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Learners' Acceptance of the Use of Mobile Phones to Deliver Tutorials in a Distance Learning Context: A Case Study at the University of Ibadan

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ABSTRACT

This case study focuses on students' acceptance of mobile phones for learning purposes within a project that aims to support and engage distance education students by using mobile phones for distance learning tutorials, rather than using technology merely to communicate information or create access to learning resources. The research design is based on Davis's Technology Acceptance Model and tests multiple hypotheses concerning the effects of perceived usefulness, perceived ease of use, interest in the technology and technology self-efficacy on the use of the mobile tutorials. The evidence gathered confirms that the mobile tutorials enhanced teaching and learning. However, it also highlights several preconditions for successful implementation, including providing technical support to students, using a well-designed interface, improving student information and communications technology (ICT) literacy, controlling the messaging and data costs faced by students, and improving the capacity of course developers and technical staff.

Keywords

Distance education, mobile learning, learning design, Technology Acceptance Model, higher education, Africa

INTRODUCTION

Over the last 12 years, the University of Ibadan (UI) has striven to improve the teaching and learning experience of staff and students. In order to support this process, UI's initial focus was on building a campus Information and Communication Technology (ICT) infrastructure. Focus has now shifted to using this infrastructure to support the teaching and learning process, underscoring the importance of interactions among staff and students to create an effective teaching and learning environment.

A number of Educational Technology (EdTech) initiatives are being pursued. Key goals for EdTech at UI include:

- Implementing discipline-specific pedagogical strategies that require students' active engagement and develop their problem-solving and problem-posing skills;
- Creating a learning environment that challenges students to become actively engaged, independent, lifelong learners in and out of formal learning spaces;
- Enriching learning experiences through enhanced interactive learning;
- Offering flexible and cost-effective quality learning to time-constrained and economically deprived students;
- Alleviating staff and space capacity constraints within the institution;
- Achieving learner-centered education, and enabling open and distance learning; and
- Developing teachers who make learning relevant, exciting and effective, while achieving efficiencies that will help them meet their multi-faceted academic responsibilities.

The Distance Learning Centre (DLC) of UI was established in 2002 to serve the needs of both young and adult distance learners, whether currently employed or seeking employment. Establishing the DLC responded to one of the major objectives of the Nigerian National Policy on Education: providing equal educational opportunities to all citizens at all levels of education, thus widening participation in education.

The National Universities Commission (NUC) policy guidelines (NUC 2009) for open and distance learning in Nigerian universities encourage the use of technology in deploying distance education programs. According to these guidelines, content delivery should be based on resource-based pedagogies and the management of assessment processes should be automated. In line with the NUC policy guidelines, and funded by the Educational Technology Initiative of the Partnership for Higher Education in Africa (PHEA), the project described in this case study explored the use of mobile phones to support distance learning students. This paper focuses on the acceptance of mobile phones for tutorial delivery in distance education.

The use of mobile phones to support distance education has three clear rationales. First, distance learners are in diverse geographical locations, and may be learning in isolation, so affordable technology is an appropriate means to help them communicate with the institution and with other learners. The mobile phone can be used to provide academic and administrative support for such learners, and therefore to reduce what Moore (in Kegan, 1979: 22-38) refers to as transactional distance, one of the major constraints faced by distance education learners. Second, learners can conveniently carry their mobile device with them, meaning that they can learn wherever they are. Third, mobile phone penetration in Africa is high, and mobile devices such as phones and PDAs (personal digital assistants, i.e., palmtop computers) are available at much lower prices than desktop computers and therefore offer a less expensive means of communication. In Nigeria, pervasive evidence of mobile penetration and adoption is irrefutable: cell phones, PDAs, MP3 players, portable game devices and laptops all abound, and from

toddlers to senior citizens, people are increasingly communicating in ways that would have been impossible to imagine only a few years ago. In addition, many claims have been made about the potential and benefits of mobile learning (M-learning) to make learning possible anywhere, anytime, in any way and by any means (Adedoja and Oyekola, 2008; Adedoja, Omotunde and Adelere, 2010; Young, 2002; and Salmon, 2000).

Improving our understanding of the ways mobile phones can be used to support education is therefore crucial. A growing body of evidence (Green, 2002; Campbell, 2004 and 2006; Hooper, Fitzpatrick and Weal, 2009) demonstrates that currently available hardware such as PDAs and mobile phones can indeed help to increase communication and interaction and enhance the quality of learning, particularly in distance education. Hooper et al. (2009) argue that mobile technologies are increasingly being used to create innovative mobile learning experiences for learners, with a key benefit being learners' ability to collaborate through the use of the PDAs and mobile phones.

In pursuit of the stated reasons for investing in EdTech at UI, four groups have been working on capacity building, development of open courseware resources, use of radio and mobile phone resources, and development of tele-classrooms (classrooms in which students view classes that are streamed in from a distant location). The mobile phone project is particularly concerned with exploring the use of mobile phones for distance learning tutorials, and seeks to go beyond merely communicating information and creating access to learning resources, aiming in addition to support and engage distance education students. This case study focuses on students' acceptance of mobile phones for learning purposes.

The objectives of this study on the use of mobile phones in distance learning are to:

- a) Determine the level of acceptance of students for mobile delivery modes;
- b) Create opportunities for users to contribute to the final product, while studying the influence of the following variables: external factors, perceived usefulness, perceived ease of use, intention to use, attitude to using and action (Davis, 1986);
- c) Determine which cultural and environmental factors are predominant in influencing acceptability of the courseware;
- d) Determine preferences for a particular delivery format and reasons for this choice;
- e) Ascertain the type of support that students need to make effective use of mobile delivery modes; and
- f) Based on challenges faced during use, make appropriate recommendations for adoption.

THEORETICAL FRAMEWORK

This study's framework is based on Davis's (1986) Technology Acceptance Model (TAM), which makes use of the Theory of Reasoned Action (TRA). TRA postulates that an individual's attitude toward behavior is influenced by his/her beliefs. Notably, this model deals with the acceptability of an information system/tool, predicting acceptability of the system/tool and modifications to be made, if necessary, for acceptability. TRA assumes that acceptability is primarily determined by two factors: Perceived Usefulness (PU) and Perceived Ease of Use (PEU).

PU can be described as the degree to which an individual believes that the use of a system/tool will improve his/her performance, while PEU refers to the degree to which an individual believes the use of a tool/system will be effortless or require minimum effort. TRA postulates that use of a system/tool is determined by behavioral intention, an individual's attitude toward its use, and perception of its utility.

Davis (1986) posits that the attitude of an individual is not the only factor that determines his/her use of new technology, as the impact the tool or system will have on his/her performance is also significant. The key factors in the Technology Acceptance Model are illustrated in Figure 1.

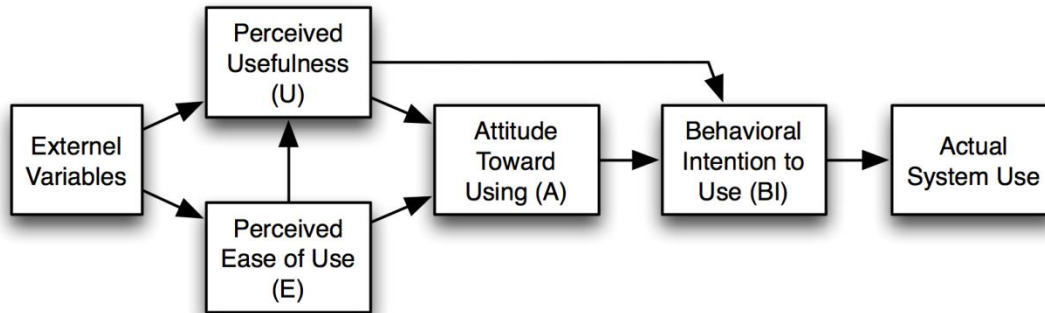


Figure 1: The TAM Relationship between Perceived Usefulness, Perceived Ease of Use and Actual Use (Davis, 1986)

Many studies have been carried out using Davis's (1986) TAM. Most conclude that the model is incomplete because it fails to account for social influence in the acceptance, adoption, and utilization of a new tool/system (Misiolak, Zakaria and Zhang, 2002; Malhotra and Galletta, 1999). It is important to take this into account because human beings are strongly influenced by their social environment. Nonetheless, many studies have used the constructs of PU, PEU, and subjective norms (the influence of instructors, mentors, and peers) to explain technology acceptance and usage for a variety of instructional systems including online learning.

Mun and Yujong (2003) exposed students to Microsoft end-user applications for a period of eight weeks. After a two-week trial period, they found that learners' self-efficacy, enjoyment and learning goal orientation determined the actual use and acceptance of the system. Shen, Laffey, Lin and Luang (2006) explored the extent to which subjective norms influence and shape the perception of learners towards the use of different course delivery modes. Their results showed that instructors' influence made a significant contribution to students' PU, while mentors' influence was significant for PEU. This result suggests the importance of the instructor's role in shaping learners' impressions of the value of using a course delivery system. Miller, Rainer and Corley (2003) found that PEU and PU had a significant positive relationship with the amount of time students spend on a course. They also noted that both are significant factors for predicting intention to use the technology. Sumak, Hericko, Pusnik and Polamcic (2011) found that the use of Moodle, a learning management system, by learners depended on behavioral intentions and attitude, and PU was the strongest and most important predictor of attitude.

This study uses Davis's (2006) TAM model as an analytical framework to examine how distance education students at UI perceive the use of mobile technology for learning purposes. Figure 2 shows the adapted model used in the study.

In the proposed model (Figure 2) based on TAM, it is assumed that perceived usefulness, perceived ease of use, interest and technology self-efficacy will exert an important direct effect on attitude towards use and behavioral intention to use. According to Farah (2011), technology self-efficacy refers to teachers' belief in their ability to integrate technology into their classroom successfully. All the aforementioned variables will exert an important direct effect on attitude towards use and behavioral intention to use,

which in combination with actual use are the most important antecedents of acceptance of the proposed model. This model can also be applied to the prediction of learners' acceptance of using an e-learning system. The influence of additional factors derived from the literature (e.g. interest, technology, and self-efficacy) and constructs from TAM will also be explored in this study.

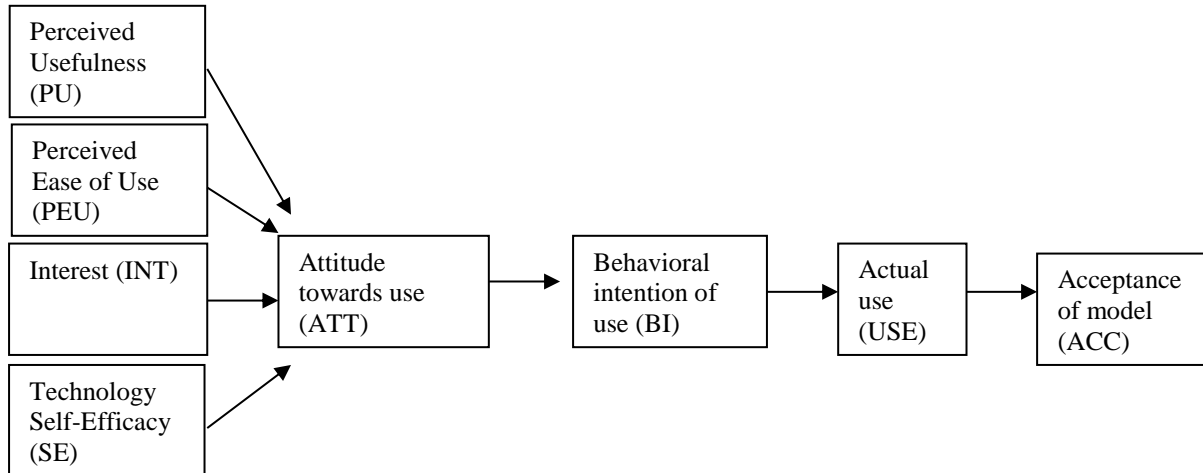


Figure 2: Proposed Technology Acceptance Model (adapted from Davis 2006)

In this study, the following hypotheses were tested:

- H₁: Perceived usefulness is positively related to improving attitude toward the use of mobile technology.
- H₂: Perceived ease of use has a positive effect on attitude toward the use of mobile technology.
- H₃: Perceived ease of use has a positive effect on the perceived usefulness of mobile technology.
- H₄: Interest is positively related to the use of mobile technology.
- H₅: Technology self-efficacy is positively related to attitude, hence affecting learners' acceptance of mobile technology use.
- H₆: Perceived usefulness is positively associated with actual use of mobile technology.
- H₇: Behavioral intention is positively associated with learners' acceptance of mobile technology use.
- H₈: There is a significant relationship between the attitude of learners and their behavioral intention to use mobile technology.

METHODOLOGY

A multi-method (both quantitative and qualitative) approach was used in order to triangulate the data, as well as to solicit rich data from respondents. Use of a survey enabled researchers to draw on a large sample of the total population. Two types of items were included in the survey: questionnaire items structured on a four-point Likert scale ranging from 'strongly agree' to 'strongly disagree,' and open-ended questions that allowed the researchers obtain responses from the participants regarding skills developed in the course of the mobile learning activities, as well as challenges encountered. To complement the survey data, Focus Group Discussions (FGDs) were held with respondents. Items in the questionnaire and FGDs centered on constructs that were perceived to be predictive of learners' acceptance of the proposed technology. These constructs were: Perceived Usefulness, Perceived Ease of

Use, Interest, Technology Self-efficacy, Attitude, Behavioral Intention, Actual Use, and Acceptance of the mode. Each respondent was also asked to indicate specific skills gained over the course of the program, as described in the paragraph on procedures.

The sample for this study comprised 201 students of the DLC at UI. A census of students from the Faculties of Arts, Social Science and Education was taken, and three courses designed with mobile learning as the key student support strategy were chosen as the basis for the sample. Using the purposive sampling method, students taking the courses who were willing to participate, and who had the required technology tools and applications such as internet enabled (GPRS, 3G) mobile phones, were selected for this study. Students were introduced to common technological tools (GSM phones) available and within the reach of everyone so as to prepare the students to use their phones in a learning situation.

The instruments were validated and Cronbach's Alpha reliability coefficients were calculated to establish construct reliability. The instruments for data collection were administered personally to respondents in their respective departments and colleges by the researchers and research assistants over a ten day period. The researchers ensured that all copies of the administered questionnaires were retrieved.

FGDs were carried out at different times in the Colleges of Arts and Education among students enrolled in three courses: LIN 241 (Introductory Phonetics) , ADE 205 (Writing and Production Techniques for Neo-Literate, and TEE 353 (Introduction to Instructional Technology) . Due to the particular issues involved in gathering distance learning students for in-person meetings, students were informed of the FGD date, time and venue through bulk SMS service (text messaging). For the TEE 353 FGD, the students gathered at the scheduled venue where they were divided into groups of five to ten. After an informal welcoming and a quick overview of the FGD by the facilitator, each group was asked to choose a group leader and a recorder. The group leader's task was to facilitate group discussion and the task of the recorder was to take down notes as each question was discussed.

Description of project and challenges encountered

Figure 3 illustrates the framework for mobile learning that was used in the study, designed for the DLC, UI.

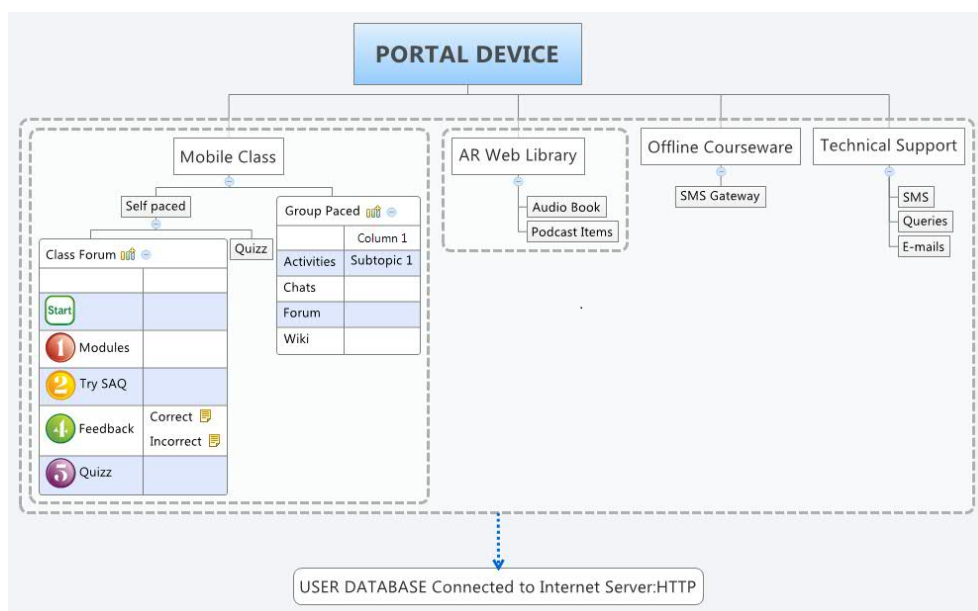


Figure 3: Framework for Mobile Learning Platform

The mobile learning platform was officially opened to students on the February 21, 2012. To bring the students together and inform them of the new mode of instructional delivery, the project team collected information and data from students in the Management Information System (MIS) unit of the DLC. These personal details were required for purposes of identification, registration and communication.

During the course of the project, group email accounts were created for the different courses. These email accounts were used to contact students at the inception of the use of the new delivery mode using the email addresses collected from the MIS Unit of DLC. Students were sent information regarding the day on which they were expected to assemble for orientation on the new instructional delivery mode.

A bulk SMS account was opened in order to reach students, because the SMS is considered one of the quickest ways to reach students on the spot via their cell phones without having to visit a cyber café to get information. By sending SMS alerts, students received prompt information wherever they were.

When the semester resumed, the students received a formal orientation on starting the courses through the use the new instructional delivery formats. They were divided into groups and were connected to online support referred to as "online tutors." The course TEE 353 had five tutors due to the large number of students taking the course. Each course tutor had a maximum of 60 students to attend to and the email addresses and telephone numbers of the online tutors could be viewed on the mobile platform page enabling students to have easy contact with tutors to facilitate maximum support. The online tutors had the following roles: assisting course lecturers in the design and delivery of course content, provide student support, facilitate online discussions, facilitate the FGDs, student assessment, and communication. Course lecturers had the responsibility of providing expert knowledge during the design of the course, giving support to the online tutors, and monitoring the activities of the students and tutors. They also had the sole rights to make changes in their courses on the mobile platform.

In the first week, students were exposed to the first three modules of each course. A module on the platform is made up of frames, which comprise a small piece of information a student is exposed to at a particular time. After each frame comes a practice question designed to stimulate students to ascertain if they properly understood the small unit of instruction to which they were previously exposed. These practice questions were of different types, mostly comprising multiple choice and short answers. If students answered correctly, they moved on to the next frame.

These modules also contained chat sessions and forums. Students were encouraged through SMS to log onto chat forums with their mobile phones and make comments on a discussion topic started by the online tutor or by another student. Notably, a challenge observed was that only students with smart phones were able to participate fully in these sessions. After a few weeks, some of the other students purchased smart phones to enable better participation. Through the chat sessions, learners were able to discuss aspects of the content and technical difficulties they had encountered. After the learners had successfully gone through the three modules, they were exposed to their first quiz on the mobile platform. The quiz was open between 6:00 pm and 8:00 pm the same day. One attempt was allowed per student with the time limit set at 10 minutes. At the end of the quiz, 95 attempts were recorded.

In the course of the project, the following challenges were encountered with respect to students using the mobile platform:

Login problem: Student difficulties included login names not written correctly, e.g. a student with a name "Joshua" is assigned a login name of "Josua". This made the students confused and frustrated.

Network problem: Some students complained about unreliable Internet connectivity. For example, a student complained of not being able to log in because of rain. This situation is frequently the case with some mobile network infrastructure.

Special needs: Blind students were not catered for in the project as they were not able to interact with content, which was wholly text-based. Students requested that their physical challenge should be factored into the design and implementation of the mobile learning project.

Inadequate ICT skills: During quizzes, some students complained about not being able to initiate the quiz (this complaint was made about TEE course quiz). Some students also complained about answering the quiz questions but then not being able to submit their response because of low IT skills.

User interface: Students commented that the mobile platform was not simple to navigate through, and most of them expressed difficulty in attempting to use the platform. This could be due to the design of the interface and poor or low internet skills at the beginning of the project. Students need to be sufficiently orientated as to how the mobile platform works, and it should not be assumed that general mobile phone skills are easily transferable to a learning situation. Also, the design of the interface should facilitate ease of navigation even by the novice student.

Students also asked questions, made comments, and registered complaints during chat sessions. Some of them are listed below:

- “Are we to answer all questions in module 1 before proceeding to another module?”
- “Please I can't access module 4 now help me”
- “The time given for the quiz was short. I want to plead that more time be given to us when next you give us such quiz. Thank you sir”.
- “The lecture is well understood”
- “The online quiz is good but why is the network so unfavorable during the attempt”
- “Modern technology cannot operate itself, it definitely needs an operator....a teacher”
- “Without a lecturer or a teacher, the technology is useless”
- “The time allocated for the quiz session was too small, what do you think?”
- “I did my first quiz today, am I supposed to take the next one?”

As indicated previously, only students with smart phones could benefit from this intervention. Apart from that, the design of a mobile platform must take into consideration several factors: language competence, technology reliability, ICT expertise, and the nature of devices. It is advisable that students participate actively in the choice and evaluation of options at the design, technology, and evaluation strategy stages. In tackling these challenges, online tutors were able to help students login to and navigate the mobile platform. In the future, the audio web library will be activated to help students with special needs.

RESULTS

The result of the following questions asked during the FGD sessions are presented below:

1. *What are the benefits of using mobile phones for learning?* Most students stated their belief that the use of mobile phones for learning will enhance accessibility of information. Other students

agreed that mobility and easy accessibility of their lecture notes will save time and make learning interesting because learning can take place anytime and anywhere.

2. *What are the problems you are likely to encounter when using mobile phones for learning?* Students believed that network failure and the poor supply of electricity could be major constraints in using mobile phones for learning. Poor supply of electricity, which usually leads to low cell phone batteries and network failure, could make instant messaging and accessing content a serious setback to using mobile phones. Sometimes, electricity supply is unavailable for several days, thereby making charging of batteries impossible. This problem usually is solved by the use of generators in many homes and institutions, irrespective of geographical location. They also concluded that small screen sizes would lead to small text sizes, which can make information viewing from the mobile platform a tiring experience. Respondents said that this may cause fatigue, especially if they stare at the screen for too long.
3. *Can you imagine learning on mobile phones?* Some 90% of the students in each group see mobile learning as a welcome innovation in their course and advancement in their learning process. Their overall response to using the technology for learning was positive.
4. *What forms of learning do you consider feasible for mobile phone use?* Three of the nine different focus groups agreed that a quiz will be the most feasible form of activity on the mobile platform. Four groups agree that reading short texts and lecture notes will be the most feasible form of activity. One group agreed that reading texts and lecture notes, and taking quizzes and tests, are all feasible forms of activities on the mobile platform. One group did not respond to the question.
5. *Have you ever tried using your mobile phone for an assignment?* Five groups indicated that they had never used their mobile devices for assignments, although, during the FGD, it was discovered that a few students have attempted to use their mobile devices to surf the web for information. Some of the information they sought was to carry out class assignments. Four other groups indicated that they have at one time or the other used their mobile phones for assignments.

The complaints cited above suggest a more elastic access for evaluation, rather than the time-constrained window for access to quizzes. They also suggest the need to offer multiple attempts instead of the one-time option. Responses from focus groups confirm findings from quantitative data. Their response was positive, and this confirmed at least 75% acceptance of using mobile technology for learning purposes.

The study employed three closely-related multivariate techniques: correlation matrix, which examined the relationship between the constructs; multiple regression, which was used to determine the prediction of learners' acceptance among the constructs; and analysis of variance. This multivariate approach was preferred because all seven predictor variables – perceived usefulness, perceived ease of use, interest, attitude, behavioral, intention, actual use, and self-efficacy – act simultaneously with one another, as well as with the dependent variable.

Correlation was used to examine the relationships between the constructs while regression analysis was used to find out the prediction of acceptance of TAM model for the delivery of lecture through the mobile phone for distance learning tutorials.

DISCUSSION

The results of the descriptive analysis for the constructs and items in the questionnaire (Table 1) show the construct means and the results indicate a positive and high interest of students in using mobile technology, who also perceive it as easy to use and useful. Students' responses suggest that they consider the mobile mode flexible. They also believe it reduces fatigue to the barest minimum and they find it exciting. The high interest and positive attitude the students showed in using the mobile platform could be attributed to the way in which learning activities were structured. Shen, Laffey, Lin, and Luang (2006) indicate that instructor and mentor influence are significant factors that impact students' perceived usefulness of the course delivery system, while only mentor influence is significantly associated with perceived ease-of-use of the system.

Construct	Mean	Standard Deviation
Perceived Usefulness (PU)	6.32	0.72
Perceived ease of use (PEU)	6.11	0.70
Interest (INT)	5.29	0.52
Self-efficacy (SE)	3.63	0.64
Attitude (ATT)	6.87	0.64
Actual Use (USE)	3.45	0.54
Acceptance (ACC)	5.62	0.69

Table 1: Descriptive Analysis (N=201)

The results of the analysis of quantitative data (Table 2) showed significant positive correlation between perceived usefulness ($R = 0.54$) and perceived ease of use ($R = 0.51$) with students' attitude towards use of mobile technology. This suggests that PU and PEU of delivery mode can actually determine the attitude towards use. In essence, the benefits or value that students see in the system could determine their feeling towards the system. In the same vein, the convenience and fewer restrictions experienced by students when using the mobile mode to support learning could also influence their attitude towards it. This confirms Porter and Donthu's (2006) perception that ease of use and perceived usefulness are related more strongly to attitude toward Internet usage. Although Lee, Cheung, and Chen (2005) reveal that perceived usefulness and perceived enjoyment had an impact on both students' attitude to and intention to use Internet-based Learning Medium (ILM), they found that perceived ease of use is unrelated to attitude. But Davis et al. (1989), cited in Venkatesh (2000), explains that there is a weak direct link between perceived usefulness and attitude, and a strong direct link between perceived usefulness and intention. This was explained as originating from people intending to use a technology because it was useful, even though they did not have a positive affect (attitude) toward using it. However, in this study of the mobile platform, there was a strong positive connection among perceived usefulness, ease of use, and attitude.

Variable/Construct	PU	PEU	INT	SE	ATT	USE	ACC
Perceived Usefulness (PU)							
Perceived Ease of Use (PEU)	0.72						
Interest (INT)	0.56	0.76					
Self-efficacy (SE)	0.58	0.67	0.62				
Attitude (ATT)	0.54	0.51	0.58	0.85			
Actual Use (USE)	0.77	0.59	0.78	0.41	0.46		
Acceptance (ACC)	0.68	0.52	0.58	0.65	0.48	0.59	

Table 2: Cross Correlation Matrix among the constructs

Our analysis also showed that there is positive correlation between PEU and PU, which indicates that the perceived ease of using the modes can actually determine its usefulness. Analysis also revealed that PU can effectively determine actual use of the mode of tutorial delivery. The model shows that PEU is significantly correlated with PU, while PU is significantly correlated to intention to use and self-reported usage. This means that if the system is easy to use, a user may find the system more useful, and hence has sufficient motivation to use it. Thus, actual usage (behavior) is an indirect result of ease of use. This important finding shows that users are motivated to adopt an application first because of the functions it performs for them, and only second, based on how easy it is to get the system to perform those functions. This study also confirms Davis' (1986) Technology Acceptance Model in the context of mobile technology usage for learning. Hence, the findings validate the Model as basis for this deployment and support the value of attitude towards mobile learning in students' acceptance.

As shown in Table 3 the seven factors examined in this study jointly influence the behavioral intention to use, and learners' acceptability of the modes, and that each of the independent variables (factors) made a significant predictor of acceptance of the modes for tutorial delivery. In terms of the magnitude of the prediction, interest to use the mode made the most significant prediction of acceptance. The next predicting value was exerted by actual use, followed by attitude to use. The factors with significant predictions are: behavioral intention, perceived ease of use, technology self-efficacy and perceived usefulness. A rate of 67 percent accounted for variation in predicting acceptability of the mobile platform. These results suggest that all the factors are good predictors of acceptance of mobile phone as a mode of tutorial delivery.

Model	R	R ²	Adjusted Square	Standard error of estimate		
1	.593	.675	.503	14.756		
ANOVA						
Model		SS	Df	MS	F ratio	Sig.
2	Regression	204154.74	3	68051.58	101.13	.000
	Residual	133243.15	198	672.94		
	Total	337398.09	201			

Table 3: Summary of multiple regression analysis (N=201)

This study also showed that self-efficacy can determine the actual use of the mode, which explains the sustained effort students showed in the actual use of the platform. Analysis showed that there is significant positive correlation between attitude to use and acceptance of using the mobile technologies for tutorial delivery, suggesting that attitude towards using the mode can actually determine its acceptability. Lastly, the study shows positive correlation between behavioral intention to use and acceptance of the mode indicates there is a significant positive correlation between the two factors. This suggests that behavioral intention to use the mode can actually determine acceptance of using the mode.

CONCLUSION

The adaptation of the Davis (1986) TAM model being used as an analytic framework for the study proved to be highly relevant and useful in this context.

This project was novel in that it demonstrated the potential of using this medium of delivery for academic support, rather than using SMS for administrative support only. Faculties and educational technologists need training and incentives to further explore opportunities for enhancing the quality of student support through the mobile phone. This also brings to the forefront the issue of teaching and instruction via this medium requiring heavy initial support. Adopting a simple, linear and user-friendly interface for the design of the platform is of paramount importance if students are to enjoy the time invested in the learning experience.

It is clear that there is need to test quizzes/evaluation models with students before deployment, taking into consideration the realities of the environment. A survey of relevance is required. There is also a need to obtain information on preferred model and type of devices before design.

In summary, this case study provides evidence to support an assertion that mobile technology is effective and efficient in enhancing the teaching and learning process, and hence can be used for academic support. However, for this to be achieved effectively, the study yielded the following insights:

1. *Learner support* - is a major contributory factor to successful implementation of mobile learning. Students using mobile devices for learning are in great need of both technical and academic support. Students called frantically because they were frustrated with matters ranging from inability to login to other technical issues such as navigating the web, network connectivity and inability to partake in quizzes. Therefore, there is need for massive support facilitated through tutorial assistants who provide timely assistance to students.
2. *ICT literacy* - is imperative for prospective distance learning students to have acquired prior to the course in order to successfully participate in the experience.
3. *Navigation* – difficulties can be alleviated by receiving a demo of the mobile platform on the center's website and this could also be demonstrated at the orientation programs since the mobile phone is an integral tool for learning in this mode.
4. *Cost* – continues to be a constraint issue. Although students were advised to subscribe to a cellular network provider plan, this was not adhered to by all of them. To alleviate this problem, it is advisable that a plan which leverages on high population of students and institutional advantage be negotiated with providers.
5. *Capacity building* – is required for course developers and technical staff. It was noted that course development for mobile learning requires some technicality and rigor beyond what is required in print or online materials.
6. As good as the outcome of this study is, this result cannot be generalized because the sample population is not large enough, hence, further studies could use more than one thousand sample population for the efficacy of the technology before we can generalize.

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REFERENCES

- Adedoja, G. and Oyekola, A.H. (2008) M-Learning: An Emerging Trend in E-Learning and its Application in Nigeria. ACDE Conference and General Assembly. African Conference on Distance Education July 8th – 11th, 2008. Available online at http://www.nou.edu.ng/noun/acde2008/acde_en/abstracts
- Adedoja, G. Omotunde, C. and Adelere, O. (2010) Short Message Service (SMS) Application as a Learning Support Tool in a University-Sponsored Literacy Programme. *International Journal of Literacy Education*. Vol. 7, (2) 56-74
- Campbell, S.W. (2004) Normative mobile phone use in public setting. Paper presented at the proceedings of the annual meeting of the national communication association. Chicago IL.
- Campbell, S.W. (2006) 'Perceptions of mobile phones in college classrooms', *Communication Education*. 55, 280 – 294.
- Davis, F.D. (1986) A technology acceptance model for empirically testing new end-user information systems: theory and results, Doctoral Dissertation, MIT Sloan School of Management, Cambridge, MA.
- Farah, A.C. (2011) Factors Influencing Teachers' Technology Self-Efficacy: A Case Study. Doctoral Dissertation. Liberty University, Lynchburg, VA.
- Green, N. (2002) 'On the move: teaching, mobility and the mediation of social time and space', *The Information Society*, 18, 281 – 292.
- Hooper, G., Fitzpatrick, G. and Weal, M. (2009) Does it matter who is holding the PDA in a mobile learning experience. Available online at http://eprints.soton.ac.uk/2654/1/does_it_really_matter_cameraready.pdf
- Keegan, D. ed. (1997) *Theoretical Principles of Distance Education*, New York, Routledge.
- Lee, M., Cheung, C. and Chen, Z. (2005) Acceptance of Internet-based learning medium: The role of extrinsic and intrinsic motivation. *Information & Management*, 42, 1095–1104.
- Malhotra Y. and Galletta. F. (1999) Extending the Technology Acceptance Model to Account for Social Influence: Theoretical Bases and Empirical Validation. Proceedings of the 32nd International Conference on System Sciences. Hawaii.
- Miller, M., Rainer, R.K. and Corley, J. K. (2003) Predictors of engagement and participation in an on-line Course. *Online Journal of Distance Learning Administration*, 6(1).
- Misiolek, N., Zakaria, N. and Zhang, P. (2002) Trust in organizational acceptance of information technology: A conceptual model and preliminary evidence. Proceedings of the Decision Sciences Institute 33rd Annual Meeting.
- Mun, Y. and Yujong, H. (2003) Predicting the Use of Web-Based Information Systems: Self-Efficacy, Enjoyment, Learning Goal Orientation and the Technology Acceptance Model. *International Journal of Human Computer Studies* 59 pg 431-449
- National Universities Commission (NUC) (2009) Guidelines for Open and Distance Learning in Nigerian Universities October, 2009. Abuja. Nigeria. Available online at <http://www.nuc.edu.ng/nucsite/file/odlrevisedguidelinesfornigeriauniversities.pdf>
- Park, S. Y. (2009) An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning. *Educational Technology & Society*, 12 (3), 150–162.

- Porter C. E. Donthu N. (2006) Using the technology acceptance model to explain how attitudes determine Internet usage: The role of perceived access barriers and demographics. *Journal of Business Research* 59(2006) 999-1007
- Salmon, G. (2000) *E-moderating: The key to teaching and learning online*. London: Kogan page.
- Shen, D., Laffey, J., Lin, Y. and Luang, X. (2006) Social Influence for Perceived Usefulness and Ease of Use of Course Delivery Systems. *Journal of Interactive Online Learning* 5(3), 270-282.
- Sumak, B., Hericko, M., Pusnik M. and Polancic G. (2011) Factors Affecting Acceptance and Use of MOODLE: An Empirical Study Based on TAM. *Informatica* 35, 91-100.
- Venkatesh, V. (2000) Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. *Information Systems Research*, Vol. 11, No. 4, pp. 342–365
- Young, G. (2002) Hybrid teaching/learning and the divide between traditional and online instruction chronicle of higher education. *Chronicle of Higher Education*. 48(28), A33-34