

Assessment of undergraduates' adoption of mobile technologies for learning

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Abstract. The study examines the influence of the undergraduates' perceived usefulness and ease of use of mobile technologies in relation to their adoption for learning. The study was designed to give a sharper focus on two research questions. Simple random sampling technique was used to select four hundred (400) undergraduates from two universities in Ogun State, South West Nigeria. The study employed multiple regressions in the analysis of the data collected. In the light of the results obtained, it was found out that students' perceived usefulness ($\beta = 0.305$, $t = 3.867$, $p < .05$) has significant contribution to adoption of mobile technologies. Also, the study found that undergraduate students' perceived ease of use ($\beta = 0.151$, $t = 1.992$, $p < .05$) has significant contribution on the adoption of mobile technologies for learning. The study revealed that the students' perception on the usefulness and ease of use significantly contributed to the adoption of mobile technology. All in all, the study recommended the need to encourage undergraduates to adopt mobile technologies for learning instead of social media only.

Keywords: Pedagogy, Adoption, Mobile technology, ICT, Undergraduates

1 Introduction

The development in information communication technologies has made knowledge accessible for users. Information technology is now an inevitable tool for teaching and learning in the present education system (Shaibu, Mike, Oyelere & Jarkko, 2016). Through the development in information technology, mobile communication devices have transformed from mere means of socialization to modern educational tools. Mobile learning or M-learning as being commonly used is the application of mobile technologies for learning (Maryam, Abubakar and Musa, 2015). For instance, Smartphone can download learning materials, access the internet for information, take photos, take videos, compose message, send e-mails and download applications that allow undergraduates to easily complete various educational tasks. The availability of mobile technologies is providing different avenues for information communication. For instance, in the developed countries, individuals now have access to mobile technology because the cost of accessibility to the internet is steadily reducing (Mai, 2014). To give this argument adequate support and strength, Olaitan and Olusegun (2017) maintained that mobile technology has provided new ways of information communication being an integral part of the young people' social interaction. The advancement has enabled educators to send instructional messages in flexible ways (Kim, Rueckert, Dong-Joong & Seo, 2013). With mobile technologies university lecturers and undergraduates can communicate with audio visual approach making the presentation to be multimedia. Using mobile technologies for educational purposes is becoming a common expectation of teachers and learners alike (Heflin, Shewmaker and Nguyen, 2017).

According to Egunjobi, Adesanya, Akorede and Olori (2007), supportive technologies for mobile learning are tablet PC, learning mobile author, notebook, personal audio player, mobile delivery and tracking system, e-readers, mobile phone, camera phone and smart phones. Mobile learning technologies have features such as portability, flexibility, adaptability, interactivity and ubiquity that make them adaptable to university education system in Nigeria. In addition, mobile technologies have the power to make the process of learning highly interactive, individualized, collaborative, self-regulated, multimedia and ubiquitous, which is not pertinent to the traditional learning environment (Mai, 2014). The use of mobile technology for teaching and learning provides the learners with the

opportunity to continuously access the learning materials anytime and anywhere which may not be provided by the traditional pedagogy (Al-Said, 2015).

A favourable inclusion of mobile learning in the university system will complement and add value to the existing instructional system design in terms of objective, media selection, delivery, evaluation and feedback. An m-learning device can be a supportive tool, instructional tool and assessment tool. As a supportive tool, a mobile device can be used to improve the communication of information between learners and teachers. Smart phones can be used by the teachers to provide the learners with electronic learning materials such as journals, textbooks, virtual library, instructional simulation and games (Shaibu, Mike, Oyelere & Jarkko, 2016). Mobile technologies can be used to assess learning outcomes as many palmtops are designed to accommodate similar operating system with laptops and desktop computer. From the perspective of instructional technology, mobile learning devices can be used for ICT-driven instruction particularly games, simulation, tutorial, demonstration and drill whether linear or branch programming (Oyelere, Suhonen & Sutinen, 2016).

Perception is a psychological construct like attitude, readiness, interest, self-esteem, motivation, confidence, performance and anxiety. Against this backdrop, it must be noted that the adoption of m-learning might be significantly influenced by users' perception on its usefulness and ease of use. Technology Acceptance Model (TAM) is a model that explains how users come to adopt technology as proposed by Davis in 1989. Davis (1989) suggests that when a user is presented with a new technology a number of factors influence the decision regarding how and when they will use it and this includes its perceived usefulness and its perceived ease of use. In Davis's study, two important constructs were identified i.e. perceived usefulness and perceived ease of use. These perceptions predict the attitudes toward the adoption of technologies, which, in turn, determines the intention to use, and it is that intention that prompts the actual application of technology. According to Davis (1989) the perceived usefulness, meaning the degree to which a person believes that using a particular system would enhance their performance, and the perceived ease of use, meaning the degree to which a person believes that using a particular system would be free from unnecessary complexities might, indeed, result in increased performance.

There are studies on the factors determining the use of mobile technologies for teaching-learning, especially in developed countries. For instance, Mai (2014) investigated the attitude held by pre-service teachers towards the use of mobile technologies in tertiary institutions. The research sample consists of (121) student-teachers from the Faculty of Education, Sultan Idris University Malaysia. It was found out that the majority of pre-service teachers have positive attitude towards the use of mobile technologies for learning. On the other hand, the findings from the study conducted by Adedoja, Adelere, Egbokhare and Oluleye (2013) revealed that a vast majority of university undergraduates had taken a rather negative attitude towards the adoption of mobile technological devices for learning due to their being simply unaffordable in view of their exorbitant prices in addition to the high cost of the internet. The reason provided is that majority of Nigerians are very poor and they live below one US dollar per day. Also, Egunjobi et al., (2007) observed that the visually illustrated textual data through large instructional graphics and diagrams may become cluttered in the small screens of mobile phones.

Olaitan and Olusegun (2017) investigated the attitudes of tertiary students toward mobile technology usage in Nigeria. Six hundred and forty randomly selected 300 and 400 level undergraduates of the Federal University and Federal Polytechnic in southwestern Nigeria participated in the study. The findings revealed that the greater part of the undergraduates have positive attitude towards the usage of mobile technology for learning.

Mojaye (2015) explained the evolution of mobile phones in Nigeria and the adverse effects of their usage amongst the undergraduates in tertiary institutions. It was highlighted that the adverse effects of mobile phone adoption by the university undergraduates outweigh its usefulness and these include distraction in the classroom, reduction of cognitive ability, encouraging cheating during examinations, cyber bullying, poor writing skills and addiction. Egunjobi et al., (2007) warned that if the rate at which students use mobile phone to cheat in examination is not checked, this situation might put the credibility of m-learning in doubtful position. It was concluded that school authorities should take a more proactive step to minimize the adverse effects of mobile phone usage by either prohibiting their use or encourage students to switch off their phones, put them in silence or flight mode.

Shaibu, Mike, Oyelere & Jarkko (2016) investigated the interactions the undergraduates in Nigerian Universities have with their portable devices. A sample of 240 undergraduates participated in

the study and it was revealed that most undergraduates can confidently use the portable communication devices to share academic information and exchange educational messages. It was observed that the reason why the large majority has confidence in using portable devices for academic purpose is influenced by their perception on the ease of use. Ogulande, Olafare and Sakaba (2016) investigate technological factors affecting the adoption of information technology by undergraduates in university of Ilorin, Nigeria. A total of 100 undergraduates were sampled and the findings from the study revealed that the IT expertise do significantly predict the students' technology usage and its perceived ease of use.

Chaka and Govender (2017) investigated students' readiness to use mobile technologies for research collaboration in South-west, Nigeria. A total of 742 respondents were drawn from federal and state colleges of education in South-western Nigeria, and the findings revealed that the largest share of students are not ready to use mobile technologies for research collaboration.

Al-Zahrani and Laxman (2014) observed that a review of the literature related to mobile learning shows that there is a growing body of research on m-learning and that the reports on the factors influencing the adoption of m-learning are controversial. Therefore, more research work needs to be carried out in the area of mobile learning adoption to deepen our understanding of the proper utilization of mobile devices in enhancing the pedagogical delivery processes and methods alike. To that end, it is considered appropriate to assess the perception of Nigerian university undergraduates on the adoption of mobile technology for learning.

1.1. Statement of the Problem

There has been an expansion in the use of information communication technologies by university undergraduates in Nigeria. Policies have also been enacted to maximally benefit from the potentials of emerging technologies in increasing the access to information. However, earlier studies indicated that the use of mobile devices by university students do significantly influence their attitude and drives their interest to learning. Conversely, there are several reports showing that adoption of mobile learning technologies has more disadvantages than advantages and as such should not be adopted in the university system. These unending debates on the usefulness of mobile technology, considering their versatility, particularly for communication and social connectivity made it expedient to explore the perception of undergraduates on adoption of mobile technology for learning.

1.2. Research Questions

- (1) Is there significant contribution of undergraduate students' perceived usefulness of mobile technology on its adoption for learning?
- (2) Is there significant contribution of undergraduate students' perceived ease of mobile technology on its adoption for learning?

2 Methodology

The study employed the survey research design, while the population for the research consists of all 400 level undergraduates of Public Universities in Ogun State, South-West Nigeria. The sample for the study consists of four hundred (400) participants from two public universities in Ogun State, South-West Nigeria and the data was collected via the use of multistage sampling technique. Undergraduates in 400 levels were purposively selected since they are mostly familiar with the ICT policies, availability and accessibility at the universities. There is one federal and two state universities in Ogun State; therefore, the federal university and one of the state ones were purposively selected. Additionally, five faculties were randomly selected in each university, while forty (40) students were randomly selected in each faculty.

2.1. Instrumentation

The instrument named (PUSAMT) “Perception of Undergraduate University Students on the Adoption of Mobile Technology for Learning” was adapted from Mai (2014) “Usage of Mobile Learning Model”. The questionnaire is segmented into two sections. Section A reports the demographic data about the respondents, while Section B contains items on usefulness and ease of use of mobile technology. It was four (4) point Likert scales with options ranging from strongly agree to strongly disagree, where strongly agree was 4 points, and strongly disagree was 1 point. In order to ensure content validity of the questionnaire it was given to two experts in Educational Technology whose corrections and suggestions were incorporated into the final drafts.

The reliability of the research instrument was achieved through test re-test. The instrument was administered to a set of sixty (60) students that were not part of the main study but have similar characteristics with the participants and the result showed a Cronbach coefficient alpha (α) of 0.592, meaning it is reliable for the study. Two research assistants who were students in the two selected universities were asked to administer the questionnaires to the undergraduate students. In each university a research assistant visited the five faculties to administer the survey instrument under the close monitoring of the researchers. All the distributed questionnaires were returned accurately completed. Linear Regression was employed in providing answers to the two research questions.

3 Results

Research questions 1: Is there significant contribution of undergraduate students’ perceived usefulness of mobile technology on the attitude to learning?

Table 1: Regression results showing the undergraduates’ perceived usefulness influencing the adoption of mobile technologies for learning

Model	Coefficients (β)	T	Std. Error	Sig (T-Prob)	F	r ²
Constant	2.282	16.595	0.138	0.000	14.952 (0.00)	0.093
Perceive Usefulness	0.305	3.867	0.065	0.000		

Dependent Variable: Adoption for learning.

The estimated result in table 1 shows that undergraduate students’ perceived usefulness ($\beta=0.305$, $t=3.867$, $p<0.05$) have a significant contribution on the adoption of mobile technologies for learning in Ogun State. The coefficient of undergraduate’ perceived usefulness is positive which indicates that a unit increase in undergraduate’ perceived usefulness will on the average leads to 31% increase in the rate of adoption of mobile technologies for learning in Ogun State. The result obtained supports the position that the usage of mobile technology for learning among the present-day undergraduates has greatly increased, largely due to the perceived usefulness they believe is derivable from such utilization.

Research Questions 2: Is there significant contribution of the undergraduates’ perceived ease of use of mobile technology on its adoption for learning?

Table 2: Regression results showing undergraduates’ perceived ease of use influencing the adoption of mobile technologies for learning

Model	Coefficients (β)	T	Std. Error	Sig (T-Prob)	F	r ²
Constant	2.493	14.479	0.165	0.000	3.392 (0.038)	0.023
Perceived Ease of Use	0.151	1.992	0.96	0.038		

Dependent Variable: Adoption for learning.

The estimated result in Table 2 shows that the undergraduates' perceived ease of use ($\beta=0.151$, $t=1.992$, $p<0.05$) has significant contribution on the adoption of mobile technologies for learning in Ogun State. The coefficient of undergraduates' perceived ease of use is positive which indicates that a unit increase in undergraduate students' perceived ease of use of technology will on the average leads to 15% increase in the rate of adoption of mobile technologies for learning in Ogun State. The result implies that as more and more undergraduates perceive greater ease in the use of mobile technology for learning, the number of undergraduates that adopts mobile technology for learning might continue to rise.

4 Discussions

From the result of the analysis of the research question one, it was found out that undergraduates' perceived usefulness ($\beta=0.305$, $t=3.867$, $p<0.05$) have a significant contribution on the adoption of mobile technologies for learning in Ogun State. The result indicates that an increase in undergraduates' perceived usefulness will lead to a growth in the rate of adoption of mobile technologies for learning in Ogun State. The finding is in line with Mai (2014) who reported that the majority of students agreed that mobile technologies were useful for learning. The reason could be that many youths have been using their smart phones for social interaction and this has made them digitally literate. It was also in line with the findings of Olaitan and Olusegun (2017) on the technological factor affecting the students' attitude in which the study revealed that the majority of the undergraduates agreed that information technology is useful for learning.

In addition, the analysis of research question two established that undergraduates' perceived ease of use ($\beta=0.151$, $t=1.992$, $p<0.05$) has significant contribution on the adoption of mobile technologies for learning in Ogun State. The coefficient of undergraduates' perceived ease of use is positive which indicates that an increase in undergraduates' perceived ease of use of technology will lead to an increase in the rate of adoption of mobile technologies for learning. The finding is in line with Ogulande, Olafare and Sakaba (2016) on the different factors that can affect the students' usage of technologies for learning. It was found out that information technology expertise significantly predicts students' perception on the ease of use of technologies for learning. Also, the study corroborated the findings of Shaibu, Mike, Oyelere and Jarkko (2016) that digital confidence significantly influences students' adoption of mobile technologies for learning.

5 Recommendations

Nigerian Government should encourage undergraduates by subsidizing the price of mobile phones that can be used for learning. There is a pressing need to add a section for mobile learning in Nigerian universities in order to prompt its application in the process of teaching and learning. Accordingly, ICT teams should be set-up in every faculty to facilitate the adoption of mobile technology in teaching and learning. Applications to overcome addiction should be configured on the smart phones used by the undergraduates. University management needs to provide their students with constant guidance as to the negative effects of excessive mobile phone uses. What's more, university management should formulate strict policies for undergraduates to pay rapt attention to their lectures rather than fiddling with their mobile phones during lectures.

6 Conclusion

The advanced research comes to the conclusion that the general perception about the usefulness and ease of use significantly contributes to the adoption of mobile technologies for learning among the undergraduates in Ogun State. It can be further inferred from the study that the undergraduate students should adopt mobile technology that will enable them to access relevant learning materials, which, in return, will enhance their communication, critical thinking, creativity, collaborative and problem solving skills that are essential for survival in the 21st century. All in all, mobile technologies are useful for learning and they are universally recognized as effective education tools. Generally, when technology is perceived to be easy to use, everybody will want to apply it, which could lead to active learning and adoption of a more learner-centered curriculum approach.

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