323	.000
	Performance Expectancy	.239	.040	.310	6.004	.000

a. Dependent Variable: Behavioral Intention

The above result showed that, significantly, on the overall Pe-Ex contributes 9.6% variance ($R^2 = .096$) in the Behavioral Intention in this study. The information in this Table means that Pe-Ex ($\beta = .310$, $p < .05$) provide 9.6% variance ($R^2 = .096$) in the dependent variable in this study (Behavioral Intention). The finding of this research question on the overall revealed that, Pe-Ex is a significant variable for Behavioral Intention.

Research Question 3

Table 4:6, 4:7 and 4:8 present the result of regression analysis to answer the research question 3.

The *F*-ratio in the ANOVA test presented in Table 6 shows whether the overall regression model is a good fit for the data in this study. The result table reveals that the independent variable statistically significantly predicts the dependent variable, F (1, 340) = 7.681, $p < .05$. This means that the regression model has good fit for the data.

Table 6: ANOVA Test

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	.950	1	.950	7.681	.006[b]
	Residual	42.032	340	.124		
	Total	42.981	341			

a. Dependent Variable: Behavioral Intention

b. Predictors: (Constant), Effort Expectency

The result presented in Table 7 revealed that, the correlation between shows that the correlation between Behavioral Intention and the predictor (Effort Expectancy) is .149. The R^2 value of .022 means that, 2.2% changes in Behavioral Intention are explained by Ef-Ex.

Table 7: Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.149[a]	.022	.019	.35160

a. Predictors: (Constant), Effort Expectency

b. Dependent Variable: Behavioral Intention

This finding means that, Ef-Ex significantly influences behavioural Intention. Further information revealed in Table 8 using the sample size of (n=342), revealed that the Ef-Ex is one of the main variables for behavioural Intention.

Table 8: Coefficient and Significance of the Regression

		Unstandardized Coefficients		**Standardized Coefficients**		
Model		**B**	**Std. Error**	**B**	**t**	**Sig.**
1	(Constant)	2.716	.098		27.650	.000
	Effort Expectancy	.082	.030	.149	2.771	.006

a. Dependent Variable: Behavioral Intention

The result in table 8 showed that, significantly, on the overall Ef-Ex contributes 2.2% variance (R^2= .022) in the behavioural Intention in this study. The information in this Table means that Ef-Ex (β =.149, $p < .05$) provide 2.2% variance (R^2=.022) in the dependent variable in this study (behavioural Intention). The finding of this research question on the overall revealed that, Ef-Ex is a significant variable for behavioural Intention.

Research Question 4

Table 9, 10 and 11 presents the result of regression analysis to answer the research question 4.

The *F*-ratio in the ANOVA test presented in Table 9 shows whether the overall regression model is a good fit for the data in this study. The result table reveals that the independent variable statistically significantly predicts the dependent variable, F (1, 340) = 14.158, $p < .05$. This means that the regression model has good fit for the data.

Table 9: ANOVA Test

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	1.718	1	1.718	14.158	.000[b]
	Residual	41.263	340	.121		
	Total	42.981	341			

a. Dependent Variable: Behavioral Intention

b. Predictors: (Constant), Social Influence

The result presented in Table 9 revealed that, the correlation between Be-In and the predictor (So-In) is .200. The R^2 value of .040 means that, 4% changes in Be-In were explained by So-In.

Table 10: Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.200[a]	.040	.037	.34837

a. Predictors: (Constant), Social Influence

b. Dependent Variable: Behavioral Intention

This finding means that the So-In significantly influence Be-In. Further information revealed in Table 11 using the sample size of (n=342), revealed that the So-In is the main variables for Be-In.

Table 11: Coefficient and Significance of the Regression

		Unstandardized Coefficients		**Standardized Coefficients**		
Model		**B**	**Std. Error**	**B**	**t**	**Sig.**
1	(Constant)	2.619	.098		26.593	.000
	Social Influence	.107	.028	.200	3.763	.000

a. Dependent Variable: Behavioral Intention

The above result showed that, significantly, on the overall So-In contributes 4% variance (R^2= .040) in the Be-In in this study. The information in Table 11 means that Social Influence (β =.200, $p < .05$) provide 4%

variance (R^2=.040) in the dependent variable in this study (Be-In). The finding of this research question on the overall revealed that, So--In is a significant variable for Be-In.

Research Question 5

Table 12, 13 and 14 presents the result of regression analysis to answer the research question 5.

The *F*-ratio in the ANOVA test presented in Table12 shows whether the overall regression model is a good fit for the data in this study. The result table reveals that the independent variable statistically significantly predicts the dependent variable, F (1, 340) = 3.962, $p < .05$. This means that the regression model has good fit for the data.

Table 12: ANOVA Test

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	.495	1	.495	3.962	.043[b]
	Residual	42.486	340	.125		
	Total	42.981	341			

a. Dependent Variable: Behavioral Intention

b. Predictors: (Constant), Facilitating Conditions

The result presented in Table 13 revealed that, the correlation between shows that the correlation between Be-In and the predictor (Fa-Co) is .107. The R^2 value of .012 means that, 1.2% changes in Be-In were explained by Fa-Co.

Table 13: Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.107[a]	.012	.009	.35350

a. Predictors: (Constant), Facilitating Conditions

b. Dependent Variable: Behavioral Intention

This finding means that, the Fa-Co significantly influence Be-In. Further information revealed in Table 14 using the sample size of (n=342), revealed that the Fa-Co is the main variables for Behavioral Intention in the context of this study.

Table 14: Coefficient and Significance of the Regression

		Unstandardized Coefficients		**Standardized Coefficients**		
Model		**B**	**Std. Error**	**B**	**t**	**Sig.**
1	(Constant)	2.726	.130		20.898	.000
	Facilitating Conditions	.087	.044	.107	1.990	.043

a. Dependent Variable: Behavioral Intention

The above result showed that, significantly, on the overall Fa-Co contributes 1.2% variance (R^2= .012) in the Be-In in this study. The information in this Table means that Fa-Co (β =.107, p < .05) provide 1.2% variance (R^2=.012) in the dependent variable in this study (Be-In). The finding of this research question on the overall revealed that Fa-Co is a significant variable for Be-In to accept mobile learning.

Research Question 6

Table 15, 16 and 17 presents the result of regression analysis to answer the research question 6.

The *F*-ratio in the ANOVA test presented in Table 15 shows whether the overall regression model is a good fit for the data in this study. The result table reveals that the independent (Enjoyment) variable statistically predicts the dependent variable, F (1, 340) =.671, p < .05. This means that the regression model has good fit for the data.

Table 15: ANOVA Test

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	.085	1	.085	.671	.413[b]
	Residual	42.897	340	.126		
	Total	42.981	341			

a. Dependent Variable: Behavioral Intention

b. Predictors: (Constant), Enjoyment

The result presented in Table 16 revealed the correlation between behavioural Intention and the predictor (Enjoyment) is .044. The R^2 value of .002 means that, .2% changes in Be-In were explained by Enjoyment variable.

Table **Error! No text of specified style in document.**:16 Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.044[a]	.002	-.001	.35520

a. Predictors: (Constant), Enjoyment

b. Dependent Variable: Behavioral Intention.

This finding means that the Enjoyment does not significantly influence Be--In. Further information revealed in Table 17 using the sample size of (n=342), revealed that the Enjoyment cannot be considered as one of the main variables for Be-In.

Table 17: Coefficient and Significance of the Regression

		Unstandardized Coefficients		**Standardized Coefficients**		
Model		**B**	**Std. Error**	**B**	**t**	**Sig.**
1	(Constant)	2.875	.133		21.654	.000
	Enjoyment	.037	.045	.044	.819	.413

a. Dependent Variable: Behavioral Intention

The above result showed that on the overall Enjoyment contributes .2% variance (R^2= .096) in the Be-In in this study. The information in this Table means that Enjoyment (β =.044, p< .05) provide .2% variance (R^2=.096) in the dependent variable in this study (Be-In). The finding of this research question on the overall revealed that, Enjoyment is not a significant variable for Be-In to accept mobile learning.

Research Question 7

Table 18, 19 and 20 present the result of regression analysis to answer the research question 7.

The *F*-ratio in the ANOVA test presented in Table 18 shows whether the overall regression model is a good fit for the data in this study. The result table reveals that the independent variable statistically significantly predicts the dependent variable, F (1, 340) = 132.215, p < .05. This means that the regression model has good fit for the data.

Table 18: ANOVA Test

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	12.034	1	12.034	132.215	.000[b]
	Residual	30.947	340	.091		
	Total	42.981	341			

a. Dependent Variable: Behavioral Intention

b. Predictors: (Constant), Flexibility

The result presented in Table 19 revealed that the correlation between shows that the correlation between Be-In and the predictor (Flexibility) is .529. The R^2 value of .280 means that, 28% changes in Behavioral Intention are explained by Flexibility in affecting Be-In to accepts mobile learning.

Table 19: Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.529[a]	.280	.278	.30170

a. Predictors: (Constant), Flexibility

b. Dependent Variable: Behavioral Intention

This finding means that, the Flexibility significantly influence Be-In. Further information revealed in Table 20 using the sample size of (n=342), revealed that the Flexibility is the main variables for Be-In.

Table 20: Coefficient and Significance of the Regression

		Unstandardized Coefficients		**Standardized Coefficients**		
Model		**B**	**Std. Error**	**B**	**T**	**Sig.**
1	(Constant)	1.817	.103		17.682	.000
	Flexibility	.361	.031	.529	11.498	.000

a. Dependent Variable: Behavioral Intention

The above result showed that, significantly, on the overall Flexibility contributes 28% variance (R^2= .280) in the Be-In in this study. The information in this Table means that Flexibility (β =.529, $p < .05$) provide 28% variance (R^2=.280) in the dependent variable in this study (Be-In). The finding of this research question on the overall revealed that, Flexibility is a significant variable for Be-In.

Research Question 8

Table 21,22 and 23 present the result of regression analysis to answer the research question 8.

The *F*-ratio in the ANOVA test presented in Table 21 shows whether the overall regression model is a good fit for the data in this study. The result table reveals that the independent variable statistically significantly predicts the dependent variable, F (1, 340) = 87.752, $p < .05$. This means that the regression model has good fit for the data.

Table 21: ANOVA Test

ANOVA[a]						
Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	8.817	1	8.817	87.752	.000[b]
	Residual	34.164	340	.100		
	Total	42.981	341			

a. Dependent Variable: Behavioral Intention

b. Predictors: (Constant), Suitability

The result presented in Table 22 revealed that, the correlation between Be-In and the predictor (Suitability) is .453. The R Square value of .205 means that, 20% changes in Be-In is explained by Suitability in influencing Be-In to accept mobile learning.

Table **Error! No text of specified style in document.**:22 Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.453[a]	.205	.203	.31699

a. Predictors: (Constant), Suitability

b. Dependent Variable: Behavioral Intention

This finding means that the Suitability significantly influences Be-In. Further information revealed in Table 23 using the sample size of (n=342), revealed that the Suitability is the main variables for Be-In.

Table 23: Coefficient and Significance of the Regression

		Unstandardized Coefficients		**Standardized Coefficients**		
Model		**B**	**Std. Error**	**B**	**t**	**Sig.**
1	(Constant)	2.126	.093		22.846	.000
	Suitability	.247	.026	.453	9.368	.000

a. Dependent Variable: Behavioral Intention

The above result showed that, significantly, on the overall Suitability contributes 20% variance (R Square= .205) in the Be-In in this study. The information in this Table means that Suitability (β =.453, $p < .05$) provide 20% variance (R^2=.205) in the dependent variable in this study (Be-In). The finding of this research question on the overall revealed that, Suitability is a significant variable for Be-In.

Research Question 9

Table 24, 25 and 26 present the result of regression analysis to answer the research question 9.

The *F*-ratio in the ANOVA test presented in Table 24 shows whether the overall regression model is a good fit for the data in this study. The result table reveals that the independent variable statistically significantly predicts the dependent variable, F (1, 340) = 0.393, $p > .05$. This means that the regression model has no good fit for the data.

Table 24: ANOVA Test

ANOVA[a]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	.050	1	.050	0.393	.531[b]
	Residual	42.932	340	.126		
	Total	42.981	341			

a. Dependent Variable: Behavioral Intention

b. Predictors: (Constant), Efficiency

The result presented in Table 25 revealed that the correlation between Be-In and the predictor (Efficiency) is .034. The R Square value of .001 means that 0.1% changes in Be-In is explained by Efficiency.

Table 25: Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.034[a]	.001	-.002	.35534

a. Predictors: (Constant), Efficiency

b. Dependent Variable: Behavioral Intention

This finding means that, the Efficiency significantly influence Be-In. Further information revealed in Table 26 using the sample size of (n=342), revealed that, the Efficiency is the main variables for Be-In.

Table 26: Coefficient and Significance of the Regression

		Unstandardized Coefficients		**Standardized Coefficients**		
Model		**B**	**Std. Error**	**B**	**t**	**Sig.**
1	(Constant)	3.077	.152		20.299	.000
	Efficiency	-.033	.052	-.034	-.627	.531

a. Dependent Variable: Behavioral Intention

The above result showed that, significantly, on the overall Efficiency contributes 0.01% variance (R^2= .001) in the Be-In in this study. The information in this Table means that Efficiency (β =.034, p > .05) provide .01% variance (R^2 =-.002) in the dependent variable in this study (Be-In). The finding of this research question on the overall revealed that, Efficiency is not a significant variable for Be-In.

DISCUSSION AND IMPLICATIONS

This study proposed an integrated research framework consisting of the UTAUT core constructs and four (4) variables of MLAM models to statistically investigate the conceptualized effects between the predicting and the criterion variables of this research model. The analysis revealed that no statistically significant difference between male and female students in terms of their behavioral intentions to accept mobile learning, as indicated by the independent samples t-test results (t (340) = -0.237, p = 0.813). This finding indicates that both male and female students are equally inclined to embrace mobile learning, in contrast with Venkatesh et al. (2012) which found no significant gender differences in technology acceptance. Several studies further, revealed that Pe-Ex affect users Be-In to accept and use technologies (Momani and Jamous, 2017; Alkhalifah, 2018; Çelik and Karayaman, 2018; Almaiah et al., 2020a; Tey et al. 2018; Julius et al. 2018; Bere 2014; Mohamad and Kassim 2019; Bervell and Umar 2017). In agreement with these findings, the regression analysis demonstrated that Pe-Ex significantly influences Be-In to accept mobile learning, with an F (1, 340) = 36.050, p < .05 and an R^2 value of .096. This indicates that 9.6% of the variance in Be-In is explained by Pe-Ex. This finding reinforces the UTAUT model's assertion that Pe-Ex is a critical determinant of technology acceptance.

Similarly, the Regression results shows that Ef-Ex (β =.149, p < .05) has significant effect on students' Be-In to accept mobile learning. This confirmed previous studies which evidenced that perceived Ef-Ex could positively affects decisions to embrace mobile learning technologies (Tey and Mose 2018; Ali and Mohd Arshad 2018; Alasmari 2018; Ayomide Odegbesan et al. 2019; Ayomide Odegbesan et al. 2019; and Badan et al. 2018). The result aligns with the UTAUT model, which posits that the ease of use associated with technology influences users' acceptance. Although Effort Expectancy has a smaller impact compared to Performance Expectancy, it remains a significant factor in the acceptance of mobile learning.

Furthermore, this study found that So-In has significant effect with (β =.200, p < .05) and an R^2 value of .040. This means that So-In explains 4% of the variance in Be-In of mobile learning acceptance. This confirmed the findings by (Thongsri et al. 2018; Moorthy et al. 2019, Moorthy et al. 2019, L. L. Zhou et al. 2019, Tey and Moses 2018) which reported significant relation between So-In and Be-In. This finding also supports the UTAUT model's assertion that So-In is a determinant of technology acceptance.

This study also found that Fa-Co has effect on Be-In to accept mobile learning with an F (1, 340) = 3.962, p < .05 and an R^2 value of .012. This indicates that Fa-Co account for 1.2% of the variance in Be-In. This result aligns with the UTAUT model, which includes Fa-Co as a factor influencing technology acceptance. Other studies that supported Fa-Co as important predictor includes (Julius Raphael Athuman Mhina, 2018; Badan and Igeria, 2018; Alasmari, 2018; Bashri 2016; Bervell and Umar 2017; Zhou et al. 2019).

MLAM variables and Behavioral Intention

The proponents of MLAM model believed that enjoyment, flexibility, suitability, and efficiency variables have influence on mobile learning acceptance among learners (Sharma et al., 2017); Sarrab, Al Shibli et al; 2016). This study found that Flexibility has the most significant effect with (β =.529, p < .05) provide 28% variance (R^2=.280) in the dependent variable (Behavioral Intention). This was followed by Suitability with (β =.453, p < .05). While Enjoyment (β =.044, p< .05) and Efficiency (β =.034, p > .05) has no significant effect on Behavioral Intention to accept mobile learning among students. These clearly pointed out that perceived flexibility and Suitability advantage that could be afforded by mobile devices is a strong determinant of Be-In to acceptance of mobile learning among students. However, results of the study found that Enjoyment (β

=.044, p< .05), Efficiency (β =.034, p > .05) is not in agreement with previous studies by (Fan., 2014, Sharma et al., 2017) which showed a positive effect of efficiency in Be-In to accept mobile learning. However, lack of significance in this study does not underscore its relevance in mobile learning factors. Hanley (1994) emphasised that the best solution towards improving learning efficiency is to change the teaching and learning approach from teacher-centred to student-cantered in line with the constructivist principles which is embedded in a mobile learning situation in which the learner is central to the entire process.

Theoretical Implications

This study provides significant contributions to the theoretical understanding of mobile learning acceptance by integrating the UTAUT core constructs with MLAM variables. The findings indicate no statistically significant gender differences in behavioral intentions to accept mobile learning, in contrast to findngs by Venkatesh et al. (2012) and reinforcing the notion that mobile learning strategies do not need gender-specific tailoring. Secondly, Pe-Ex, emerged as a critical determinant, explaining 9.6% of the variance in Be-In to accept mobile learning, supporting the UTAUT model's assertions. Similarly, Ef-Ex and So-In were found to significantly impact Be-In, accounting for smaller but notable variances. These results confirm and extend existing literature on the importance of perceived usefulness and ease of use in technology acceptance (Momani & Jamous, 2017; Tey & Moses, 2018).

Additionally, the study introduces the significance of the MLAM variables namely, Flexibility and Suitability, as strong predictors of mobile learning acceptance, explaining 28% and 20.5% of the variance in Be-In, respectively. This underscores the relevance of these factors in enhancing mobile learning experiences. However, the lack of significant influence from Enjoyment and Efficiency deviates from previous findings (Fan, 2014; Sharma et al., 2017), suggesting that while these factors may contribute to the learning experience, they are not primary drivers of acceptance. This highlights the need for further research to explore the conditions under which these factors become significant.

Practical Implications

The practical implications of this study are manifold. Given the lack of gender differences in mobile learning acceptance, educational institutions in Nigeria can implement mobile learning strategies without the need for gender-specific modifications. Focus should be placed on improving mobile learning infrastructure and resources that benefit all students equally. Emphasizing the practical benefits and effectiveness of mobile learning is essential. Educators and institutions should highlight how mobile learning can improve academic performance and provide convenient learning opportunities, thereby enhancing students' behavioral intentions to adopt these technologies.

Furthermore, ensuring that students have access to reliable internet connections, suitable devices, and technical support is crucial. Institutions should invest in necessary infrastructure and provide ongoing assistance to address technical issues. Promoting a positive attitude towards mobile learning among students and faculty, supported by influential figures such as parents, teachers, and school authorities, can significantly boost acceptance. The findings also suggest that mobile learning strategies should emphasize flexibility and suitability to align with students' preferences, thereby enhancing their acceptance. This aligns with the constructivist principles of student-centered learning, highlighting the importance of adapting teaching approaches to leverage the advantages offered by mobile technologies.

Limitations

The study has several limitations that must be considered. First, the relatively low explanatory power (R^2 values) for most predictors, except for Flexibility and Suitability, suggest that other factors not examined in this study may also play significant roles in influencing behavioral intention to accept mobile learning. Second, the study's reliance on self-reported data may introduce bias, as respondents might overestimate or underestimate their intentions. Third, the sample was limited to a specific demographical context, which may affect the generalizability of the findings to other populations and contexts. Finally, the cross-sectional design of the study limits the ability to establish causality between the predictors and the dependent variable. Future

research should explore additional variables and use diverse samples to validate and extend these findings to provide a more comprehensive understanding of mobile learning acceptance.

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