E-ISSN: 1115 - 8425 P-ISSN: 3027-012X
MPRI-JAEE | INTERNATIONAL JOURNAL OF ASSESSMENT & EVALUATION IN EDU.
VOL. 12 NO. 8 – APRIL. 2026

AN INVESTIGATION OF THE DETERMINANTS OF MOBILE LEARNING ACCEPTANCE AND UTILISATION AMONG UNIVERSITY STUDENTS IN NORTH CENTRAL, NIGERIA

MOSES DANIEL; BELLO AHMED; & USMAN ZALIHA NDATSU

Federal University of Technology, Minna, Bosso Campus, PMB 65, Minna, Niger State, Nigeria.

Corresponding Author: denielmosco84@gmail.com

DOI: https://doi.org/10.70382/mejaee.v12i8.0109

Abstract

The study investigated the determinants of mobile learning acceptance and utilisation among university students in North-Central Nigeria. The population of the study was 3,407 students drawn from Federal Universities in North-Central Nigeria. The sample of the study comprised of 348 undergraduate students purposively selected from seven Federal Universities in North-Central Nigeria. The study adopted concurrent triangular mixed method design in which eight quantitative and two qualitative (QUAN + qual) research questions guided the study with eight null hypotheses. The instruments used for data collection were closed ended questionnaire and open-ended focus group interview protocol. The instruments were validated by four experts and subjected to reliability test using Cronbach's alpha. A reliability coefficient of 0.94 was obtained. For the focus group interview protocol, Cohen's κ = 0.64 was obtained for students' acceptance and utilization of mobile learning. While thematic analysis was used for qualitative data using Atlas ti. Version 23.0. Similarly, linear regression analysis was used to test the hypotheses at 0.05 level of significance using SPSS version 26.0. The findings of the regression coefficient of PE (β = 0.657; *t* = 15.936; *p* = (.000), < 0.05), EE (β = 0.489; *t* = 10.262; p = .000), < 0.05), SI (β = .594; *t* = 13.526; *p* = (.000), < 0.05), and FC (β = 0.533; t = 11.530; p = .000) this suggests that the relationship is positive.

Keywords:
Investigation, Determinants, Mobile Learning Acceptance, Utilisation, University Students.

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

Complementing the quantitative findings, the qualitative finding of the construct revealed students' engagement with digital learning resources enhanced academic skills plays a crucial role in motivating their acceptance and utilization of mobile learning. The study recommended among others that developers of mobile learning applications and platforms should focus on enhancing performance and effort expectancy by minimizing the cognitive load required for ensuring user-friendly interfaces. This can be achieved through iterative design processes that prioritize simplicity, intuitive functionality, efficiency and accessibility

Introduction

Technology is a potential learning tool with great efficiency to enhance teaching and learning productivity with rapid online initiative for economic and social development in every aspect of life. The availability and the application principle of technology on the other hand have given rise to incorporation of information and communication technology (ICT) as a concept. Mobile learning, as a concept in teaching and learning, can be seen as a platform where multiple learning activities can be more acceptable using mobile devices and software application with no fix time and location provided all other condition are significantly constant.

Ultimately, acceptance to use mobile learning refers to students' behavioral intention to adopt mobile learning either as supplementary or as core learning approach. For more understanding, this study is underpinned by a Unified Theory of Acceptance Use of Technology (UTAUT), (Venkatesh *et al.,* 2003) model as a determinant factors. The theory holds that the key constructs performance expectancy, effort expectancy, social influence, and facilitating conditions are direct determinants of information system usage intention and usage behavior. The constructs performance expectancy means performance at work, quality, effectiveness, reliability and durability, (Hurley & Nina, 2020).while Effort expectancy refers to a degree to which person believed that using a particular system would be free from effort (Venkatesh *et al.,* 2016). The social influence is the degree to which individuals perceive that others' belief are important in their usage of mobile learning and focuses on the influence of the university, college, instructors, and the students' peers (Quadric *et al.,* 2020). Furthermore Facilitating Conditions (FC) means the availability of adequate support and resources for the proper use of technology (Venkatesh *et al*., 2016). A fundamental component of mobile learning acceptance and adoption has to rely on network infrastructures, and it is the essential element of mobile learning. Therefore, it is against this backdrop that the study poised to assess the determinants of mobile learning acceptance and utilization among university students to enable the teaching and learning process to be carried out more effectively.

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

Statement of the Research Problem

Despite the increasing availability and accessibility of mobile devices among university students in North Central Nigeria, the adoption and utilization of mobile learning (m-learning) remains relatively low. Retrogressively, the research landscape of mobile learning among university students in North Central Nigeria is marked by a multitude of intricate challenges, encompassing limited device access, varying degrees of device ownership, disparities in internet access, fluctuations in internet bandwidth strength, and inconsistencies in technical and managerial support services. However, there is a lack of understanding of the factors that influence the acceptance and utilization of m-learning among university students in North-Central, Nigeria. Therefore, this study aims to examine the determinants of mobile learning acceptance and utilization among university students in the North-central, Nigeria.

Aim and Objectives of the Study

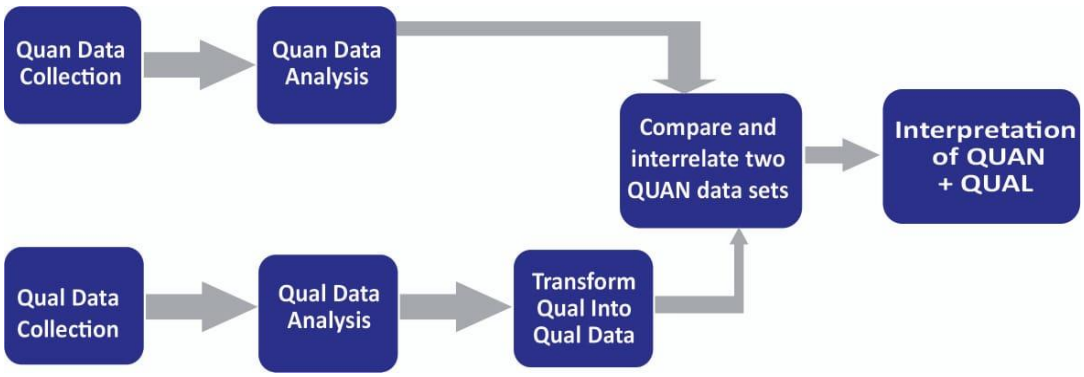
1) determine the influence of performance expectancy on students 'acceptance to mobile learning in Universities in North-central Nigeria.
2) find out the influence of effort expectancy on students' acceptance to mobile learning in Universities in North-Central Nigeria.
3) establish the impact of social influence on students' acceptance to mobile learning in Universities of North-central Nigeria.
4) investigate the influence of facilitating conditions on students' acceptance of mobile learning in Universities in North-Central Nigeria.
5) find out the influence of performance expectancy on students' utilization of mobile learning in universities in North-Central Nigeria.
6) establish the impact of effort expectancy on students 'utilization of Mobile learning in Universities in North-Central Nigeria.
7) determine the impact of social influence on students' utilization of mobile learning in Universities in North-Central Nigeria.
8) find out the influence facilitating condition on students' utilization of mobile learning in Universities in North-Central Nigeria.
9) establish the influence of performance expectancy, effort expectancy, social influence and facilitating conditions on students' acceptance toward mobile learning in Universities in North-Central Nigeria
10) determine the influence of performance expectancy, effort expectancy, social influence and facilitating conditions on students' utilization toward mobile learning in Universities in North-Central Nigeria.

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

RESEACH METHODOLOGY

The study employed a concurrent triangular mixed method design to test the relationship between the determinants of mobile learning acceptance among universities students in North-Central Nigeria. Mixed method involves merging or incorporating qualitative and quantitative research and data in a single study (Nur-E, 2019). This merging allows the quantitative and qualitative data to be mixed during the analysis stage and facilitates interrelation and analysis the two independent data sets.

Figure 1. 2 Shows a visual Triangulation Design: Data Transformation Model (Transforming QUAL data into QUAN)



Source: Adopted from creswell, (2003).

The sample for the study comprised of 348 respondents who the students are offering computer sciences in seven Federal Universities within the study area. The North-Central Nigeria is made up of Benue, Kogi, Kwara, Nasarawa, Niger, Plateau State and the Federal Capital Territory Abuja. The study adopted multi-stage sampling technique using purposive and simple random sampling techniques.

In the study area, there are seven Federal government owned Universities. Since Federal Universities distribution in the study area is not much, randomization is not necessary of these Universities hence, the seven Universities were purposively selected and used for the study base on their common characteristics. Thereafter, simple random sampling technique was used in selecting 58 students in each of the six Universities that offer computer sciences. The research instrument that was used for the study is structured closed ended questionnaire and open-ended focus group interview protocol. The questionnaire titled "Students Mobile Learning Acceptance" (SMLA) was adapted from the scale developed by Venkatesh *et al.,* (2003) and modified to suit the research objectives. The instrument was validated by research team, despite its validation status, it was further subjected to face and content validation by experts and subjected to reliability check using Cronbach's alpha. The reliability coefficient of the items for students' acceptance of mobile learning for independent variables was ascertained for

Performance Expectancy as α = 0.94 with five items, Effort Expectancy as α = 0.82 with five items, Social Influence as α = 0.88 with five items, Facilitating Conditions as α = 0.94 with five items, while α = 0.82 was obtained for acceptance of mobile learning with seven items for dependent variable. Likewise, the reliability coefficient of the items for students' utilization of mobile learning was ascertained for Performance Expectancy as α =0 .96 with five items, Effort Expectancy as α = 0.95 with five items, Social Influences α = 0.93 with five items, Facilitating Conditions as α = 0.95 with five items, while α = 0.95 was obtained for utilization of mobile learning with eight items. The results reliability coefficients of the PE, EE, SI and FC were supported by Hair *et al*, (2003) who reported that a reliability coefficient 0.8 is consider adequate and acceptable for a research like this.

For the focus group interview protocol, a pilot focus group interview was conducted with six students purposively selected in the university where the questionnaire was pilot tested. Two lecturers were used in collecting, transcribing, coding and interpreting the data. The outcome of the two investigators was coded as rater = (R1), and rater=(R2) and were assigned a numerical value to qualify the data for Cohen's kappa interrater reliability analysis. The results of this analysis yielded a Cohen's κ coefficient of .64 indicating a substantial level of agreement between the two raters in their assessments of students' acceptance and utilization of mobile learning. Following Cohen's kappa criteria, agreement levels are categorized as follows: 00.01—0.20 indicating slight agreement; 0.21—0.40 indicating fair agreement; 0.41—0.60 indicating moderate agreement; 0.61—0.80 indicating substantial agreement; and 0.81—1.00 indicating perfect agreement. The results obtained were considered both comprehensive and reliable for the purposes of this study (Altman, 1999).

The research work was analyzed using descriptive and inferential statistics. Descriptive statistic for quantitative data such as Mean and Standard Deviation used to answer the research questions with the arithmetic mean for the values sum as 5+4+3+2+1=15/5=3.00. Any item with mean weight of 3.00 and above considered accepted, however a mean item weighing less than 3.00 was rejected as decision rule. Descriptive statistic for qualitative data was thematic analysis was used to answer research question five with the help of Atlas ti. Version 23.0.

Findings

Answering Research Questions for Quantitative Data (Phase Ia).

Research question one: What is the influence of performance expectancy on students' 'acceptance to mobile learning in Universities of North-Central Nigeria?

To answer research question one, on the relationship between PE and students' acceptance of mobile learning scattered plot was used to illustrate the relationship in figure 1.3

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

Figure 1.3: Scattered plot relationships between PE and students' acceptance of mobile learning

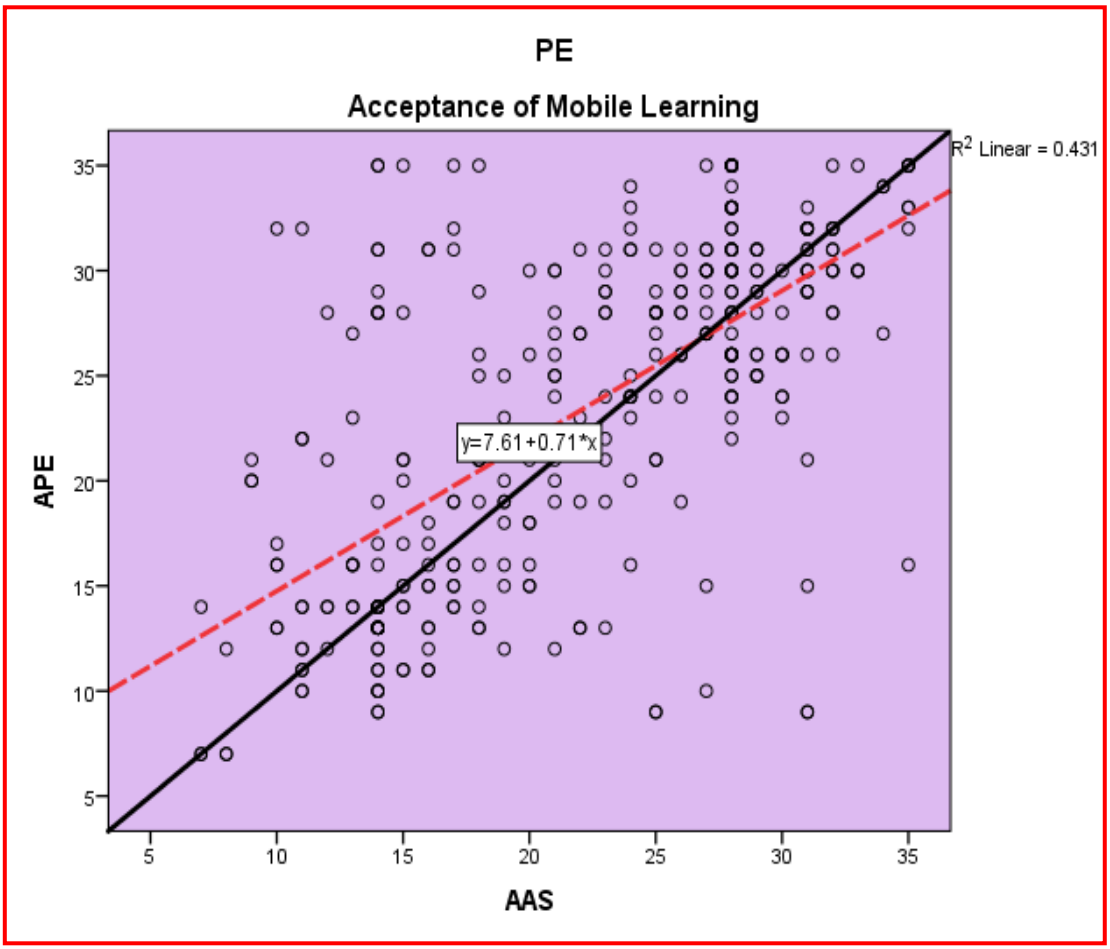


Figure 1.3 shows a scatterplot depicting the relationship between PE and students' acceptance of mobile learning. The scatterplot show a positive relationship between the two constructs, as indicated by the upward slope of the regression line. The positive slope indicates that as students find mobile learning easier to use, their acceptance of it increases. This highlights the importance of designing user-friendly mobile learning platforms to enhance student engagement and acceptance. Thus, linear regression analysis was used to determine the strength of this relationship.

Research question two: What is the influence of effort expectancy on students' acceptance to mobile learning in Universities of North-Central Nigeria?

To answer research question two, on the relationship between EE and students' acceptance of mobile learning scattered plot was used to illustrate the relationship in figure 1.4.

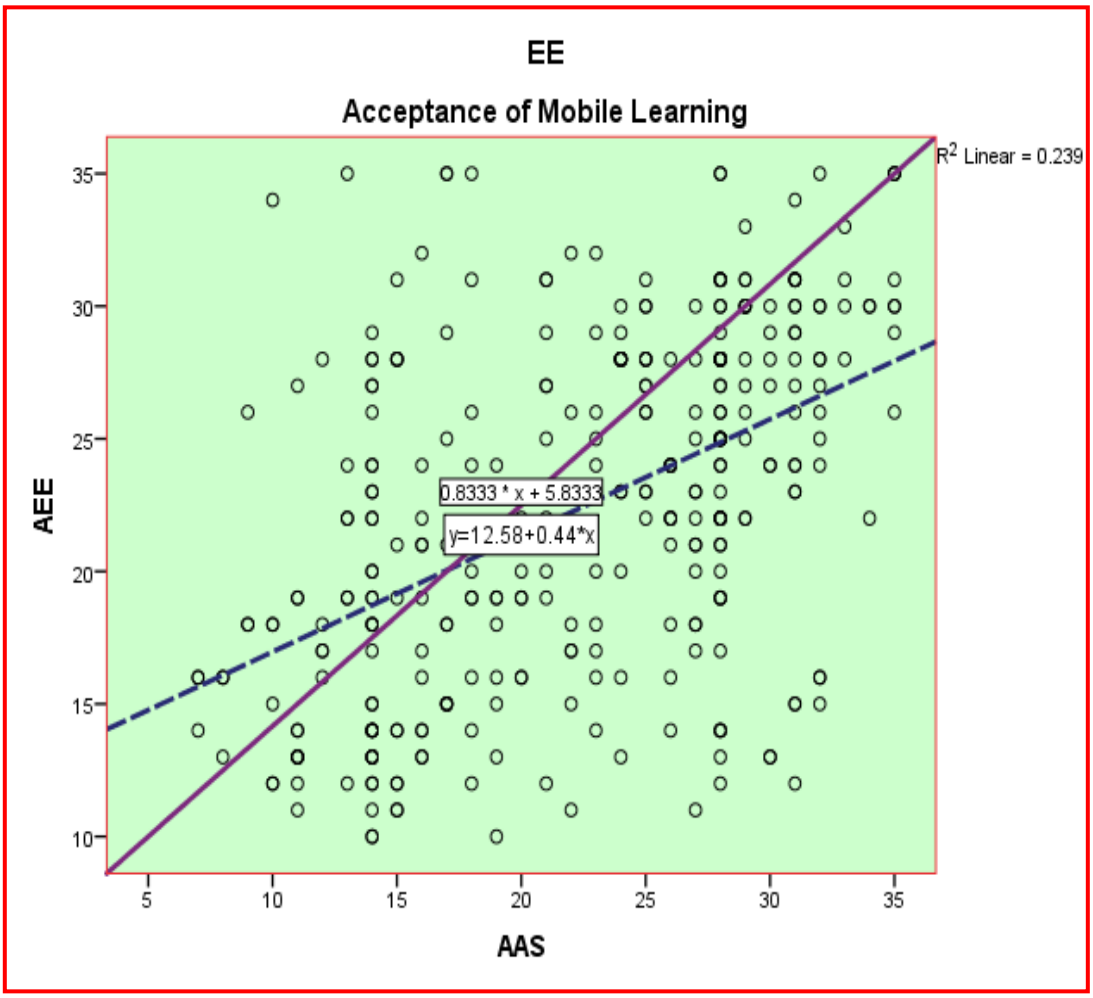


Figure 1.4: Scattered plot relationships between EE and students' acceptance of mobile learning

Figure 1.4 shows a scatterplot depicting the relationship between EE and students' acceptance of mobile learning. The scatterplot indicates a positive relationship between the two constructs, as evidenced by the upward slope of the regression line. This positive relationship suggests that as students find mobile learning platforms easier to use and less effort-intensive, their acceptance of these tools increase. This highlights the importance of developing mobile learning applications that are user-friendly and require minimal effort, to enhance adoption and effective usage among students. Therefore, linear regression analysis was used to determine the strength of this relationship.

To answer research question three, on the relationship between SI and students' acceptance of mobile learning scattered plot was used to illustrate the relationship in figure 1.5.

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

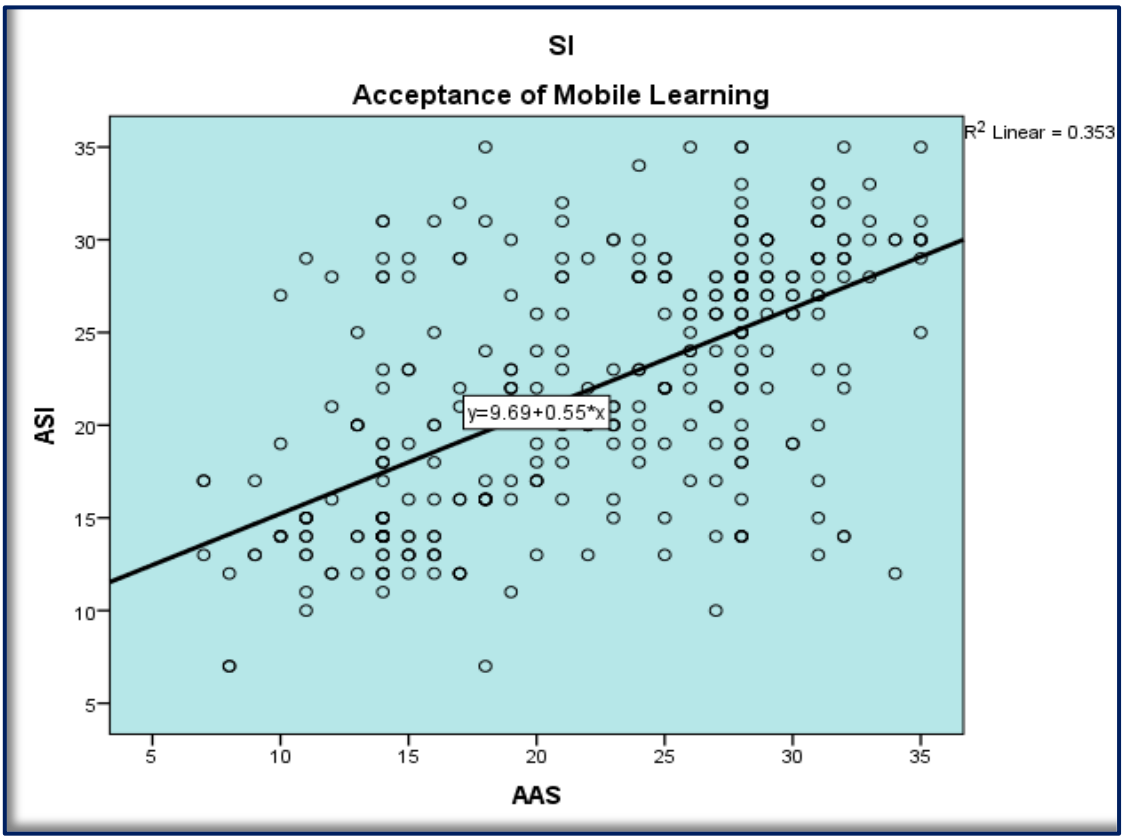


Figure 1.5: Scattered plot relationships between SI and students' acceptance of mobile learning

Figure 1.5 shows a scatterplot depicting the relationship between Social Influence (SI) and students' acceptance of mobile learning. The scatterplot indicates a positive relationship between the two constructs, as evidenced by the upward slope of the regression line. This positive correlation suggests that as the social influence on students' increases, their acceptance of mobile learning also rises. This highlights the significance of peer and societal support in encouraging the adoption of mobile learning technologies. Effective strategies to leverage social influence could further enhance students' willingness to engage with mobile learning platforms. As such, linear regression analysis was used to determine the relationship.

Research question four: What is the influence of facilitating conditions on students' acceptance to mobile learning in Universities of North-Central Nigeria?

To answer research question four, on the relationship between FI and students' acceptance of mobile learning scattered plot was used to illustrate the relationship in figure 1.6.

The relationship between FC and students' acceptance of mobile learning is illustrated using scatterplot in figure 1.6

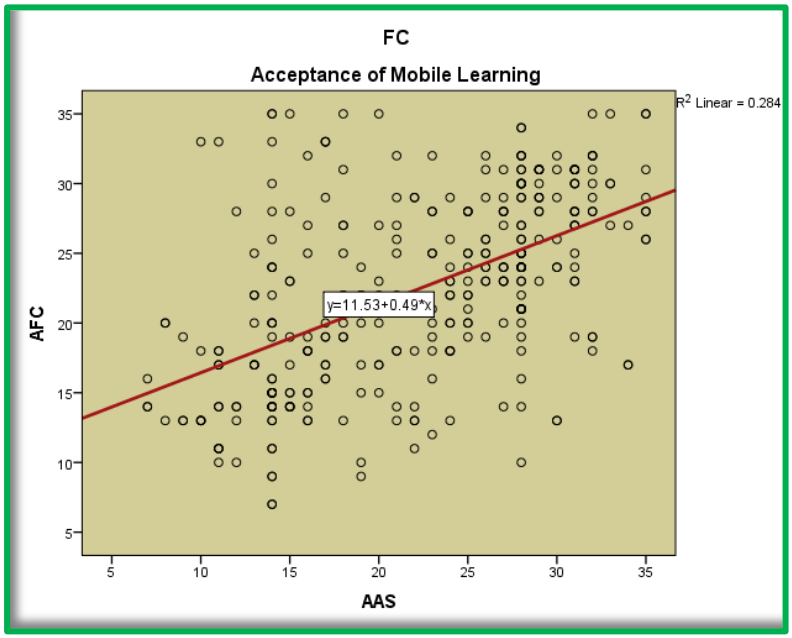


Figure 1.7: Scattered plot relationships between FC and students' acceptance of mobile learning

Figure 1.7 shows a scatterplot depicting the relationship between Facilitating Conditions (FC) and students' acceptance of mobile learning. The scatterplot indicates a positive relationship between the two constructs, as evidenced by the upward slope of the regression line. This positive correlation suggests that when students perceive strong facilitating conditions—such as available resources, their acceptance of mobile learning increases. This highlights the importance of providing robust support systems and adequate resources to foster the adoption and effective use of mobile learning technologies among students. Linear regression analysis was used to determine the strength of this relationship.

Research Questions for Quantitative Data

To answer research question five, six. Seven, and eight on the relationship between the determinants and students' and utilization to mobile learning, the same method was follow in which scattered plot was used to illustrate the relationship. The scatterplot indicates a positive relationship between the 8 constructs, as evidenced by the upward slope of the regression line.

Research question Nine: How do PE, EE, SI, and FC serve as the determinants in students' acceptance toward mobile learning in Universities of North-Central Nigeria?

To address research question Nine, which explores the determinants of students' acceptance toward mobile learning in Universities of North-Central Nigeria, a qualitative approach was employed. The transcripts of the interviews conducted with students were subjected to inductive thematic analysis using ATLAS.ti 24.0.0 for Windows software. Through this analysis, patterns, themes, and categories of analysis were derived from the interview data. Specifically, the analysis focused on four categories corresponding to the Unified Theory of Acceptance and Use of Technology (UTAUT) constructs, namely

Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC). Within these categories, a total of 16 themes emerged, guided by the participants' responses to the interview questions. This comprehensive analysis allowed for a nuanced understanding of how these determinants influence students' acceptance of mobile learning in the context of North-Central Nigerian universities.

Performance Expectancy: In exploring the Performance Expectancy (PE) aspect of students' acceptance toward mobile learning, participants were asked about the extent to which they believed expected academic skills and increased learning outcome from mobile learning would influence their acceptance. The responses indicated that mobile learning significantly enhanced their access to learning resources and timely information, as well as improved their academic skills and ability to collaborate online with peers.

"*Student A: "Using mobile learning device supplemented me with AI application to have different definition or meaning of word that are related to my ideas with make me to acquired knowledge that improved my learning outcomes (K2019M)"* This suggests that the perceived benefits of mobile learning, such as improved academic skills, increased learning outcome and increased access to resources, play a significant role in shaping students' acceptance of this technology.

Several themes emerged from the data, reflecting performance expectancy, including: (1) enhanced academic skills, (2) improved learning outcomes, (3) greater access to resources

Table 1. These themes highlight the multi-layered impact of performance expectancy on students' acceptance toward mobile learning, encompassing both academic and technological dimensions.

Table 1: Thematic analysis and description of emerging themes for performance expectancy construct

S/N	Theme	Description	Significant findings
1	Enhanced academic skills	Acquisition of academic writing, computer, and internet skills	Expectation for increased academic skills influences students' engagement with digital learning resources.
2	Improved learning outcomes	Enhanced student performance and academic achievements	Higher learning outcomes are associated with the use of digital resources and engagement with platforms.
3	Greater access to resources	Access to a wide range of educational materials and free digital tools	Availability of resources online positively influences student learning experiences.

Source: Field interview, (2023)

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

Table 1. Illuminates that performance expectancy encompasses various facets, including the anticipation of enhanced academic skills, improved learning outcomes, greater access to resources, familiarity with digital platforms, and opportunities for online collaboration, all of which contribute to students' acceptance toward mobile learning. The findings, supported by a network of codes and quotations, which further emphasize the interconnectedness between the provided information and its alignment with the performance expectancy construct. Furthermore, the graphical depiction of the code and quotation networks in Figure 2.2 offers a visual representation of the complex relationships within the constructs, enriching our comprehension of students' acceptance of mobile learning.

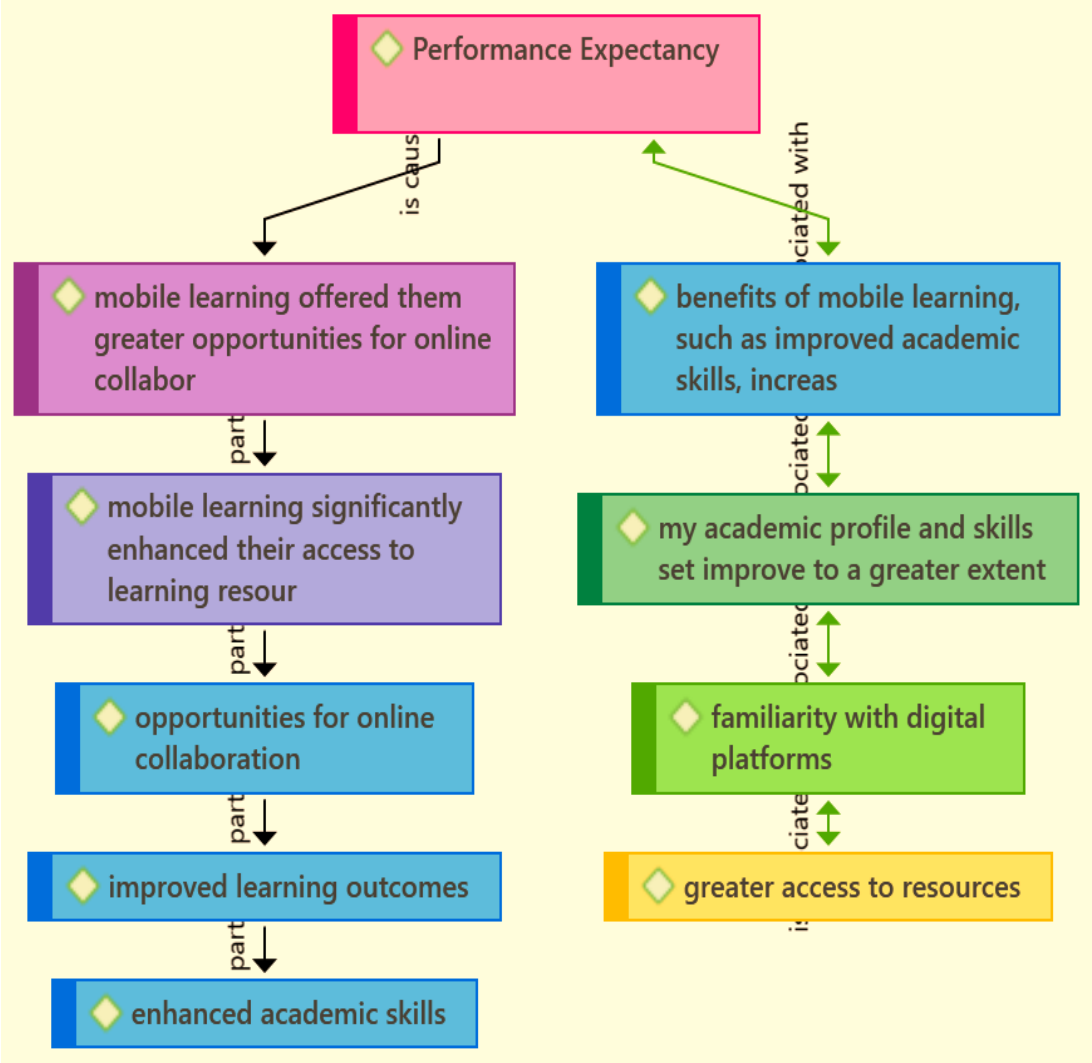


Figure 1:8 Codes and quotation network of the constructs on acceptance toward mobile learning.

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

Figure 1.8 visually presents the interconnectedness between five distinct codes and an additional six quotations, all of which are intricately linked to the construct of performance expectancy. This graphical representation highlights the qualitative validation of the quantitative finding, emphasizing the significant influence of performance expectancy on students' acceptance of mobile learning.

Research question 10: How do PE, EE, SI, and FC interact to determinants in students' Utilization toward mobile learning in Universities of North-Central Nigeria? This finding triangulated the quantitative findings that shows there is an association between the determinants and utilization of mobile learning.

Discussion of Findings

The findings from research question one, two, three and four shed light on the pivotal role of performance expectancy ,effort expectancy, social influence and facilitating condition on students' acceptance of mobile learning within North-Central Nigerian universities.This emphasizes the crucial significance of perceived utility, accessibility, peer support and technical support in influencing students' attitudes towards mobile learning initiatives. The quantitative finding revealing a noteworthy correlation between determinants and the acceptance of mobile learning. Similarly, the qualitative finding revealed a significant finding regarding students' engagement with digital learning resources. The mixed-method findings provide comprehensive insights into the multifaceted factors influencing students' acceptance of mobile learning in North-Central Nigerian universities.

These findings align with existing literature, as Alshammari, (2021) findings showed that effort expectancy and performance expectancy are significant predictors of behavior intention toward the use of virtual classrooms. Consistent with this finding, effort expectancy was found to exhibit a significant correlation with the acceptance of mobile learning.

The results obtained from research question five, six, seven and eight highlight the significant influence of performance expectancy, effort expectancy, social influence and facilitating condition on students' utilization of mobile learning within North-Central Nigerian universities, elucidating the direct impact of perceived benefits, the ease of use and minimal effort required, the influence of peer networks and ICT infrastructure on students' engagement, with mobile learning platforms. The mixed method findings from research question five, six, seven and eight highlight the significant influence of the determinants on students' utilization of mobile learning within North-Central Nigerian universities. The finding agrees with Masrek and Samadi (2017) whose finding showed that performance expectancy, effort expectancy, social factors, facilitating conditions,

perceived playfulness and self-management of learning are strong determinants of intention to adopt mobile learning.

Conclusions

Performance expectancy, effort expectancy, social influence and facilitating conditions variables jointly influence students' acceptance and Utilization to mobile learning in the Universities of North Central Nigeria.

Contributions to Body of Knowledge

The research findings contribute to the existing body of knowledge by providing insights into the role of the determinants in students' acceptance and utilization of mobile learning in North-Central Nigerian universities. Highlighting the significant correlation between perceived benefits, ease of use, peer group and resources to acceptance and utilization.

REFERENCES

Alshammari, S. H. (2021). Determining the factors that affect the use of virtual classrooms: A modification of the UTAUT Model. *Journal of Information Technology Education: Research, 20*,117-135. https://doi.org/10.28945/4709

Altman, D. G. (1999). *Practical Statistic for Medical Research.* London: Chapman and Hall, 404-408..

Hair, J. F. Jr., Babin, B., Money, A. H. & Samouel, P. (2003). Essential of business research methods. *John Wiley & Sons*: United States of America.

Hurley, P. & Nina, V. D. (2020). *Australian Investment in Education: Higher Education*. Melbourne: Mitchell Institute.

Masrek, M. N. & Samadi, I. (2017). Determinants of Mobile Learning Adoption in Higher Education Setting. *Asian Journal of Scientific Research* ·DOI: 10.3923/ajsr.2017.60.69.

Nur-E H. (2019). Mixed Methods research: An overview for beginner researchers. *International journal of literature, languages and linguistics* in kuala lumpur Malaysia.58(5) 1-45

Quadric, N. N., Mohammad, M. & Nassert, A. (2020). Structural Equation Modeling for mobile learning acceptance by university students: An Empirical study. Retrieved on October 2020 from www.mdpi.com/journal/sustainability.

Venkatesh, V., James, T. & Xin Xu. (2016). Unified Theory of Acceptance and Use of Technology: A Synthesis and the Road Ahead. *Journal of the Association for Information Systems* 17: 328–76.

Venkatesh, V., Morris, M.,Davis, G. & Davis, F. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478. Retrieved from https://doi.org/10.2307/30036540

.

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]