Factors Influencing Students’ Behavioural Intention to Adopt and use Mobile Learning in Higher Educational Institutions in Nigeria: An Example of Ekiti State University, Ado-Ekiti

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Abstract—Rapid explosion of mobile technologies and its services in Nigeria has provided a new platform for higher institutions to widen access to education through mobile learning. Mobile technologies provide learners with flexibility and ubiquity to learn anytime and anywhere via wireless Internet. However, few researches have been conducted to investigate factors that contribute towards students’ adoption and use of mobile learning in Nigeria. Therefore, this study applied the Unified Theory of Acceptance and Use of Technology (UTAUT) model to investigate students’ behavioural intention to adopt and use mobile learning in higher educational institutions in Nigeria. This study follows a quantitative approach and a survey questionnaire was developed and utilised as the main instrument for data collection. A sample of 250 students was selected from five different schools and four hypotheses are formulated. The data collected was tested against the research model using regression analysis. The results showed that, three factors with the exception of facilitating conditions: performance expectancy, effort expectancy and social influence had significant positive effects on students’ intention to adopt and use mobile learning with performance expectancy being the strongest predictor. Further, the findings show that the developed model explains 48.2% of the variance in the adoption intention to use M-Learning. Based on these findings, M-Learning services that based on students’ suggestions in order to meet their performance expectations must be developed and the M-Learning content must be compatible with different mobile devices along with their operating system. Educational institutions should increase students’ awareness about the expected benefits and advantages of using M-Learning system. Mobile learning providers should conduct training and awareness to early adopters who are already using various mobile services. These early adopters have the potential to persuade their colleagues and friends to adopt to use mobile learning.

Keywords-- Behavioural Intention, Mobile Learning, Mobile Learning Acceptance, Technology Acceptance Model, Technology Adoption and UTAUT

I. INTRODUCTION

Over the past few years, there has been a tremendous growth and penetration of mobile technologies and mobile services in Nigeria. The number of mobile devices shipped to Nigeria has been increasing every year. At the same time, the number of mobile subscribers and Internet users has been increasing too.

In 2010, Nigeria was ranked the first followed by South Africa, Kenya and Tanzania by ITU for mobile phone penetration in Africa [14]. Actually, people in Nigeria have a better access to mobile devices than to clean water, to bank account or even to electricity [21].

Despite the penetration of mobile devices in higher education in Nigeria, their use to enhance education is not widespread. Most of eLearning technologies implemented in higher education are based on desktop computers. Desktop computers have limitations in terms of flexibility and mobility to learners [8]. Furthermore, eLearning implementation through desktop computers requires institutions to install extensive traditional communications infrastructure as well as building multiple computer rooms [16].

The recent emergence of mobile learning can provide a new platform for institutions in Nigeria to enhance education through mobile learning. Mobile learning provides learners with flexibility and ubiquity to learn anytime, anywhere via mobile devices connected to wireless Internet ([15], [19]). Moreover, it provides a new way to deliver education without installing complex communications infrastructure. According to [5], mobile devices have become all-in-one devices that can be carried and used almost anywhere. Consequently, they give learners the opportunity to carry their institution in their own hands [15]. Even those learners described as “hard-to-reach” learners such as work-based, traveller communities, can easily benefit from courses offered via mobile technologies [4].

Despite numerous opportunities offered by mobile learning in education, mobile devices suffer from several challenges such as having small screens, limited processing power, and small keyboards [20]. For example, memory size is said to be too small to hold the course resources such as PDF files and other multimedia enhanced resources [10]. These devices also suffer from risk of loss due to their portability ([11]; [19]). Due to these challenges and many others, some users have negative perceptions towards using these devices for education purposes [19] and make adopting mobile learning difficult [20].

It is evident in the related literature that only a paucity of research into M-Learning adoption can be found with the exception of the study of [6].
The findings of this study show that perceived usefulness and perceived ease of use positively and significantly influence students’ attitude towards M-Learning and in turn Attitude positively and significantly affects intentions to use M-Learning. Results also indicate that individual differences have a great impact on user acceptance and that the perceived enjoyment and perceived mobility can predict user intentions of using M-Learning.

On the other hand and based on UTAUT, [20] investigated the determinants of M-Learning acceptance. Facilitating conditions was not considered in their model, but perceived playfulness and self management of learning were both included to extend UTAUT. The study also aimed to discover if there exist either age or gender differences in the acceptance of M-Learning, or both. Their findings indicate that performance expectancy, effort expectancy, social influence, perceived playfulness, and self-management of learning were all significant determinants of behavioural intention to use M-Learning. They also found that age differences moderate the effects of effort expectancy and social influence on M-Learning use intention, and that gender differences moderate the effects of social influence and self management of learning on M-Learning use intention.

Clearly, the presence and accessibility of mobile technologies do not guarantee their potential will be realized in educational contexts [11]. It should be noted that, the success of mobile learning depends on human factors in the use of mobile devices [10]. The need to understand factors that contribute towards learners’ intention to adopt and use mobile learning is critical for successful implementation in a given context. This will help those who are involved in mobile learning implementation to make mobile services that are relevant and acceptable.

This study was aims to examine factors influencing students’ behavioural intention to adopt and use mobile learning in higher educational institutions in Nigeria. A sample of 250 students was selected amongst the regular degree students of Ekiti State University in Affiliated with Emmanuel Alayande College of Education, Oyo. Data was collected and tested against the research model using regression analysis. The study adopted the Unified Theory of Acceptance and Use of Technology (UTAUT) model [17] as a theoretical framework. The model used for this study is presented in Figure (1).

![Figure 1. Research Model](image-url)
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II. RESEARCH OBJECTIVES

This research aims to enhance understanding of factors influencing learners’ behavioural intention to use mobile learning in Ekiti State University, Ado-Ekiti, Nigeria. The research also examined the applicability of an extended UTAUT to mobile learning as a new innovation for learning tool in a Nigerian university education system. Specifically, the objectives of this research are as follows:

1) To investigate the relationship between performance expectancy and learner’s behavioural intention to use mobile learning.
2) To investigate the relationship between effort expectancy and learner’s behavioural intention to use mobile learning.
3) To investigate the relationship between social influence and learner’s behavioural intention to use mobile learning.
4) To investigate the relationship between facilitating conditions and learner’s behavioural intention to use mobile learning.

III. RESEARCH HYPOTHESES

The following Hypothesis was formulated and tested for this study:

1) There is no statistically significant positive effect of Performance Expectancy on the Behavioural Intention to use mobile learning.
2) There is no statistically significant positive effect of Effort Expectancy on the Behavioural Intention to use mobile learning.
3) There is no statistically significant positive effect of Social Influence on the Behavioural Intention to use mobile learning.
4) There is no statistically significant positive effect of Facilitating Condition on the Behavioural Intention to use mobile learning.

IV. RESEARCH METHODOLOGY

The quantitative research design of the survey type was employed in the study. The population of the study consisted of all the students in Ekiti State University, Ado-Ekiti. A stratified random sampling technique was used to select two hundred and fifty (250) respondents from the population. Fifty (50) respondents were selected from each school. An adapted questionnaire tagged “Factors Influencing students’ Behavioural Intention to Adopt and use Mobile Learning in Higher Institution (FISBIAUML)” was used for data collection. The questionnaire was made up of six sections. Section A focused on demographic data. Section B focused on Behavioural Intention (BI) of the students’ to adopt and use mobile learning.

The section contained three (3) items. Section C contained five (5) items on Performance Expectancy (PC). Section D contained four items on Effort Expectancy (EE). Section E of the questionnaire which contained three (3) items addressed the Social Influence (SI). Section F contained four (4) items on Facilitating Conditions (FC). All the items were measured using a five-point Likert-type scale, ranging from “strongly agree” to “strongly disagree”. The face and content validity of the questionnaire was ascertained by experts in Test and Measurement. A sample of twenty respondents was selected apart from the selected sample and the questionnaire was administered on them to carryout test-retest analysis. The reliability and internal consistency of measurement scales was measured using Cronbach’s Alpha (α). The Cronbach’s Alpha of all scales included in this study ranged between 0.82 and 0.91; which indicate good reliabilities of the scales. Hence, both the content validity and reliability are satisfactorily met in this study (See Table II). The instrument was administered personally by the researcher on the selected sample. Data collected was analysed using regression analysis at 0.05 level of significant.

V. RESULTS

Table I

<table>
<thead>
<tr>
<th>Measure</th>
<th>Item</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>90</td>
<td>36.0</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>160</td>
<td>64.0</td>
</tr>
<tr>
<td>Age</td>
<td>18-24</td>
<td>87</td>
<td>34.8</td>
</tr>
<tr>
<td></td>
<td>25-30</td>
<td>65</td>
<td>26.0</td>
</tr>
<tr>
<td></td>
<td>31-35</td>
<td>48</td>
<td>19.2</td>
</tr>
<tr>
<td></td>
<td>36-40</td>
<td>35</td>
<td>14.0</td>
</tr>
<tr>
<td></td>
<td>Above 40</td>
<td>15</td>
<td>6.0</td>
</tr>
<tr>
<td>Type of Degree</td>
<td>Regular</td>
<td>158</td>
<td>63.2</td>
</tr>
<tr>
<td></td>
<td>Degree</td>
<td>92</td>
<td>36.8</td>
</tr>
</tbody>
</table>

The descriptive statistics of the sample from Table I showed that 36.0% of the respondents were male and 64.0% were female. Respondents aged between 18-24 years formed the largest age group and represented 34.8% of the sample, whilst respondents aged between 25-30 years represented 26.0% of the sample. Also, 19.2% of the respondents aged between 31-35 years. Respondents aged between 36-40 years represented only 14.0% of the sample. Finally, 6.0% of the respondents aged above 40 years. In terms of their type of degree, the majority respondents (i.e. 63.2%) are offered regular degree, whilst those offered sandwich degree represented only 36.8%.
Table II
Reliabilities, Means, And Standard Deviations

<table>
<thead>
<tr>
<th>Construct</th>
<th>Cronbach’s Alpha (α)</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Expectancy (PE)</td>
<td>0.89</td>
<td>17.70</td>
<td>5.003</td>
</tr>
<tr>
<td>Effort Expectancy (EE)</td>
<td>0.85</td>
<td>17.50</td>
<td>4.471</td>
</tr>
<tr>
<td>Social Influence (SI)</td>
<td>0.91</td>
<td>17.66</td>
<td>5.089</td>
</tr>
<tr>
<td>Facilitating Conditions (FC)</td>
<td>0.82</td>
<td>5.34</td>
<td>2.093</td>
</tr>
<tr>
<td>Behavioural Intention (BI)</td>
<td>0.89</td>
<td>14.66</td>
<td>2.318</td>
</tr>
</tbody>
</table>

Table II shows the Cronbach’s Alpha of all the scales used to obtained data and the results indicated that the ranged are in between 0.82 and 0.91.

Table III
Regression Analysis Of Effect Of Performance Expectancy, Effort Expectancy, Social Influence And Facilitating Conditions On The Behavioural Intention Of The Students’ To Adopt And Use Mobile Learning.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>N</th>
<th>DF</th>
<th>T_cal</th>
<th>Sig.</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td></td>
<td></td>
<td>250</td>
<td>248</td>
<td>11.39</td>
<td>0.00</td>
<td>S</td>
</tr>
<tr>
<td>Performance Expectancy (PE)</td>
<td>.711</td>
<td>.298</td>
<td>.655</td>
<td></td>
<td>7.08</td>
<td>0.00</td>
<td>S</td>
</tr>
<tr>
<td>Effort Expectancy(EE)</td>
<td>.247</td>
<td>.133</td>
<td>.477</td>
<td></td>
<td>2.87</td>
<td>0.63</td>
<td>S</td>
</tr>
<tr>
<td>Social Influence (SI)</td>
<td>.290</td>
<td>.249</td>
<td>.637</td>
<td></td>
<td>2.16</td>
<td>0.24</td>
<td>S</td>
</tr>
<tr>
<td>Facilitating Conditions (FC)</td>
<td>.035</td>
<td>.066</td>
<td>.032</td>
<td></td>
<td>0.53</td>
<td>0.59</td>
<td>NS</td>
</tr>
</tbody>
</table>

Predictors: (Constant), PE, EE, SI and FC  
Dependent variable: Behavioural Intention (BI) to adopt and use Mobile Learning

Table III indicates that the t_cal obtained for performance expectancy, effort expectancy, social influence and facilitating conditions are 7.08, 2.87, 2.16 and 0.53 respectively while their sig. are 0.00, 0.63, 0.24 and 0.59 respectively. Meaning that t_cal is greater than sig. at 0.05 level of significant for performance expectancy, effort expectancy and social influence while t_cal is less than sig. at 0.05 level for facilitating conditions. Hence, the result is significant for performance expectancy, effort expectancy and social influence while insignificant for facilitating conditions. Though, if all the variables are pooled together the t_cal is greater than sig. at 0.05 level of significant (i.e. 11.39>0.00). Therefore, there is statistically significant positive effect of performance expectancy, effort expectancy and social influence on the behavioural intention of the students to adopt and use mobile learning while there is no statistically significantly positive effect of facilitating conditions on the behavioural intention of the students to adopt and use mobile learning.

Table IV
Multiple Regression Analysis

<table>
<thead>
<tr>
<th>R²</th>
<th>Adjusted R²</th>
<th>F Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.492</td>
<td>0.482</td>
<td>19.253</td>
<td>0.000***</td>
</tr>
</tbody>
</table>

*** Significant at p≤ 0.05  
Dependent Variable: Behavioural Intention to adopt and use M-Learning

The results, showed in Table IV, indicate that Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions altogether explain about 48.2% of the difference in the intention to use M-Learning in the future. The F Value is equal to (19.253) and hence is significant at (p≤0.05) and this assures that there is a relationship between the independent variables and the dependent one.
As in Figure 2, it was found that “Performance Expectancy” ($\beta = 0.655$, $p \leq 0.05$), “Effort Expectancy” ($\beta = 0.477$, $p \leq 0.05$) and “Social Influence” ($\beta = 0.637$, $p \leq 0.05$) are significantly and positively related to “Behavioural Intention” of M-Learning (Adjusted $R^2 = 0.482$). Thus, H1, H2 and H3 are supported. However, results show that “Facilitating Conditions” ($\beta = 0.032$) is not significant at $p \leq 0.05$ levels. Hence, H4 is not supported.

VI. DISCUSSION

This study was set up with the aim of assessing students’ behavioural intention to adopt and use mobile learning in higher education in Nigeria. The main finding was that three out of four constructs had significant positive influence towards students’ behavioural intention to use mobile learning as shown in Table III. The findings of this study provided evidence that the UTAUT construct for performance expectancy (i.e. the expected benefits gained by using M-Learning) has a significant positive influence on the behavioural intention to use of M-Learning.

The standardized coefficient (Beta value) for the performance expectancy is positive and significant ($\beta = 0.655$, $p \leq 0.05$). This implies that students in higher education in Nigeria believe mobile learning is useful, and will enable them to accomplish their learning activities faster and more efficiently. Students also think that mobile learning will help them to improve their learning performance and to obtain better grades. In order to strengthen this belief, educators should pay attention to the quality of learning resources deployed in mobile devices as well as developing tools that will facilitate student learning.
The effect of effort expectancy on intention to use M-Learning was very similar to performance expectancy. Effort expectancy, which is similar to the ease of use construct in TAM, remains a significant and a strong predictor of behavioural intention to use M-Learning. As shown in Table III, the standardized coefficient (Beta value) for the Effort expectancy is positive and significant ($\beta = 0.477, p \leq 0.05$). This findings support the existing literature on the topic that a system’s ease of use has a direct influence on its level of usage ([12]; [7]; [12]; [18]; [13]). These findings suggest that students believe that they will not need a lot of instruction to be able to use mobile learning as they think it will be clear, understandable, and easy to use [1].

Moreover, they believe they will have the required skills to use mobile learning once it is introduced. To strengthen these beliefs, developers should develop usable mobile learning services [20]. If the devices and mobile application are made easy to use, students are likely going to adopt and use. Usability is a key for students to use mobile learning services as many mobile devices have small screen sizes, limited processing power, and small sized keyboards [20].

The findings of this study revealed that social influence was positively influences student intention to use M-Learning systems. As shown in Table III, the standardized coefficient (Beta value) for the social influence is positive and significant ($\beta = 0.637, p \leq 0.05$). This result corroborates the previous findings (e.g. [8]; [22]; [19]; [23]; [13]). This result provides further support for the hypothesis that, students believe their colleagues and friends can influence them to adopt and use mobile learning. Mobile learning providers should conduct training and awareness to early adopters who are already using various mobile services. These early adopters have the potential to persuade their colleagues and friends to adopt to use mobile learning [20].

Finally, in this study, facilitating conditions construct did not have a significant direct effect on intention to use M-Learning. This result is in line with the findings of [13] but contradicted the findings of [9]. The construct of facilitating conditions was originally suggested by [17] to be a primary predictor of actual usage and not behavioural intention. The idea is that facilitating conditions in terms of access, infrastructure, training, technical support, and other related issues would mainly affect the nature, type, and frequency of use and not the behavioural intentions of users. Previous studies indicated that in the context of developing countries, the influence of facilitating conditions on technology adoption is not direct [3].

VII. CONCLUSION

M-Learning is still considered as a new technological innovation worldwide. In some developing countries, like Nigeria, where expenditures on IT infrastructure are huge, the idea of utilizing mobile technologies in education is not very far from reality. However, before such a technology is implemented, there is a pertinent need to supply decision makers in higher education with important details that would facilitate the implementation process and makes M-Learning a success. Though, it is becoming increasingly difficult to ignore the importance of mobile learning to enhance education in higher education in Nigeria.

Therefore, there is a need to determine factors that contribute towards learners’ acceptance of mobile learning in education in order to facilitate adoption and usage of mobile learning. The empirical findings of this study will help those who are involved in planning and developing mobile learning for higher education in Nigeria to make mobile services that are relevant and acceptable to learners.

On the basis of the Unified Theory of Acceptance and Use of Technology (UTAUT) and following a quantitative approach, important results have been reached in this study. It was found that performance expectancy is a direct predictor and an influential factor of adoption intention of M-Learning. The more M-Learning is perceived as a way in which students can improve their academic performance, the more are the students who are willing to adopt this technology. Another factor that was also found to be influential in this context is effort expectancy. This means that if students perceive M-Learning solutions as user friendly, easy to be used and free of effort, then their adoption intentions to use this technology would be greater.

The construct of social influences was also found to have a positive significant impact on the adoption intention to use M-Learning. Accordingly, if the surrounded environment is encouraging (e.g. peers and faculty members), students will feel more positive in trying out M-Learning. On the other hand and in the context of this study, the construct of facilitating conditions was not found to have a significant impact on the adoption intention of M-Learning.

VIII. RECOMMENDATIONS

Based on the findings of this study, the following suggestions are recommended:

1) Designer of M-learning should designed M-Learning services that based on students’ suggestions in order to better meet their performance expectations.
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2) M-Learning content should be compatible with different mobile devices along with their operating systems [20].

3) Educational institutions should increase students’ awareness about the expected benefits and advantages of using M-Learning systems.

4) M-Learning providers should make a concerted effort to develop M-Learning systems that are friendly and easy to use. This indeed includes aspects related to interface design and navigation as well as input and output tools. This is particularly important when it comes to M-Learning given the acknowledged limitations in terms of screen size and processing power of mobile devices [20].

5) Mobile learning providers should conduct training and awareness to early adopters who are already using various mobile services. These early adopters have the potential to persuade their colleagues and friends to adopt to use mobile learning [20].

REFERENCES


