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Review Paper

Mobile learning platform programme and pre-service teachers' behaviour towards mobile instruction using technology acceptance model

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Abstract. Mobile learning has been described as the type of learning that happens across locations or that takes advantage of learning opportunities offered by portable technologies such as handheld technologies, together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of teaching and learning. The use of these devices is gradually changing the face of instructional delivery in institutions of higher learning and the University of Ibadan is not an exception. In this study, 216 pre-service teachers of the University of Ibadan were exposed to the mobile learning platform using the Technology Acceptance Model (TAM). The model contained the following variables: perceived usefulness, perceived ease of use, attitude, peer-influence, behavioural intention to use, interest, technology self-efficacy and acceptance. The paper discussed pre and post behaviour of the undergraduate students to these variables. Findings and implications were discussed and recommendations were also made.

Keywords: Mobile Learning, Pre-service Teachers, Technology Acceptance Model (TAM).

INTRODUCTION

Through the advancement of mobile technology and their increasing affordability, mobile devices have transformed from a means of communication to tools for socialization, entertainment, work, and learning. In the past decade, mobile devices have evolved from a luxury item to a necessity. As the demand for devices has increased, the cost has decreased. Combined with an increase in technological capabilities, mobile devices have become multi-functional tools capable of performing tasks that were once the job of multiple devices. These multi-functional tools are usually referred to as smart phones. However, many devices like the iPod Touch provide the user with the same capabilities without telephone service. Today, mobile devices are so ubiquitous that they have begun invading all areas of society, including education. Mobile devices are being used both informally, by users who seek out their own learning experiences, and formally, by users who are prompted to do so as part of a class.

Both formal and informal use, however, is occurring in classrooms across the globe (Pollara, 2011). Mobile learning is a new stage of e-learning. Any individual who uses the mobile phone for learning has having the ability to learn everywhere at every time through use of mobile and portable devices (Attewell and Savill-Smith, 2004; Hilton, 2006). The ongoing challenge remains as to how best to improve learning and teaching methods for tomorrow's workforce (Barone, 2005; Motiwalla, 2007). Mobile learning (m-learning) is rapidly becoming one of the latest trends of e-learning. Today, more people than ever are learning on the move rather than sitting in traditional classrooms. Mobile learning provides the

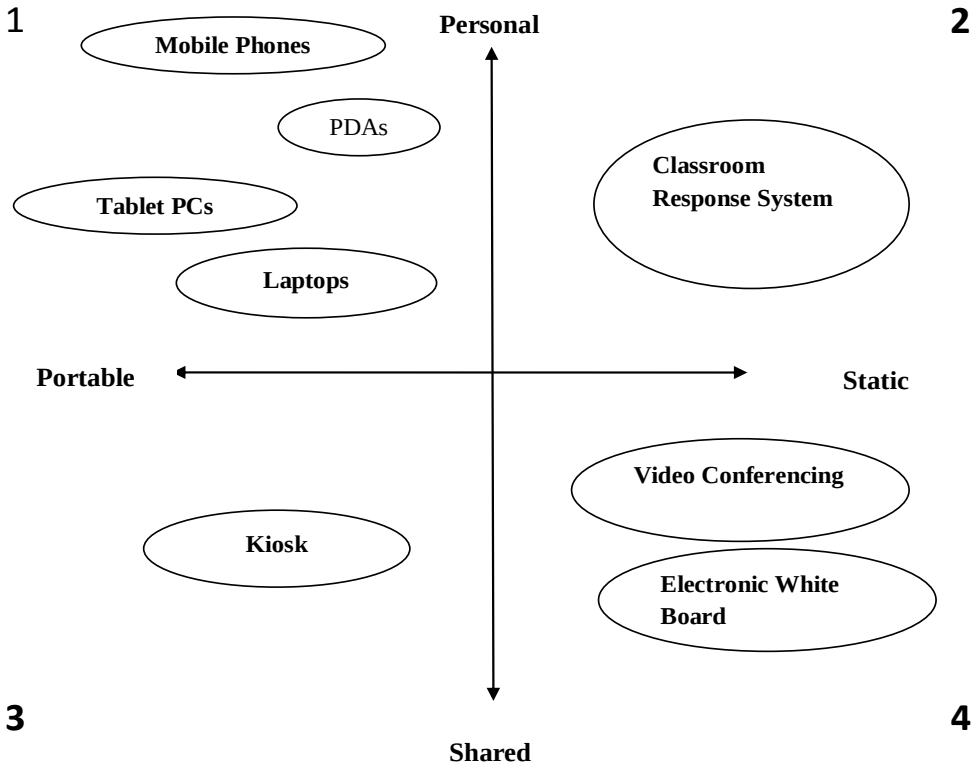

Figure 1. Classification of mobile technologies. Source: Naismith et al. (2004).

opportunity to connect informal learning experiences that occur naturally throughout the day with formal learning experiences such as those encountered in the virtual classroom model, using games or in online learning implementations (Suki and Suki, 2011).

Current research on students and mobile learning indicated that students became active learners, not passive learners (Al-Fahad, 2009), it brings about high level of collaboration, control over learning process (Guenther et al., 2008), it increases understanding of content (Hsu et al., 2008), it shows students who use the technology scored higher than those who used traditional methods of study (McConatha et al., 2008). Again, it generated excitement and interest, collaborative learning (Rogers et al., 2010), and it brings about better utilization of study time, review materials better, reinforce materials/topics, enjoyed portability (Williams and Bearman, 2008). However, mobile learning cannot take place without mobile devices

Mobile devices

The mobile learning ecosystem is made up of a wide variety of devices connected to different kinds of networks. The most common mobile devices are mobile phones, smartphones, personal digital assistants (PDAs), netbooks, tablets, e-readers, digital cameras, portable media players, and gaming devices (World Campus Learning Design, 2011)

The largest category of devices for mobile learning is "feature phones" (Woodill, 2011). These devices make phone calls, send and receive text messages (SMS), and take pictures (New Media Consortium; EDUCAUSE Learning Initiative, 2011). Another rapidly growing category comprises of "smartphones" which run mobile device operating systems such as iOS, Android, Windows Mobile, Blackberry and Symbian. Smartphones, in many ways, offer the same functionality as laptop computers, allowing access to the web, e-mail, documents, office productivity tools, and are currently seen as the most suitable platform for mobile learning purposes (Woodill, 2011).

According to Naismith et al. (2004), mobile technologies can be classified into the following: portable and personal, static and personal, portable and shared, and static and shared (Figure 1).

Type 1: Portable and Personal – technologies in quadrant 1 include what most people think of as mobile devices [mobile phones, Personal Digital Assistants (PDAs) tablet PCs and laptops]. These afford communication and information, so while devices themselves may be personal, they allow for information to be easily shared.

Type 2: Static and Personal – technologies in quadrant 2 are static (that is, they can only be used in one location),

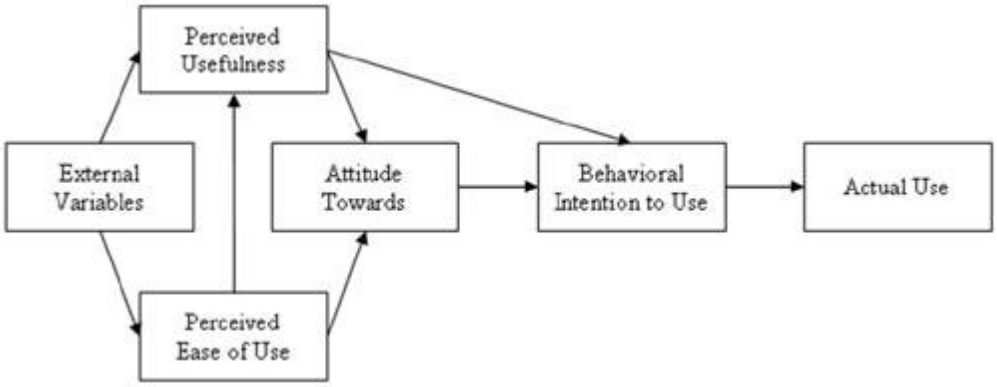

Figure 2. Original Technology Acceptance Model (TAM) by Davis (1989).

but they still offer personal interactions with learning experiences because of their small size and allocation to one user (e.g. classroom response systems).

Type: 3 Portable and Shared – technologies in quadrant 3 can provide learning experiences to users on the move – the users are portable even though the devices themselves are not portable. These technologies are less personal as they are likely to be shared by multiple users (e.g. street kiosks, interactive museum displays).

Type: Static and Shared – technologies in quadrant 4 include larger devices (which are therefore less portable) which allow more shareable interactions. These are not generally classified as 'mobile technologies'.

The study

This study adopted pre-test and post-test quasi experimental research design. A total of 216 undergraduate students who registered for a course titled "Introduction to Instructional Technology" participated in the study. Out of these participants, 130 were female while 86 were males. A TAM model of technology integration which has the following components – perceived usefulness, perceived ease of use, attitude, peer influence, behavioural intention to use, technology self-efficacy and acceptance was used for this study.

The technology acceptance model (TAM) was developed by Davis (1989), based on the theory of reasoned action (TRA) (Fishbein and Ajzen, 1975) in psychology research. According to Masron (2007), the TRA posits that individual behaviour is driven by behavioural intention where behavioural intention is a function of an individual's attitude toward the behaviour and subjective norms surrounding the performance of the behaviour.

Meanwhile, TAM proposes that perceived ease of use and perceived usefulness of technology are predictors of user attitude towards using the technology, subsequent behavioural intentions and actual usage. Perceived ease of use was also considered to influence perceived usefulness of technology. Figure 2 presents original TAM (Davis, 1989).

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There is no significant difference between the pre and post pre-service teachers' perceived usefulness of the mobile learning platform.
2. There is no significant difference between the pre and post pre-service teachers' perceived ease of use of the mobile learning platform.
3. There is no significant difference between the pre and post pre-service teachers' attitude to mobile learning platform.
4. There is no significant difference between the pre and post pre-service teachers' peer influence on the use of mobile learning platform.
5. There is no significant difference between the pre and post pre-service teachers' technology self-efficacy to use the mobile learning platform.
6. There is no significant difference between the pre and post pre-service teachers' acceptance of mobile learning platform.

Table 1 shows that there is significant difference between pre and post perceived usefulness of mobile learning by the pre-service teachers ($t = 2.17$; $df = 449$; $P < 0.05$). This implies that the pre-service teachers perceived the mobile learning as useful more after the treatment.

Table 2 shows that there is significant difference between pre and post perceived ease of use of mobile learning platform by the pre-service teachers ($t = 4.28$; $df = 449$; $P < 0.05$). This implies that the pre-service teachers perceived the mobile learning platform easy to use after the treatment.

Table 1. Summary of t-test showing difference between pre and post perceived usefulness.

Variable	N	Mean	Std. D	T	df	Sig.	Remark
Perceived usefulness							
Pre-score	216	22.91	2.79	-2.167	449	.021	Sig
Post-score	235	24.16	2.17				

Table 2. Summary of t-test showing difference between pre and post perceived ease of use.

Variable	N	Mean	Std. D	T	df	Sig.	Remark
Perceived ease of use							
Pre-score	216	24.71	3.58	-4.282	449	.000	Sig
Post-score	235	24.06	2.80				

Table 3. Summary of t-test showing difference between pre and post attitude.

Variable	N	Mean	Std. D	T	df	Sig.	Remark
Attitude							
Pre-score	216	9.27	1.15	.714	449	.476	Not Sig
Post-score	235	9.19	1.03				

Table 4. Summary of t-test showing difference between pre and post peer influence.

Variable	N	Mean	Std. D	T	df	Sig.	Remark
Peer influence							
Pre-score	216	8.59	1.65	.619	449	.536	Not Sig
Post-score	235	8.50	1.64				

Table 5. Summary of t-test showing difference between pre and post technology self efficacy.

Variable	N	Mean	Std. D	T	df	Sig.	Remark
Technology self efficacy							
Pre-score	216	8.12	2.03	-2.012	449	.031	Sig
Post-score	235	10.30	1.86				

Table 3 shows that there is no significant difference between pre and post attitude of pre-service teachers to mobile learning platform ($t = 0.71$; $df = 449$; $P > 0.05$). This implies that the pre-service teachers' attitude towards the mobile learning platform before and after the treatment is almost the same.

Table 4 shows that there is no significant difference between pre and post peer influence on mobile learning platform by the pre-service teachers ($t = 0.62$; $df = 449$; $P > 0.05$). This implies that the peer influence on mobile learning before and after the treatment is almost the same.

Table 5 shows that there is a significant difference between pre and post technology self-efficacy on mobile learning by the pre-service teachers ($t = -2.01$; $df = 449$; $P < 0.05$). This implies that the technology self-efficacy of pre-service teachers on mobile learning platform after the treatment (mean = 10.30) is higher than that of before the treatment (mean = 8.12).

Table 6 shows that there is no significant difference between pre and post acceptance of mobile learning platform by the pre-service teachers ($t = 0.89$; $df = 449$; $P > 0.05$). This implies that the acceptance of mobile learning platform before and after the treatment is almost the same.

DISCUSSION

The study's primary goal was to determine the pre-service teachers' behaviour towards mobile learning instruction after their exposure to the mobile learning platform using the Technology Acceptance Model (TAM). The pre-service teachers perceived mobile learning as

Table 6. Summary of t-test showing difference between pre and post acceptance.

Variable	N	Mean	Std. D	T	df	Sig.	Remark
Acceptance							
Pre-score	216	20.37	2.67	-.886	449	.376	Not Sig
Post-score	235	20.58	2.53				

Useful. Perceived Usefulness in the technology acceptance model is an example of extrinsic motivation (Davis et al., 1992). Extrinsic motivation emphasizes performing a behaviour to achieve specific goals or rewards (Vallerand, 1997). Perceived Usefulness is a key driver of usage behaviour and intention. Perceived Usefulness refers to "the degree to which a person believes that using a particular system would enhance his or her performance (Punnoose, 2012). The finding is in line with the finding of Park et al. (2011) who reported that Korean University students' percieved mobile learning as useful. Because the pre-service teachers found mobile learning to be useful, they are more likely to use it as a mode of learning.

The pre-service teachers perceived the mobile learning as easy to use after their exposure to the platform. Perceived Ease of Use is the degree to which a person believes that using a particular system would be free from effort (Davis, 1989). As such, the perceived ease of use of the mobile learning platform by the pre-service teachers can really influence the pre-service teachers to use the mobile learning platform as a means of accessing their lectures. The finding supports the findings of Jairak et al. (2009) who stated that perceived ease of use is a determinant in the acceptance of mobile learning.

The pre-service teachers' self efficacy also increased after their exposure to mobile learning. Self-efficacy is the belief that one has the capability to perform a particular behaviour, and it is an important concept in Social Cognitive Theory (SCT) (Gong et al., 2004). Computer Self-Efficacy refers to individuals' judgement of their capabilities to use computers in diverse situations (Compeau and Higgins, 1995). Individuals with a weak sense of Computer Self-Efficacy will be frustrated more easily by obstacles to their performance and will respond by lowering their perceptions of their capability of using technology. Conversely, individuals with a strong sense of Computer Self-Efficacy will not be deterred easily by difficult problems and will persist with their efforts, with the result that they are more likely to overcome whatever obstacle that they confronted with (Compeau and Higgins, 1995). The pre-service teachers therefore believed they can adequately use mobile learning platform and mobile devices for their learning. The finding is in line with Yang (2012) who reported that the students have high self-efficacy towards m-learning and had no problem with the use of the functionalities in the mobile devices such as downloading online materials, as well as reading and entering information.

Conclusion

Mobile Learning is certainly gaining momentum. While mobile content does not currently replace traditional content, it can supplement it and add spice to the lesson. Education has become more learner-centred as students are given a choice of what device to use, where they want to use it and how they want to use it. It is proven in this study that Technology Acceptance Model (TAM) can be employed to explain the acceptance of and behaviour towards mobile learning by pre-service teachers.Mobile access to course resources enables them to stay on top of things, get the most of their time, and be more motivated to learn. Educators need to continue to look for new ways to motivate students in order to maximize their learning, and one way to accomplish this objective may be by delivering the content on devices of their choice.

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