Network for Research and Development in Africa
International Academic Journal of Management and Marketing
ISSN: 2384-5849. Volume 7, Number 1
Pages 104-118 (February, 2022)
arcnjournals@gmail.com

Determinants of University Students' Behavioural Intention to Use Smartphone for Academic Learning in Nigeria

Sambo, Abdulrahman and Dr. UMar A. Mu'azu
Department of Management and Information Technology,
Faculty of Management Sciences, Abubakar Tafawa Balewa University, Bauchi
Dr. A. M. Noma
Computer Science Department,
Faculty of Sciences, Bauchi State University, Gadau

Abstract: *Smartphones offer more affordances to the users because their capabilities can be extended through downloading different kinds of mobile applications. Smartphones are central to the lives of many university students. Although smartphones do not formally exist in the curriculum, they are used by students for their education. The purpose of this study was to examine the factors that influences university students' behavioral intention to use smartphone for academic learning. To address this goal, an empirical framework was drawn based on extending the UTAUT model by adding self-management of learning to the structure of the UTAUT model. A cross sectional survey methodology was employed and a closed ended questionnaire was used to collect data for the study from 363 undergraduate students of Abubakar Tafawa Balewa University (ATBU) Bauchi. The instrument for the data collection was developed using validated items from previous studies. IBM SPSS version 25 application software was used to enter raw data from the questionnaire and Smart PLS 3.0 was used in analyzing both the measurement and the structural model of the study. The results showed that social influence and facilitating conditions of learning had a significant positive influence on the students' behavioral intention to use smartphone for academic learning. The research results also present several theoretical and practical contributions and implications by means of identifying the key factors influencing behavioral intention to use smartphones for academic learning. The study recommended that universities should lay emphasis on the issues that would improve students' performance academically using smartphone which include the provision of stable electricity supply and access to fast free wireless internet connectivity within the university campuses and should constantly ensure that IT systems are most of the time compatible with all the generations of smartphones.*

Keywords*: Behavioural Intention, Smartphone, Academic Learning*

INTRODUCTION

The continuous evolution in mobile technology and the widespread revolution brought by the internet have given rise to one of the smartest digital devices of the era called "Smartphone". With over 2.87 billion users worldwide (Statista, 2017). Smartphone is the most recent

technological innovation of the new media that has defined human progress, creating a new paradigm of modernity and enabling adopters and users to improve on life affairs in terms of connectivity and social interaction with varieties of applications and usage freedom referred to as a new mobile lifestyle (Liew, 2016 & Jesensky, 2016).

The ownership and use of mobile technology in Africa are among the highest globally with Nigeria alone boasting of about 174 million active mobile lines as well as the highest mobile traffic growth in the world (International Telecommunications Commission (ITC), 2018; Nigerian Communications Commission (NCC), 2019; Twinpine, 2017). It has the largest economy and mobile market on the continent (Onyeajuwa, 2017). With fixed line penetration below 0.2%, many Nigerians "leap-frogged" past more expensive fixed-line technology to adopt mobile technologies, which are provided by four main operators: MTN, Globacom, Airtel, and 9mobile, formerly known as Etisalat (Gillwald, Odufuwa, & Mothobi, 2018; Groupe Speciale Mobile Association (GSMA), 2015). As a result, data for 2017 indicate that 71% of the population use mobile phones as a primary platform for communication and accessing the Internet, and significant percentage of this population are students, with 89.79% of the population covered by 2G signal, 62.05% by 3G signal, and 11.04% by 4G signal (Gillwald et al., 2018).

In 21st Century learning, students can use learning technologies to apply knowledge to new situations, analyze information, collaborate, solve problems, and make decisions. Academic learning is now innovative as a result of smartphone and other media in promoting and advancing 21st century needed skills and knowledge (Tulenko & Bailey, 2013; Emerson & Berge, 2018). Smartphones are used everywhere at home, at work, at the playground, and even in the classroom when students are supposed to learn something new. In general, smartphones and other ICTs can be used to improve the education process, e.g. by providing better simulations and models (Condord Consortium, 2016), enabling learning and facilitating better assessment (Coursera, 2016; Glovico, 2016). Smartphones can play a very important role in students' learning, especially in teaching and learning and research (Ebiye, 2015). Ebiye (2015) further regards smartphones as a smart device used for fast access to knowledge geared towards students achieving their teaching and learning and academic research objectives. A great deal of relevant information is available online that students can access through their smartphones.

While prior studies have attempted to investigate m-learning adoption in Nigeria, there is still a paucity of extensive research on the intention of students to embrace the use of their mobile devices such as smartphones for their academic purposes in the country (Oguchinalu & Sunday, 2018). Therefore, this study investigates the factors that determine the intention of university students in Nigeria to use their smartphone for academic learning using Abubakar Tafawa Balewa University (ATBU), Bauchi as a case study. This study is expected to provide many key contributions to previous studies. It is another study that investigated the determinants of ATBU students' behavioral intention to use their smartphone for academic learning.

Universities today invest huge amounts of capital in information technology, e-learning and learning management systems. This expenditure is based upon the presumption of their benefit to students and their preference to use such platforms. At the ATBU Campuses, a free wireless network is provided to students in some locations around the Campuses, and using smartphones among the students is becoming a norm. Students use their smartphones to connect easily to the wireless networks and gain limitless access to internet connections that are aimed at advancing students' learning experience and performance. Furthermore, the deployment of these internet (Wi-Fi) connections is aimed at increasing access to learning contents across the Campuses and beyond. Therefore, an understanding of students' behavioral intention relating to the use of smartphones for academic learning can both guide and facilitate this endeavor.

A measurement model was built based on the Venkatesh, Morris, Davis and Davis (2003)'s Unified Theory of Acceptance and Use of Technology (UTAUT). The theory was used as the baseline model for predicting and understanding the determinants of university students' behavioral intention to use their smartphone for academic learning. Although the UTAUT model has been widely adopted, doubts exist over its capability to explain individuals' technology acceptance and usage. Thus, the original UTAUT model has been extended. The present study extended the UTAUT model by incorporating the construct of self-management of learning from Garrison, (1997)'s model of Self-Directed Learning (SDL) to the original UTAUT model to predict the determinants of university students' behavioral intention to use their smartphones for academic learning.

The aim of this study is to examine the determinants of university students' behavioral intention to use their smartphones for academic learning in Nigeria.
The study was guided by the following research questions:

3.0 How does social influence determine the ATBU students' behavioral intention to use smartphone for academic learning?

4.0 To what extent does facilitating conditions influence the ATBU students' behavioral intention to use smartphone for academic learning?

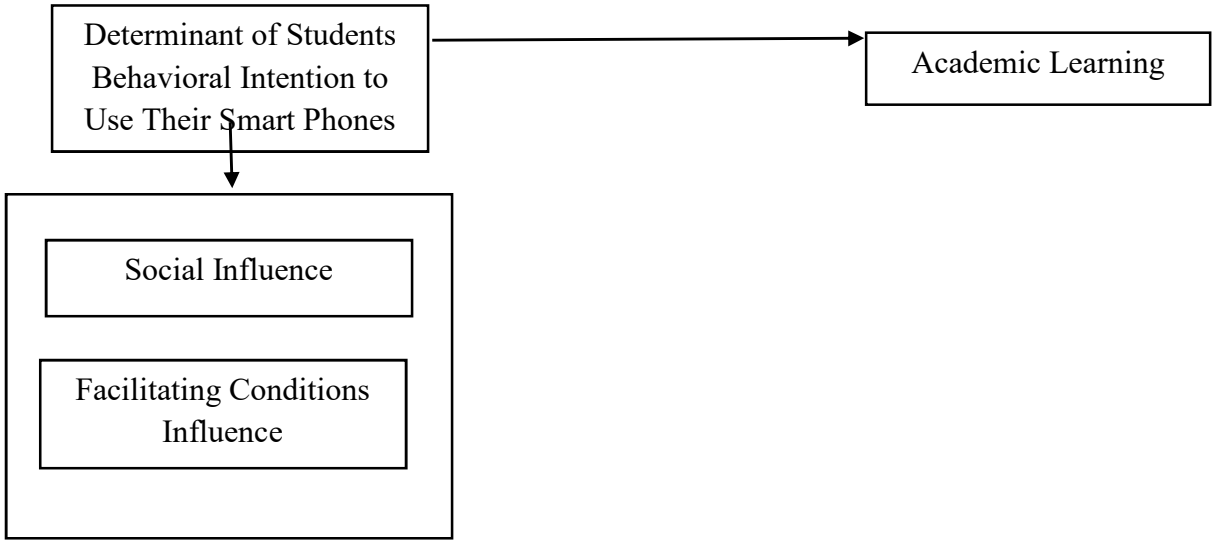

Fig.1 Conceptual framework for determinants of students behavioural intention to use their smart phones on Academic learning

Source: Author's Desk Research, 2022

LITERATURE REVIEW

Theoretical Foundation

In this study, UTAUT is considered for understanding the factors that will determine University students' behavioral intention to use their smartphones for academic learning. The UTAUT model is one of the most outstanding models in explaining technology acceptance and use thus far (Marchewka, Liu, & Kostiwa, 2007; Decman, 2015; Liebenberg, Benade, & Ellis, 2018).

Venkatesh et al. (2003) formulated the UTAUT model based on nearly twenty years of research and studies on technology acceptance and adoption. The model was founded with integration of eight theoretical models: (i) Motivational Model, (ii) Theory of Planned Behaviour, (iii) Technology Acceptance Model, (iv) Theory of Reasoned Action, (v) Model of PC Utilization, (vi) Innovation Diffusion Theory, (vii) Combined TAM-TPB, and (viii) Social Cognitive Theory (Dwivedi, Rana, Jeyaraj, Clement, & Williams, 2017; Liebenberg et al., 2018; Slade, Dwivedi, Piercy, & Williams, 2015; Šumak & Šorgo, 2016; Venkatesh et al., 2003, 2016; Williams, Rana, & Dwivedi, 2015; Yueh, Huang, & Chang, 2015). The UTAUT model is one of the most recent and extensively used models in explanation of technology acceptance and in consideration of individual differences (Cruz, Boughzala, & Assar, 2014; Marchewka, Liu, & Kostiwa, 2007). Abbas, Hassan, Asif, Ahmed, Hassan and Haider. (2018) and Olatubosun, Olusoga, and Shemi

(2014) also echoed that the UTAUT model is one of the most comprehensive, powerful and robust technology acceptance and adoption models to present.

Since its introduction, the UTAUT model have been applied and tested extensively for predicting system usage and making technology-adoption and technology-usage-related decisions in various fields such as interactive whiteboards (Šumak & Šorgo, 2016; Šumak, Pušnik, Herièko, & Šorgo, 2017), near-field communication technology (Khalilzadeh, Ozturk, & Bilgihan, 2017), mobile health (Hoque & Sorwar, 2017), home telehealth services (Cimperman, Brenˇciˇc, & Trkman, 2016), mobile learning (Chao, 2019), and acceptance of Enterprise Resource Planning (ERP) software (Chauhan & Jaiswal, 2016). Applied research regarding the UTAUT model has been extensive. This model provides a framework that not only explains acceptance of IT and ISs but also elucidates the actual use of such technologies and systems. Because of its capability to integrate different the TAMs, the UTAUT model contributes substantially to the exploration of technology acceptance and usage (Venkatesh et al., 2003).

Behavioural intention

Behavioural intention is the individual's readiness to perform a specific action or behaviour (Davis, 1989). In general, the stronger the intention to perform a certain behaviour, the more likely it is that such performance will take place (Ajzen, 1991). Behavioural intention is the dependent variable in this study and refers to a student's intention to use smartphone for academic learning. According to Ajzen (1991) "Intentions are assumed to capture the motivational factors that influence a behaviour; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behaviour. As a general rule, the stronger the intention to engage in a behaviour, the more likely should be its performance". In this study, the behavioural intention can be determine through different factors including performance expectancy, effort expectancy, social influence, facilitating condition and self-management of learning. Generally, the concept that behavioural intention can affect behaviour influences has been well proven in literature (Ahmad, Amr & Zahra, 2018). And found to have a positive effect on actual use of technology (Turner et al., 2010).

Social influence

According to Venkatesh et al. (2003), social influence measures the degree or extent to which an individual perceives that significant others believe s/he should use a new technology, like smartphone for academic learning. As humans are always influenced by the environments in which they interact socially and culturally, it is reasonable to say that social influence molds an individual's behavioral intention. These influencing factors force the user to react to how others will view him as a result of using the technology. Venkatesh and Davis (2000) highlighted the importance of social factors as they become more significant in mandated environments.

The role of social influence is complex, which shape individual perception about a particular technology. This was studied in two separate research projects by (Venkatesh et al., 2003;

Venkatesh et al., 2012). Both assessed the impact of Social Influence on Behavioural Intention in the UTAUT1 and UTUAT2 models. Social Influence was found to be a direct determinant on influencing Behavioural Intention in mandatory or voluntary contexts. In a similar study conducted by AlAwadhi and Morris (2008) using UTAUT, the acceptance of e-government services was assessed and it was concluded that peer influence on users is significant.

In the field of learning, Escobar-Rodríguez and Carvajal-Trujillo (2014) investigated factors that influence the perceived advantages and relevance of Facebook as a learning tool. The findings, among others established/identified that social influence has enormous influence on students take up of Facebook as a learning tool, as students were largely influenced by their peers to log onto Facebook, and to use it for learning because they were also there.

Facilitating conditions

Facilitating condition is defined as the degree to which an individual believes that an organization or infrastructure exists to support the new technology, in this case, smartphone usage for academic learning (Venkatesh et al. 2003). This assertion is corroborated by Joshua and Koshy (2011) who note that the more convenient the access, the more proficient the use of the technology culminating eventually into higher levels or rate of adoption. When a user attempts to adopt a new technology he is expected to have some prior knowledge (Venkatesh et al., 2003; Zhou, 2008). The element of resource, technical support, prior knowledge and peer help can be explained by the facilitating condition construct. Facilitating conditions for a student to use the smartphone for academic learning, is the presence of an organized technical support system, formal or informal, from his fellow classmates and peers at the university.

Triandis (1979) posits that a behavior cannot occur if the objective conditions in the environment prevent it. In the case of mobile technologies, the aspect of conducive environment had demonstrated a positive correlation with facilitating conditions and behavioural intention (Wu, Tao, & Yang, 2007). In an educational environment which fosters learning using mobile devices like smartphones, the satisfaction of the learner is affected by his perception of available technical support, learning content, functionality of personal devices, peer help and encouragement Venkatesh et al. (2008).

With regard to the UTAUT model, the facilitating conditions have a positive relationship with user behavior but no direct impact on behavioral intention. In the context of mobile environment, Baptist and Oliveira (2017) and Krogstie (2012) demonstrated this relationship. To illustrate, Bawack and Kamdjoug (2018) and Cimperman, Brencic and Trkman (2016) argued that facilitating conditions have a direct impact on behavioral intention. Therefore, in this study, the influence of facilitating conditions on university students' behavioral intention will be measured.

Role of smartphone in academic learning

The role of smartphone and mobile technologies in education must not be ignored (Tikoria & Agariya, 2017). Academic learning is now innovative as a result of smartphone and other media in promoting and advancing 21st century needed skills and knowledge (Tulenko & Bailey, 2013; Emerson & Berge, 2018). The transformation brought about by smartphones also affects students (Jesse, 2015).

When we look at the students' smartphone usage; they can benefit from smartphones as a learning assistant for many reasons, including ease of use, portability, comprehensive learning experience, multi-resource provisioning and multi-tasking and being eco-friendliness (Anshari, et al., 2017). Many students use the camera of smartphones to receive lecture notes or other notes given by instructors (Anshari, et al., 2017). Smartphones play a very important role in students' learning, especially in teaching and learning and research (Ebiye, 2015).

Social Influence and smartphone use for academic learning

Social Influence is the degree to which an individual perceives that others believe he/she should use the new system. According to Venkatesh et al. (2003), social influence measures the degree or extent to which an individual perceives that significant others believe s/he should use a new technology, like smartphone for learning. The previous studies have noted the positive influence of SI towards BI (Bandyopadhyay & Fraccastoro 2007; Im, Hong, & Kang, 2011; Jairak et al. 2009; Slade et al., 2015; Šumak & Šorgo, 2016; Venkatesh et al., 2003). It has been established in the literature that social influence is one of the most critical step towards the technology adoption (Venkatesh et al. 2003), and that for first time patrons of a new technological platform, who may be naive about the technology, just the influence of significant others through recommendation or seeing them use the technology goes a long way to influence trying the new technology (Datta, 2011).

In the field of learning, Escobar-Rodríguez et al. (2014) investigated factors that influence the perceived advantages and relevance of Facebook as a learning tool. The findings, among others established/identified that social influence has enormous influence on students take up of Facebook as a learning tool, as students were largely influenced by their peers to log onto Facebook, and to use it for learning because they were also there. Placing this situation in the context of smartphone usage for academic learning, it is believed that similar results would be obtained as regards students' behavioral intention to use smartphone for academic learning. Hence, it is hypothesised that:

H_1: Social-influence positively influences the students' behavioral intention to use smartphone for academic learning.

Facilitating Conditions and smartphone use for academic learning

Facilitating conditions as a construct in UTAUT refers to the extent to which an individual perceives that organizational and technical infrastructures required to use the intended system are available (Ghalandari, 2012). Facilitating conditions are factors in an environment that make

possible the use of smartphones for academic learning by university students. Facilitating conditions are largely determined by indicators such as perceived behavioral control and compatibility.

In their study investigating mobile learning among students and lecturers in the developing world, Singh, Thomas, Gaffar, and Renville (2016) found facilitating conditions to be most critical variable in students and lecturers take up of mobile devices as learning tools. The effective use of smartphones for learning by university students defends on the availability of organizational resources (human and materials) and appropriate technical infrastructure required for their optimum performance. This implies that the degree to which students believe that organizational resources and technical infrastructure exist to support the effective use of smartphones for academic learning could determine if they will actually use their smartphones for learning or not. Facilitating conditions appears to be an essential construct to determine the students' behavioral intention to use smartphone for academic learning hence, the fourth hypothesis:

H_2: Facilitating conditions positively influences the students' behavioral intention to use smartphone for academic learning.

METHODOLOGY

A cross sectional survey methodology was employed and a closed ended questionnaire was used to collect data for the study from 363 undergraduate students of Abubakar Tafawa Balewa University (ATBU) Bauchi. The instrument for the data collection was developed using validated items from previous studies. IBM SPSS version 25 application software was used to enter raw data from the questionnaire and Smart PLS 3.0 was used in analyzing both the measurement and the structural model of the study.

DATA ANALYSIS AND RESULTS

Hypotheses Testing

The result of the hypothesized direct relationship/effect of each independent variable on the dependent variable was presented. Two hypotheses were tested in order to obtain the *t*-values and *p*-values. If the data is not normal the *t*-values would be inflated or deflated which would lead to Type I error. Thus, to get the *t*-values for the item loadings and the path coefficients, there is need to run the bootstrapping procedure (Ramayah, 2015).

The following five direct hypotheses were developed in order to ascertain their acceptance or rejection in line with the research questions:

H_1: Social-influence positively influences the students' behavioral intention to use smartphone for academic learning.

H_2: Facilitating conditions positively influences the students' behavioral intention to use smartphone for academic learning.

The two hypotheses tested were directional (Two-tailed), and the results on table 1, shows that the two IVs (SI and FC) have significant effect on the DV (BI).

Bootstrapping is a procedure whereby a large number of subsamples (Hair *et al.*, 2011) are taken from the original sample with replacement to give bootstrap standard errors, which in turn gives approximate *t*-values for significance testing of the structural path and the bootstrap result approximates the normality of data (Wong, 2013). The reason for this is that the character of PLS-SEM is distribution-free (Hair *et al*., 2012) as such the standard errors used in the calculation of t-values are calculated from the bootstrapping procedure this is to avoid inflation or deflation of the standard errors due to non-normality.

Statistical *t*-values that are substantially different from 0 is said to be almost always statistically significant. However, it is largely defending on the degree of freedom, confidence interval and the direction of hypothesis, thus *p*-value is used to ascertain if the paths are significant (Hair *et al*., 2014).

So if the *t*-value is greater than 1.645 ($p< 0.05$), and if the *t*-value is greater than 2.33 ($p< 0.001$) then they are significant for 1-tail test, and if the *t*-value is greater than 1.96 ($p< 0.05$) and if the *t*-value is greater than 2.58 ($p< 0.001$) then they are significant for 2-tail test (Ramayah, 2015). Based on the result on table 1, two hypotheses (SI -> BI, FC -> BI) were statistically significant.

Table 16: Hypotheses Result

Hypotheses	**Relationship**	***t*-Value**	***p*-Value**	**Decision**
H_1	Social Influence -> Behavioral Intention	2.554	0.011	Significant
H_2	Facilitating Conditions -> Behavioral Intention	3.352	0.001	Significant

*$p<0.001$, *$p<0.05$

Source: Extracted from Smart PLS output, 2022.

DISCUSSION

This study sought to find out the determinants of university students' behavioral intention to use their smartphones for academic learning in ATBU Bauchi. The study consist of two independent variables, (social influence and facilitating conditions) which were drawn from UTAUT model. The first research question states that how does social influence determine the ATBU students' behavioral intention to use smartphone for academic learning. This has been answered through the third hypothesis which states that social-influence positively influences the students' behavioral intention to use smartphone for academic learning. The result of the hypothesis shows that it has a *t*-value of 2.554, and a p-value of 0.011 which revealed that it is significant at less than 5% ($p<0.05$). This indicates that social influence is a factor that

determines the ATBU students' behavioral intention to use smartphone for academic learning. This finding is consistent with the results of several recent studies (e.g Jairak et al., 2009; Venkatesh et al., 2012; Zhou & Wang, 2010; Alharbi & Drew, 2014; Bere, 2014). According to this finding it can be concluded that students' desire to engage with using smartphone for academic learning is markedly increased when they are encouraged and advised by individuals who are important to them, people who influence their behavior, their family members and their university friends.

The fourth research question states that to what extent does facilitating conditions influences the ATBU students' behavioral intention to use smartphone for academic learning. The question has been answered through the fourth hypothesis which states that facilitating conditions positively influences the students' behavioral intention to use smartphone for academic learning. The result of the hypothesis shows that it has a *t*-value of 3.352, and a p-value of 0.001 which revealed that it is significant at less than 5% ($p<0.05$). This indicates that facilitating conditions is a factor that determines the ATBU students' behavioral intention to use smartphone for academic learning. he finding is in consistent with the research results of (Chang, Ng, Sim, Yap & Yin 2015; Carlsson, Carlsson, Hyvonen, Puhakainen & Walden 2006; Wu, Tao, & Yang 2008; Raman & Don 2013; Alrawashdeh, Muhairat, & Alqatawnah 2012; Wilson, Mao, & Lankton 2010; Abdulwahab & Zulkhairi 2012; Ugur et al. 2016; Zainol et al. 2017; Jairak et al. 2009; Chaka & Govender 2017).

CONCLUSION AND RECOMMENDATIONS

The main goal of this study has been to explore factors that influence students' behavioral intentions to use smartphone for academic learning in ATBU Bauchi. The study consisted of two independent variables, (social influence and facilitating conditions) which were drawn from UTAUT model. The results suggested that social influence and facilitating conditions has a positive and significant influence on the students' behavioral intention to use smartphone for academic learning.

The study recommends that

1. The surrounded environment (e.g. family members, university friends) should emphasize upon the importance of using smartphone for academic learning, motivating the students to incorporate it in their daily lives as smartphone-learning can be used together with traditional modes of learning to increase the learning effectiveness.
2. To increase the level of facilitating conditions that could enhance smart phone use for academic learning by university students, the management of universities should continue to work assiduously to provide stable electricity supply and access to fast free wireless internet connectivity within the university campuses and should constantly ensure that IT systems are most of the time compatible with all the generations of smartphones.

REFERENCE

Abbas, S. K., Hassan, H. A., Asif, J., Ahmed, B., Hassan, F., & Haider, S. S. (2018) Integration of TTF, UTAUT, and ITM for mobile banking adoption. *International Journal of Advanced Engineering, Management and Science 4*(5), 375–379. doi: 10.22161/ijaems.4.5.6

Abdulwahab, L, & Zulkhairi, M. D. (2012). Modeling the Determinants and Gender, Age and Ethnicity Difference in Telecommunication Centre Acceptance. *Research Journal of Information Technology, 4*(3), 85-105.

Ahmad, S., Amr, A., & Zahra (2018). Modeling students' readiness to adopt mobile learning in higher education: An empirical study. *International Review of Research in Open and Distributed Learning*. *19*(1), 1-15.

Ajzen, I. (1991). The theory of planned behaviour. *Organisational Behaviour and Human Decision Processes, 50*(2), 179-211.

Alawadhi, S., & Morris, A. (2008). *The Use of the UTAUT Model in the Adoption of E-government Services in Kuwait.* Paper presented at the Proceedings of the 41st Hawaii International Conference on System Sciences, Hawaii.

Alharbi, S., & Drew, S. (2014). Mobile learning-system usage: Scale development and empirical tests. *International Journal of Advanced Research in Artificial Intelligence*, *3*(11), 31-47.

Alrawashdeh, T. A, Muhairat, M. I, & Alqatawnah, S. M. (2012). Factors affecting acceptance of

web-based training system: Using extended UTAUT and structural equation modeling. *arXiv preprint arXiv:1205.1904.*

Anshari, M., Almunawar, M. N., Shahrill, M., Wicaksono D. K., & Huda, M. (2017).

Smartphones usage in the classrooms: Learning aid or interference? *Education and Information Technologies, 22*(6), 1-17. doi: 10.1007/ s10639-017-9572-7.

Bandyopadhyay, K., & Fraccastoro, K. A. (2007). The effect of culture on user acceptance of Smartphones usage in the classrooms: Learning aid or interference? *Education and Information Technologies, 22*(6), 1-17. doi: 10.1007/ s10639-017-9572-7

Baptista, G. & Oliveira, T. (2017). Why so serious? Gamification impact in the acceptance of mobile banking services. Internet Res. *27*, 118–139.

Bawack, R. E. & Kamdjoug, J. R. K. (2018) Adequacy of utaut in clinician adoption of health information systems in developing countries: The case of Cameroon. *International Journal of Medical Information.* 109, 15–22.

Bere, A (2014). Exploring determinants for mobile learning user acceptance and use: An application of UTAUT. In S Latifi (ed). Proceedings of the 11th International Conference on Information Technology. Los Alamitos, CA: IEEE Computer Society. doi: 10.1109/ITNG.2014.114

Carlsson, C., Carlsson, J., Hyvonen, K., Puhakainen, & Walden, P. (2006). Adoption of Mobile Devices/Services-Searching for Answers with the UTAUT. *Proceedings of the 39th Hawaii International Conference on System Science-* IEEE [Internet] Available from: <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=01579556>.

Chaka, J. G., & Govender, I. (2017). Students' perception and readiness towards mobile learning in colleges of education: A Nigerian perspective. *South African Journal of Education*, *37*(1), 1-12. https://doi.org/10.15700/saje.v37n1a1282

Chang, P. Y., Ng, M. Q., Sim, H. Y., Yap, J. W., & Yin, S. Y. (2015). *Factors influencing behavioural intention to adopt mobile e-books among undergraduates: UTAUT2 framework.* UTAR.

Chao, C-M. (2019) Factors Determining the Behavioral Intention to Use Mobile Learning: An Application and Extension of the UTAUT Model. Front. Psychol. 10:1652. doi: 10.3389/fpsyg.2019.01652

Cimperman, M., Brenˇciˇc, M. M., & Trkman, P. (2016). Analyzing older users' home telehealth services acceptance behavior—applying an extended UTAUT model. *International Journal of Medical Informatics.* 90, 22–31. doi: 10.1016/j.ijmedinf

Condord Consortium (2016). *The Concord Consortium – Revolutionary digital learning for science, math and engineering*. URL: https://concord.org/

Coursera. (2016). *Online Courses from Top Universities*. URL: https://www.coursera.org/

Cruz, Y., Boughzala, I., & Assar, S. (2014) Understanding the influence of learning styles in mobile learning usage from the perspective of technology adoption and continuance use.
Pre-ICIS Workshop. ecis2014.eu/E-poster/files/0937-file1.pdf

Datta, P. (2011). A preliminary study of ecommerce adoption in developing countries. *Information Systems Journal*, *21*(1), 3-32.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982-1002.

Decman, M. (2015) Modeling the acceptance of eLearning in mandatory environments of higher education: The influence of previous education and gender. *Computers in Human Behavior*, 49: 272–281. http://doi.org/10.1016/j.chb.2015.03.022

Ebiye, V. E. S. (2015). Impact of smartphones tablets on the information seeking behaviour of medical students and staff of Niger Delta University Bayelsa State - Nigeria. Retrieved September 12, 2019, from http://digitalcommons.unl.edu/libphilprac/1288

Ghalandari, K. (2012). The effect of performance expectancy, effort expectancy, social influence and facilitating conditions on acceptance of e-banking services in Iran: The moderating role of age and gender. *Middle East Journal of Scientific Research, 12*(6), 801-807

Gillwald, A., Odufuwa, F., & Mothobi, O. (2018). *The state of ICT in Nigeria. Policy paper series (5): After access state of ICT in Nigeria.* http://extensia-ltd.com/wp-content/uploads/2018/11/After-Access-Nigeria-State-of-ICT-2017.pdf.

Global Speciale Mobile Association (2015). *The mobile economy 2015*. http://www.gsmamobileeconomy.com/GSMA_Global_Mobile_Economy_Report_2015.pdf

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139-152.

Hoque, R., & Sorwar, G. (2017). Understanding factors influencing the adoption of mHealth by the elderly: an extension of the UTAUT model. International Journal of Medical Information, 101, 75–84. doi: 10.1016/j.ijmedinf.2017.02.002

Im, I., Hong, S., & Kang, M. S. (2011). An international comparison of technology adoption testing the UTAUT model. *Information & Management, 48*(2011), 1-8. doi:10.1016/j.im.2010.09.001

Jairak, K., Praneetpolgrang, P., & Mekhabunchakij, K. (2009). An acceptance of mobile learning for higher education students in Thailand. *Special Issue of the International Journal of the Computer, the Internet and Management, 17*(3)*,* 36.1–36.8.

Jesensky, J. (2016). Positive impacts of smartphones on social society http://www.trffcmedia.com/topics/positive-impacts-of-smartphones-on-social-society/

Jesse, G. R. (2015). Smartphone and App Usage among College Students: *Using Smartphones Effectively for Social and Educational Needs*. 2015 Proceedings of the EDSIG Conference. Conference on Information Systems and Computing Education. 1-13

Khalilzadeh, J., Ozturk, A. B., & Bilgihan, A. (2017). Security-related factors in extended UTAUT model for NFC based mobile payment in the restaurant industry. *Computer in Human Behavior*, 70, 460–474. doi: 10.1016/j.chb.2017.01.001

Krogstie, J. (2012). Bridging research and innovation by applying living labs for design science research. Nord. Contrib. IS Res. 159–176.

Liebenberg, J., Benade, T., & Ellis, S. (2018) Acceptance of ICT: Applicability of the unified

Management, *28*(3), 443-488. doi:10.1108/JEIM-09-2014-0088

Liew, J.Y., (2016). The effect of smart phones on social interaction https://www.academia.edu/4661907/The effect of smart phones on social interaction

Marchewka, J. T., Liu, C., & Kostiwa, K. (2007) An application of the UTAUT model for

medical students and staff of Niger Delta University Bayelsa State - Nigeria. Retrieved

millions). Available at: https://www.statista.com/statistics/274677/forecast-of-mobile-

Olatubosun, O., Olusoga, F., & Shemi, A. P. (2014) Direct determinants of user acceptance and

on Information Technology. Los Alamitos, CA: IEEE Computer Society. doi:

p157.

Raman, A. & Don, Y. (2013). Preservice teachers' acceptance of Learning Management Software: An application of the UTAUT2 model. *International Education Studies, 6*(7), 157.

Ramayah, T. (2015).*Smart partial least squares 2.0.* University Sains, Penang: Malaysia. role of age and gender. *Middle East Journal of Scientific Research, 12*(6), 801-807.

Singh, L., Thomas, T. D., Gaffar, K. O., & Renville, D. (2016). Mobile Learning among Students and Lecturers in the Developing World: Perceptions Using the UTAUT Model. In *Handbook of Research on Mobile Devices and Applications in Higher Education Settings* (pp. 402-431). IGI Global.

Slade, E. L., Dwivedi, Y. K., Piercy, N. C., & Williams, M. D. (2015) Modeling consumers' adoption intentions of remote mobile payments in the United Kingdom: Extending UTAUT with innovativeness, risk, and trust. *Psychology & Marketing*, *32*(8), 860-873. doi: 10.1002/mar.20823

Statista online (2017) Number of mobile phone users in Australia from 2011 to 2019 (in millions). Available at: https://www.statista.com/statistics/274677/forecast-of-mobile-phone-users-inaustralia

Šumak, B., & Šorgo, A. (2016). The acceptance and use of interactive whiteboards among

teachers: Differences in UTAUT determinants between pre-and post-adopters. Computer

tests. *International Journal of Advanced Research in Artificial Intelligence*, *3*(11),

Tikoria, J., & Agariya, A. K. (2017). ICT enabled classroom effectiveness scale development and validation: A case of multi-campus university. *Knowledge Management & E-Learning, 9*(1), 111–127.

Triandis, H., C. (1979). *Values, attitudes, and interpersonal behavior.* Paper presented at the Nebraska symposium on motivation

Tulenko, K., & Bailey, R. (2013). Evaluation of spaced education as a learning methodology for in-service training of health workers in Ethiopia. *Knowledge Management & E-Learning, 5*(3), 223–233.

Venkatesh, V. & Davis, F. D. (2000). A theoretical extension of the Technology Acceptance Model: four longitudinal field studies. *Management Science*, 46(2), 186–204 https://doi.org/10.1287/mnsc.46.2.186.11926

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly, 36*(1)*,* 157-178.

Williams, M. D., Rana, N. P., & Dwivedi, Y. K. (2015). The unified theory of acceptance and use of technology (UTAUT): a literature review. *Journal of Enterprise Information Management*, *28*(3), 443-488. doi:10.1108/JEIM-09-2014-0088

Wilson, E. V., Mao, E., & Lankton, N. K. (2010). The distinct roles of prior IT use and habit strength in predicting continued sporadic use of IT.

Wong, K. K. K. (2013). Partial least squares structural equation modeling (PLS- SEM) techniques using smart PLS. *Marketing Bulletin, 24*(1), 1-32.

Wu, Y. L., Tao, Y.-H., & Yang, P.-C., (2007). *Using UTAUT to explore the behavior of 3G mobile communication users.* Paper presented at the Industrial Engineering and Engineering Management, 2007 IEEE International Conference.

Zainol, Z., Yahaya, N., Yahaya, N. M., & Zain, N. N. B. M. (2017). Factors influencing mobile learning among higher education students in Malaysia*. International Journal of Advanced Scientific Research and Management, 2*(8), 86-91. http://www.ijasrm.com

Zhou, T. (2008). Exploring mobile user acceptance based on UTAUT and contextual offering. Paper presented at the International Symposium on Electronic Commerce and Security, 2008, Guangzhou, China