

# Learner Characteristics: Antecedents for mLearning Adoption among Community Health Trainees, Kenya

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Gatotoh, Augustine Mwangi<sup>ab</sup>; Keiyoro Peter. N, Ph.D<sup>ab</sup>; Gakuu Christopher. M. Ph.D<sup>a</sup>

<sup>a</sup>Open Distance and eLearning Campus, University of Nairobi, P.O. Box 30197 -0100, Nairobi, Kenya.

<sup>ab</sup> Corresponding author, [augmwa2002@gmail.com](mailto:augmwa2002@gmail.com) or [pkeiyoro@yahoo.com](mailto:pkeiyoro@yahoo.com)

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## Abstract

*Different studies have produced conflicting results on the impact of learner characteristics on adoption of educational technologies. The main assumption for this study was that every technology is unique and is often delivered in varied learning environments. Evidently however, learner characteristics are known to be critical determinants of technology adoption. This study sought to establish the relationship between learner demographic characteristics and adoption of mLearning among Community Health Trainees enrolled on the mHealth platform run by Amref Health Africa in Kenya. The learner demographic characteristics examined in this study were age, gender, level of education, work experience and period of exposure to the learning technology. The study population was 3081 participants of the two phases of mHealth project. A sample of 354 participants was obtained through simple random sampling procedures and utilised for this study. No significant relationship between either age or gender and adoption of mobile learning was found. However, a significant relationship exists between level of education, work experience and period of exposure to mLearning technology and adoption of mLearning. Based on the findings, this study concluded that institutions considering implementation of mLearning should encourage and motivate learners to adopt mLearning regardless of age and gender as long as equal learning environments are provided. The study also concluded that period of exposure to mLearning technology is the greatest determinant of mLearning adoption. The study recommends that instructional designers provide mLearning solutions that are based on everyday mobile use for better adoption of mobile learning technology. It is also recommended that instructional designers appraise learner characteristics in the context of the learning environment and not as discrete determinants of adoption when developing mLearning content.*

**Key words:** mLearning, adoption of mLearning, learner characteristics, instructional design, Information and Communication Technology (ICT), Open Distance and eLearning (ODEL).

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## Introduction

Mobile technology is an integral part of everyday life. Mobile telephony has transformed the way individuals interact with each other and with their social-economic environment. Many sectors of the economy and social sphere have integrated mobile

technology in their everyday operations (Taleb & Sohrabi, 2012). The utilization of mobile technology is extensive within the areas of business and finance such as m-commerce, m-banking (Bankole, Bankole & Brown, 2011); medicine and public health (m-

health) (Doyle 2014; Chang, Ghose, Littman-Quinn, Anolik, Kyer, Mazhani, & Kovarik, 2012) and in education (mLearning) (González, Martín, Llamas, Martínez, Vegas, & Hernández 2017). Consistent with the advancement of technological innovation, eLearning methods have evolved and are transforming instructional design for efficient and effective teaching and learning. Education technology has also adopted connectivity pedagogy (Anderson, 2011). Moreover, mobile learning is one of the medium for this pedagogy which is an integral part of Open Distance and eLearning (ODeL). Notably, mobile phones are personalised gadgets; therefore, the characteristics of the user are paramount in their adoption. Learners' characteristics have an impact of students' adoption and use of technology (Laukkanen and Pasanen 2008; Pollara, & Broussard, 2011)

Mobile learning presents unique educational affordances that initiate a kind of highly situated, personal, and collaborative learner-centred environment (Kukulka-Hulme, 2009; Cavus and Ibrahim 2009). Indeed, mLearning has changed the way learners access content as well as revolutionised how learners interact with one another and with the facilitators (Cavus and Ibrahim, 2009).

The popularity of mobile learning devices makes them appropriate for use in educational contexts (Negas and Ramos 2011; Jeng, Wu, Huang, Tan, & Yang 2010). Although the rapid increase in the quantity of mobile devices has enabled institutions to begin exploring their use (Wang *et al.*, 2009), adoption of mLearning in teaching and learning is not wide spread (Cheon, Lee, Crooks & Song 2012). Mobile learning (mLearning) therefore, presents a paradigm shift in the provision of distance education by allowing learning to take place anywhere and anytime (Negas & Ramos 2011; Brown Campbell & Li 2011).

There is a general consensus in literature that mobile technology presents educational affordances for learner-centred learning, however, the uptake of mobile technology is low. Characteristics such as age, background, computing ability, computing attitude and motivation have an impact on the likeness of students using a technology to support their studies (Al-Ghaith, Sanzogni & Sandhu, 2010; Adegbiya, & Bola 2015).

It is therefore, important for instructional designers to have an understanding of learner characteristics in order to peach content to the level and learning environment of the novice. The appropriate pedagogical approaches for mLearning should be selected based on learner personalities (Ozdamli, 2012).

Users' demographic characteristics and previous experience have been identified as important factors in technology adoption theories and have also been examined widely as moderators of the relationship between the various antecedents of adoption (Pappas, Mikalef, & Giannakos 2016). Pappas *et al.*, (2016) indicate that demographic characteristics refer to learners' gender, age, and level of education. Elogie (2015) extend the demographic characteristics in addition to those mentioned by Pappas *et al.*, (2016) to include; educational experience and experience with Information and Communication Technology (ICT) used for educational purpose.

Learner characteristics are likely to influence the adoption of a technology (Pappas *et al.*, 2016; Elogie, 2015). Nevertheless, there exist, conflicting evidence with regard to the influence of demographic factors. A research carried out by Padachi, Rojid, & Seetanah. (2008) revealed that there were no significant differences between technology adopters and non-adopters in case of demographic variables. The main purpose of the research was to examine learner demographic characteristics and adoption of

mobile learning for the mHealth community health training programme by Amref Health Africa in Kenya. The specific objective of this research was to assess how learner characteristics, influence adoption of mLearning for the mHealth community health trainees. The study hypothesis was that, there is no relationship between learner demographic characteristics and adoption of mLearning for the mHealth community health trainees.

### **Literature review**

This study focused on literature on demographic characteristics relating to gender, age, level of education, work experience and duration of exposure to mLearning and their influence on adoption of technology in general and specifically mLearning. Different studies present different results on the influence of gender on adoption of technology (Wei & Zhang, 2008). For instance, Wei and Zhang, (2008) point out that gender play an important role in technology adoption and argue that when men decide to use technology, their decision is often strongly influenced by the perceived usefulness of the technology in comparison with others. They also noted that the ease of use is the major variable influencing women's decisions to adopt technology. Chen and Wellman, (2004) in a study which focused on internet usage in China, Germany, Korea, Italy, Japan, Mexico, UK, and USA found that men were more likely than women to use the internet. It is therefore, clear that user context is an important variable for the outcome of gender influence on adoption of any technology.

Adoption of technology has produced different results in different environments. A number of studies (Laukkanen and Pasanen, 2008; MacGregor and Vrazalic, 2006) show that males are more likely than females to adopt e-service. This does not hold in Saudi Arabia (Siddiqui, 2008) where more females were likely to adopt compared to males. This difference is probably due to the nature of the Saudi

society. In such a society, a female tends and prefers to achieve her necessities from home by using the internet (Siddiqui, 2008). The aforementioned literature shows that cultural contexts play a part in the outcome of gender influence on adoption of technology.

Other gender differences regarding technology adoption are noted by Liao, Chen, & Yen, (2007) who observed that gender has a significant effect on adoption. Equally, Evans, Hopper, Knezek, & Jones, (2013) found a significant relationship between gender and smartphone usage, however, they contend that due to the small sample size, the results are not conclusive. Evans *et al.*, (2013) further indicate the need to refine the instrument used, as well as increase the sample size in order to determine more conclusively whether gender is a predictor in smartphone task choice.

On the other hand, the findings by Adegbija, and Bola (2015) showed that there is no significant difference in the extent to which male and female undergraduates perceived the adoption of mobile technologies for learning in three Universities in Kwara State, Nigeria. As mentioned earlier, it is clear that studies on gender and technology adoption have produced conflicting results depending on the context.

Just like gender, the outcome age and adoption of technology is based on learner context. Findings by Mac Callum (2009) indicate that younger students were more likely to perceive mLearning as a positive way to learn and therefore adopt, this may be due to the constraints that the older generation perceive when using a mobile device.

Moreover, Wang, Wu and Wang (2009) also reported that there were some significant age differences in terms of the intended adoption of mLearning. Their findings show a link with

computer self-efficacy whereby younger students tend to have higher computer self-efficacy, and therefore the effort they have to put into learning how to use the device does not influence their decision to adopt mLearning. Another reason given by Wang, Wu and Wang (2009) was that younger students had higher levels of self-worth compared to mature students, and therefore, they were more inclined to making an independent decision to adopt an advanced m-learning system without being influenced by those around them. Wang, Wu and Wang (2009) further indicate that the main reason for low adoption among older users is the user friendliness of the user interface which can hamper their use. These findings imply age cannot be looked at in isolation but as part of the technology in use and the contextual environment.

The level of education has been found to be a determinant of technology adoption. For instance, Al-Ghaith, Sanzogni and Sandhu, (2010). Contend that adopter characteristics can also be found among people who are well educated, have a high level of income, young, male, living in urban areas and have a good grasp of the English language.

Research also show that prior exposure to Information and Communication Technology (ICT) can influence adoption of technology and related behaviour. Moreover, there is evidence that period of exposure to mLearning technology impacts on use and adoption of mLearning (Pappas *et al.*, 2016). Further, (Pappas *et al.*, 2016) defined previous experience refers to how many times a learner has used videos for learning the past six months and for how long the learner watched the video. In learning adoption and continuance research models, split groups analyse also pinpoint that there are significant differences between groups of learners that are considered experienced compared to those without any prior experience. Liao *et al.*, (2008) and Sun *et al.*, (2008), find that anxiety of using an eLearning

medium can be a detrimental factor for its adoption. Thus, with frequent use of a specific medium anxiety is lessened and adoption and satisfaction levels are enhanced.

This study is premised on the Unified Theory of Acceptance and Use of Technology (UTAUT). UTAUT is a comprehensive model that was developed by Venkatesh, Morris, Davis, and Davis, (2003). The UTAUT theory has been used to explain the factors affecting the adoption of different technologies (Kripanont 2007). The Unified Theory of Acceptance and Use of Technology examines, the variables: gender, age, experience, and voluntariness of to moderate the key relationships in the model. In the present study, the influence of gender, age, experience, and level of education on mobile learning adoption is examined.

### **Methodology**

The study utilised a descripto-explanatory survey research design. This design combines both a descriptive and explanatory designs. Combined designs enable the researcher to achieve optimal results Saunders, Lewis and Thornhill (2009). While the descriptive survey design to determine the status of the independent variables on the dependent variables, the main aim of an explanatory research is to identify any causal links between the factors or variables that pertain to the research problem (Fraenkel & Wallen, 2008, Kothari, 2008).

The study was guided by the pragmatism paradigm. This paradigm is selected because it applies to mixed methods arguing that inquirers draw liberally from both quantitative and qualitative assumptions when they engage in their research (Tashakkori & Teddlie, 2010). In effect therefore, the study adopted a mixed methods research approach. Mixed methods involve combining or integration of qualitative and quantitative research and data in a research study. The core assumption of this form of inquiry is that

the combination of qualitative and quantitative approaches provides a more complete understanding of a research problem than either approach alone (Tashakkori & Teddlie, 2010).

The unit of analysis for the research was community health trainees enrolled for mLearning in the mHealth programme run by Amref Health Africa in Kenya. The study population was 3081 participants of the two phases of mHealth programme. To achieve the expected threshold for a sample size, the researchers drew the sample size using the formula suggested by Yamane (1967) for calculating sample sizes. A 95% confidence level and  $P = 0.5$  are

$$n = N/1 + N(e)^2$$

assumed for the Equation

This formula gives a sample size of 354 for this study. The data was collected from six counties in Kenya of the thirteen counties where the mHealth programme took place.

The data was collected through questionnaires while focused group discussions and key informant interviews were utilised for triangulation. While the learner characteristics data was collected using the questionnaires, adoption was measured based on the Mobile Learning Management System (MLMS) data on learner time taken to complete timed assigned topics. The Technology Adopter Category Index further used to compute adopter categories.

Both descriptive and inferential statistics were used for analysis. A Spearman’s correlation analysis was used to identify the relationships between age, gender and adoption of mLearning while regression analysis was used to show the amount of variance in mLearning adoption accounted for by learner characteristics as well as test the hypothesis.

**Results**

The characteristics of the community health trainees enrolled in the mHealth programme to undertake

their study using mLearning were sought and the results are presented in this section. The characteristics which were considered for this study consisted of age, gender, academic achievement, professional experience as a community health volunteer, prior experience with mLearning and duration of exposure to mLearning.

**Age**

The descriptive analysis for age is presented in Table 1.

**Table 1 Age of respondents**

Age in years	Frequency	Percent
24 and below	11	3.7
25-29	37	12.6
30-34	53	18.0
35-39	69	23.5
39-44	54	18.4
Above 40	70	23.8
<b>Total</b>	<b>294</b>	<b>100.0</b>

The age of the community health volunteers is as follows; 24 years and below 3.7%, 25-29 constitute 12.6%, 30-34 were 18.0%, 35-39 constitute 23.5%, 39-44 were 23.5% and those above 44 years of age constitute 23.8 %.

**Gender of respondents**

The descriptive analysis for gender is presented in Table 2.

**Table 2: Gender of respondents**

Gender	Frequency	Percent
Female	202	68.7
Male	92	31.3
<b>Total</b>	<b>294</b>	<b>100.0</b>

The results in Table 2 showed that there were more female (68.7%) community health volunteers than the male (31.3%). This result is consistent with the national average where we have more females

participating in community health volunteer work than males.

**Level of education**

Regarding the level of education of the community health trainees participating in the mLearning programme, primary education, secondary education and professional qualification (certificate and diploma level) emerged as the main categories for consideration. The descriptive analysis for level of education is presented in Table 3.

**Table 1: Academic achievement of respondents**

Level of Education	Frequency	Percent
Primary	16	5.4
Secondary	25	8.5
Certificate Level	223	75.9
Diploma	29	9.9
Bachelor’s Degree	1	.3
<b>Total</b>	<b>294</b>	<b>100.0</b>

The results showed that 5.4% of the participants had primary education, 8.5% had secondary education, 75.9 % had professional certificate while 9.9% had diploma. Only one of the Community Health Volunteers sampled for the study held a Bachelor’s degree representing 0.3%.

**Professional Experience and Adoption of mLearning**

The descriptive analysis is presented in Table 4.

**Table 4: Number of years worked as Community Health Volunteer**

No. of years	Frequency	Percent
5 years and below	149	50.7
6-10 years	112	38.1
11-15 years	30	10.2
16-20 years	3	1.0
<b>Total</b>	<b>294</b>	<b>100.</b>

The results of the study (Table 4) show that 50.7% of the respondents had 5 years and below of experience as Community Health Volunteers. Another 38.1 percent had 6-10 years’ experience with 10.2% having 11-5 years’ experience and 1.0% having 16-20 years.

**Duration of Exposure to mLearning and Adoption of mLearning**

The descriptive results for duration of exposure to mLearning are presented in Table 5.

**Table 5. Duration of Exposure to mLearning**

Months	Frequency	Percent
1-4	3	1.0
5-8	9	3.1
9-12	197	67.0
13-16	3	1.0
17-24	82	27.9
<b>Total</b>	<b>294</b>	<b>100.0</b>

The results in Table 5 indicates that 1.0% of the participants were exposed to the mLearning programme for 3 months, 3.1% were exposed for 5-8 months, 67.0 were exposed for 9-12 months and 1.0% for 13-16 months while 27.9% were exposed for 17-24.

**Learner Characteristic and Adoption of Mobile Learning**

Correlation analysis was used to identify the relationships between each variable. The results indicated that the level of education was positively and significantly correlated with adoption of mobile learning ( $r=.150^*p < 0.05$ ). The analysis also established that work experience was positively and significantly correlated with adoption of ( $r=.233^{**} p < 0.01$ ). The results also show that the period of exposure to mLearning was positively and significantly correlated with adoption of mLearning ( $r=.466^{**} p < 0.01$ ). The period of exposure to

mLearning had the greatest correlation with mLearning adoption of the three sub variables of learner characteristics. This finding implies that the longer the learner is exposed to the mLearning platform the higher the adoption of mLearning.

Secondly, regression analysis was used to show the amount of variance in mLearning adoption accounted for by learner characteristics. Age and gender were excluded from the regression model. To test the hypothesis, the model  $Y = \beta_0 + \beta_2 X_1$  was fitted.

The results showed that the association between the learner characteristics and adoption of mLearning was positive and significant  $F(1,270) = 79.346$ ,  $p < 0.001$ ,  $R^2 = 0.227$ . The finding that  $R^2 = 0.227$ , implies that about 23% of variation in mLearning adoption is explained by variation on learner characteristics.  $R = 0.477$  meaning that learner characteristics contributed to about 48% of the mLearning adoption. The model equation therefore is;

$$Y = 3.279 + 0.153X_1$$

Where Y is mLearning adoption and  $X_1$  is

learner characteristics

It was hypothesized that:

H<sub>01</sub>: There is no relationship between learner characteristics and adoption of mLearning for the mHealth community health trainees.

With,  $\beta = 0.153$   $t = 8.908$ ,  $p < 0.05$  it means that for one-unit improvement in learner characteristics, mLearning adoption increases by about 0.153. Given that the p-value is  $< 0.05$ , the null hypothesis was rejected and it was concluded that there is significant relationship between learner characteristics and adoption of mLearning. This implies that learner characteristics such as prior exposure to mLearning are critical in mLearning adoption. This means institutions offering mLearning should have an

awareness of the learner characteristics in order to meet the shortfalls such as in prior experience.

### Discussion of findings

This study did not find a significant relationship between gender and adoption of mLearning. This finding is consistent with Adegbija, and Bola (2015) who find no significant difference in the extent to which male and female undergraduates perceived the adoption of mobile technologies for learning in Nigeria. The findings of this study, however, contradicts Nwagwu and Odetumibi, (2011) who find gender playing an important role in technology adoption. We therefore, contend that in mLearning adoption, gender should not be considered in isolation as a determinant of technology adoption, but it ought to be put in context of the learning environment. In the current study both men and women were exposed to a similar learning environment and thus the finding. Equally, this study did not find a significant relationship between age and adoption of mLearning. This contradicts findings by Mac Callum (2009) who find that age is factor in adoption of mobile learning with younger students more likely to adopt. The finding in the current study can be explained by the fact that most (83.7 %) of the participants in the current study were above 30 years old and that they were exposed to similar learning environments.

The results however, show a significant relationship between level of education and adoption of mLearning. This finding in agreement with Wang *et al.*, (2009) who find that educational experience can influence the adoption of a technology. The results also show a significant relationship between both work experience and period of exposure to mLearning and adoption of mLearning. This finding is consistent with Theng (2009) and Venkatesh *et al.* (2003) who found that prior experience in use of a technology playing a positive role in technology adoption.

## Conclusions

Based on the findings of this study, it is concluded that although learner characteristics are critical determinants of technology adoption as depicted in literature, they must not be considered in isolation but as part of the whole learning environment including entry behaviour, learning context and the design of the technology in question. In the case of this research the population was more homogeneous than heterogeneous and the mLearning platform was modelled on basic phone usage thus providing almost equal opportunity for the participants.

It is also concluded that institutions considering adoption of mLearning should encourage and motivate learners to adopt mLearning regardless of age and gender. It is further concluded that period of exposure to mLearning technology is the greatest determinant of mLearning adoption.

## Recommendations

Utilizing the results of this study, it is recommended that instructional designers design mLearning solutions modelled on everyday mobile use for enhanced adoption.

The study further recommends that age and gender should not be considered by instructional designers in the adoption of mobile technology for learning, instead both male and female learners should be presented with equal experience in the use of mobile technologies for learning provided the mLearning platform is user friendly.

It is further recommended that instructional designers appraise learner characteristics in the context of the learning environment and not as discrete determinants of adoption when developing mLearning content.

## References

- Adegbija, M. V., & Bola, O. O. (2015). Perception of undergraduates on the adoption of mobile technologies for learning in selected universities in Kwara state, Nigeria. *Procedia-Social and Behavioural Sciences*, 176, 352-356.
- Al-Fahad, F. N. (2009). Students' attitudes and perceptions towards the effectiveness of mobile learning in King Saud University, Saudi Arabia. *TOJET: The Turkish Online Journal of Educational Technology*, 8(2).
- Al-Ghaith, W., Sanzogni, L., & Sandhu, K. (2010). Factors influencing the adoption and usage of online services in Saudi Arabia. *EJISDC*, 40(1), 1-32.
- Al-Hujran, O., & Migdadi, M. (2013). Developing Countries. *E-Government Implementation and Practice in Developing Countries*, 242.
- Anderson, T. (2011). Three generations of Distance Education Pedagogy - Past Present and our Networked Future: Athabasca University, Canada Open University
- Bankole, F. O., Bankole, O. O., & Brown, I. (2011). Mobile banking adoption in Nigeria. *The Electronic Journal of Information Systems in Developing Countries*, 47.
- Brown, K., Campbell, S., C., and Ling, R. (2011). Mobile Phones Bridging the Digital Divide for Teens in the US? *Future Internet*
- Cavus, N., & Ibrahim, D. (2009). m-Learning: An experiment in using SMS to support learning new English language words. *British journal of educational technology*, 40(1), 78-91.
- Chang, A. Y., Ghose, S., Littman-Quinn, R., Anolik, R. B., Kyer, A., Mazhani, L., ... & Kovarik, C. L. (2012). Use of mobile learning by resident physicians in Botswana. *Telemedicine and e-Health*, 18(1), 11-13.

- Cheon, J., Lee, S., Crooks, S. M., & Song, J. 2012, "An Investigation of Mobile Learning Readiness in Higher Education Based on the Theory of Planned Behavior". *Computers & Education*, vol.59, pp.1054–1064.
- Doyle, G. J., Garrett, B., & Currie, L. M. (2014). Integrating mobile devices into nursing curricula: Opportunities for implementation using Rogers' Diffusion of Innovation model. *Nurse education today*, 34(5), 775-782
- Elogie, A. A. (2015). Factors Influencing the Adoption of Smartphones among Undergraduate Students in Ambrose Alli University, Ekpoma, Nigeria.
- Evans, M., Hopper, S., Knezek, G. A., & Jones, G. (2013). Gender as a predictive factor for tasks completed using smartphones.
- Fraenkel, J. R., & Wallen, N. E. (2008). Introduction to qualitative research. *How to Design and Evaluate Research in Education*, 7th ed. Boston, MA: McGraw-Hill International Edition.
- González, M. Á., González, M. Á., Martín, M. E., Llamas, C., Martínez, Ó., Vegas, J., ... & Hernández, C. (2017). Teaching and Learning Physics with smartphones. In *Blended Learning: Concepts, Methodologies, Tools, and Applications* (pp. 866-885). IGI Global.
- Jeng, Y.-L., Wu, T.-T., Huang, Y.-M., Tan, Q., & Yang, S. J. H. 2010, "The Add-on Impact of Mobile Applications in Learning Strategies: A Review Study." *Educational Technology & Society*, vol. 13, pp. 3–11.
- Kripanont, N. (2007). *Examining a technology acceptance model of internet usage by academics within Thai business schools* (Doctoral dissertation, Victoria University).
- Kukulska-Hulme, A. (2009). Will mobile learning change language learning? *ReCALL*, 21(2), 157-165.
- Laukkanen, T., & Pasanen, M. (2008). Mobile banking innovators and early adopters: How they differ from other online users? *Journal of Financial Services Marketing*, 13(2), 86-94.
- Liao, C., Chen, J. L., & Yen, D. C. (2007). Theory of planning behaviour (TPB) and customer satisfaction in the continued use of e-service: An integrated model. *Computers in human behavior*, 23(6), 2804-2822.
- Liao, H. L., & Lu, H. P. (2008). The role of experience and innovation characteristics in the adoption and continued use of e-learning websites. *Computers & Education*, 51(4), 1405-1416.
- Mac Callum, K. (2009). Student characteristics and variables that determine mobile learning adoption: An initial study. In *Proceedings of the universal college of learning: teaching and learning conference* (pp. 1-8).
- Negas, M.C., & Ramos, P. 2011, "Critical Factors in the Use of Mobile Learning by "Digital Natives" on Portuguese Teaching." *Proceeding of the European Conference on Information Management & Evaluation*, pp. 333-340.
- Nwagwu, W. E., & Ajama, M. (2011). Women's health information needs and information sources: a study of a rural oil palm business community in South-Western Nigeria.
- Ozdamli, F. (2012). Pedagogical framework of m-learning. *Procedia-Social and Behavioral Sciences*, 31, 927-931.
- Ozdamli, F., & Uzunboylu, H. (2015). M-learning adequacy and perceptions of students and teachers in secondary schools. *British Journal of Educational Technology*, 46(1), 159-172.
- Padachi, K., Rojid, S., & Seetanah, B. (2008). Investigating into the factors that influence the adoption of internet banking in Mauritius. *Journal of Internet business*, (5).

- Pappas, I. O., Mikalef, P., & Giannakos, M. N. (2016). Video-Based Learning Adoption: A Typology of Learners. In *SE@ VBL@ LAK* (pp. 34-41).
- Pollara, P., & Broussard, K. K. (2011). Student perceptions of mobile learning: A review of current research. In *Society for Information Technology & Teacher Education International Conference* (pp. 1643-1650). Association for the Advancement of Computing in Education (AACE).
- Saunders, M. L., & Lewis, P. (2009). P. and Thornhill, A. (2009). *Research methods for business students, 4*
- Siddiqui, H. (2008) Investigation of intention to use e-commerce in the Arab countries: A comparison of self-efficacy, usefulness, culture, gender, and socioeconomic status in Saudi Arabia and the United Arab Emirates. Ph.D. dissertation, Nova Southeastern University, United States -Florida
- Sun, P. C., Tsai, R. J., Finger, G., Chen, Y. Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & education, 50*(4), 1183-1202.
- Taleb, Z., & Sohrabi, A. (2012). Learning on the move: the use of mobile technology to support learning for university students. *Procedia-Social and Behavioral Sciences, 69*, 1102-1109.
- Tashakkori, A., & Teddlie, C. (2010). Putting the human back in “human research methodology”: The researcher in mixed methods research.
- Theng, Y. L. (2009, June). Mobile learning for tertiary students: an exploratory study of acceptance of use. In *EdMedia: World Conference on Educational Media and Technology* (pp. 937-946). Association for the Advancement of Computing in Education (AACE).
- 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*.
- Wang, Y.S., Wu, M.C., Wang, H.Y.: (2009) Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology 40*, 92-118.
- Wei, L., & Zhang, M. (2008). The adoption and use of mobile phone in rural China: A case study of Hubei, China. *Telematics and Informatics, 25*(3), 169-186.
- Yamane, T. (1967). *Statistics: An introductory analysis* (No. HA29 Y2 1967).