

Effectiveness of M-Learning in Higher Education

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ABSTRACT

M-learning will play an increasingly significant role in the development of teaching and learning methods in higher education. However, the effectiveness of m-learning in higher education will be based on users' acceptance and satisfaction of this technology. The purpose of this case study is to examine the effectiveness of m-learning and the factors influencing the m-learning effectiveness in Tamilnadu, India. Data were collected through triangulation method. The relationship and influence of technology acceptance, system success and environmental factors on user satisfaction and intention were identified. The satisfaction leads to the intention and it have the relationship with perception about mobile learning effectiveness. The preferences for m-learning activities were also conditioned by academic milestones. Therefore study may help practitioners and educators with useful guidelines for designing a successful m-learning system.

Keywords: E-Learning, M-Learning, Technology acceptance model, Triangulation.

1. INTRODUCTION

In the current competitive situation the upcoming generation has higher thirst for learning, without continuous learning and getting in to the highest placement or achieving the goal is very critical. Recent advancements in the technology plays a vital role in learning. In the 21st century, or the digital age, learning is affected by the rapid development of information and communication technologies and the availability of low cost mobile devices. Book learning got evaluation through digital learning and transformed to e-learning, now the current generation moved to mobile learning (m-Learning). M-learning emerge as the new paradigm in modern education system which is more in engineering students to support their academic improvement as well as placement. The great advantage of m-learning is that it is very easy to carry based on their convenience without the limitations of time and space. At present, it is getting very popular and has created great demand in learning community particularly in higher education. Mobile devices play a main part in the higher education it will have advantages as well as limitations to higher education institutions (Looi et al. 2010; Mims & Holmes 2006)

Indian Government as well as Universities initiate and support online learning in education system like Massive Open Online Course (MOOC), e-Pathshala, Saransh, Swayam etc., with easiest approach and low cost manner. In worldwide m-learning market has continuous growth. Mobile Learning Market worth is \$37.60 Billion by 2020 (Markets and Markets 2015). However failures also exist, a number of people who start m-learning are very enthusiastic, but later get in to slow and then ultimately stop m-learning. Little is known about why some users stop their m-learning after their initial experience. Information system research clearly shows that user satisfaction is one of the most important factors in assessing the success of system implementation (DeLone and McLean 1992). In m-learning environment, several factors account for user's satisfaction. Those factors can be grouped into three dimensions: Technology acceptance, System success and Environmental factors.

The factors affecting m-learning effectiveness is presented by previous researchers which are basically from descriptive or analytical studies with certain dimensions. Therefore, understanding m-learning can be effective to engage students and to improve

their academic learning outcomes which is a pertinent and practical issue. The research described in this paper is designed as a case study to investigate the effectiveness of m-learning. The main aim of this case study is to identify and understand the students perception and intention towards the mobile learning in higher education. The result presented in this manuscript can certainly help institutions to adopt m-learning technology by overcoming potential obstacles, and hence reduce the risk of failure during implementation.

2. FOUNDATIONS OF M-LEARNING

Mobile learning is defined as the conducting of educational activities using a mobile device and wireless service in which both learner and device are mobile (El-Hussein and Cronje 2010). M-learning is defined as a form of e-learning that specifically uses mobile devices to integrate with ubiquitous computing technologies to deliver learning contents and supports (Muyinda 2007; Hwang and Chang 2011). M-learning encourages flexibility; students do not need to be a specific age, gender or geography to participate learning environment. In a world of restrictions of time, space and place have been lifted (Behera 2013). Furthermore, Winters (2007); Sharples et al. (2007); Traxler (2007, 2010); Cook, Pachler, and Bradley (2008), identified mobile learning as both formal and informal. Formal learning, by design, is where learners are engaging with materials developed by a teacher to be used during a program of instruction in an educational environment, highly structured, institutionally sponsored, and generally recognized in terms of a certificate or a credit upon completion (Colley, Hodgkinson, and Malcom 2003; Marsick and Watkins 1990). Informal learning is often defined as learning that results “from daily work-related, family or leisure activities” (Halliday-Wynes and Beddie 2009). It is often planned but unstructured and contextualized (Marsick and Watkins 2001). This type of learning is sometimes “unanticipated, unorganized, and often unacknowledged, even by the learner” (Jubas 2010). Activities such as reading, using the Internet, visiting community resources, such as libraries, museums, and zoos, and on-the-job learning are usually considered informal learning activities, though there is no conclusive definition of informal learning.

M-learning is a subset of e-learning, e-learning and m-learning both subsets of flexible learning. Though e-learning does not fully include in m-learning, there is an interconnecting area between e-learning and m-learning. There is an m-learning area located beyond the boundary of e-learning.

While e-learning is asynchronous, scheduled and passive; m-learning is synchronous, spontaneous and instant. Looked at from a different perspectives, there are some technical, social and educational challenges that m-learning has to be overcome.

3. METHODOLOGY

The goal of the research is to examine the effectiveness of m-learning. The qualitative approach allowed for the representation of reality through the eyes of the individuals is interviewed in order to share their stories and hear their voices.

3.1. Context and Participants

To best align with our operationalization of mobile learning, mobile devices in this study included the following characteristics: (a) persistent access to the internet, (b) a variety of downloadable applications, (c) used as a communication device, specifically phone and sms messaging, and (d) small enough to carry in a pocket or handbag. Primarily targeting Apple or Android phone users. Therefore, only handheld devices, including cellphones and smartphones are used in this study.

The m-learning students are invited for an interview. Particularly those who are using m-learning as a blended learning, it means one who is using m-learning as a tool to support the subjects and what they are study in class room. This included the students

of engineering, Coimbatore, Tamilnadu, India from different programmes (ECE, EEE, CSE, IT, Mech, and Civil) 10 members from each department in total 60 students.

The samples comprised of 33 male and 27 female. Among the respondents 28 are hostellers and 22 are day scholars respectively.

3.2 Instrument

For the purposes of the investigation, an interview protocol with two sections is designed by the researchers. The first one is open-ended questions to identify the m-learning effectiveness, technology acceptance, system success, social factors, learner satisfaction and learner intention. The second section is about the demographic information of the respondents. The questions are framed based on the literature review and experts opinion. The protocol is available in Appendix 1.

3.3 Procedure

The study started with the identification of m-learning students with the help of faculty members, the purpose of the study and objective is explained. After getting the acceptance from the students the interview and observations are conducted based on the respondent's convenient time and place.

3.4. Data collection

Triangulation method is planned for the data collection. Triangulation involves combining multiple methods to gather data, such as documents, interview, and observations. According to Yin (2002), Case study researchers need assurance of construct validity through the triangulation. It includes multiple sources and chains of evidence. This interview was conducted through the interview protocol. While the interview protocol acted as a guide, the questions were flexible to represent the emergent nature of the interview conversation.

The interviews were recorded and the additional body language and reactions were noted. When observing the students intention towards m-learning it shows the both positive and negative intentions about mobile devices among students.

The document collection is little bit difficult in this study we can get only the screenshots and certificates are collected. Some of them are now undergoing the course, so it is not possible to collect the certificates. This is one of the limitations in this study. In this research, most of the findings are based on the interview response.

3.5 Data Analysis

Content analysis was used to analyze verbal and written material. The technique uses a set of codes to reduce volumes of verbal or print material into more manageable data from which researchers identify patterns and gain insight.

4. FINDINGS

Specific themes emerged from the qualitative analyses which depicts the (a) Technology Acceptance (b) System Success (c) Environmental Factors (d) Learner Satisfaction (e) Learner Intention and (f) M-Learning Effectiveness.

4.1 TECHNOLOGY ACCEPTANCE

Technology acceptance is a major benefit to mobile learning users. The two advantages are perceived usefulness and ease of use.

The students are happy with convenience of constant connectivity but some quoted that due to network problem they cannot stay in connection with mobile learning. The utilization of large data in the past olden days cost more but due to introduction of Jio it is easy to access the data with low cost.

The users feel mobile learning is useful for their studies because of its fast delivery method of materials that make students more comfortable way to learn. M-learning would enable students to achieve their learning tasks more quickly.

Most of the respondents stated that learning through mobile increased their grades during their exams. Furthermore, students spoke positively about accessing course content such as discussion boards, course readings and video clips which they needed to watch for class on their mobile devices.

Some students came out with the point of easy to navigate around the site in mobile. They felt that all the data is in the pocket. All the participants viewed the ability to access information through the mobile device positively.

Many students quoted that mobile learning is user-friendly because of its flexible techniques, saves time, easy to use, can carry anywhere and anytime. It is the best user-interface, doubt clearness and it gives more satisfaction to the learner but not in all cases because of the network problem.

4.2 SYSTEM SUCCESS

Another advantage that stemmed constantly among students is the information quality and system quality that leads to a system success in m-learning.

The most of the respondents felt that the mobile learning system provides information that is exactly what they need i.e. Content Accuracy. It provides information that is relevant to their course but some students felt that the relevance of the content mismatch sometimes.

The mobile learning system provides information which they need at the right time. The availability of the information is the best advantage in mobile learning stated by many students.

Many students said that the mobile learning system provides an appropriate level of online assistance and explanation due to its technological improvements and the exact explanation for understanding of student's level of knowledge but some stated that they do not exactly found what they want.

The mobile learning system allows a high level of customization for different courses and the students found themselves communicating more because of the mobile devices.

However sometimes they felt that the system quality is the major problem among students.

The students felt that the mobile learning system provides interactive features for an effective user experience. Finally, students stated that system quality and information quality highly influence the learner satisfaction and intention of the learners.

4.3 ENVIRONMENTAL FACTORS

The students want their environment to be positive to support their mobile learning system. The environment includes lectures, parents, career advisors, friends, government etc.

Lecturers are not allowing the mobile devices because mobile devices are highly distracting the class attention. The students would like to use mobile learning if it is recommended by their lecturers.

The lecturers of their programme are helpful in the use of mobile learning systems, but also some of their lecturers want to give guidance to learn in mobile devices and many stated that the students should to be allowed to use mobile in the class for learning purpose.

Parents don't have the positive attitude towards mobile use for learning and they felt it hampers the study. The students also want their parents to support and have to show the positive attitude towards mobile use for learning.

Many career advisors are highly inducing them to use mobile learning in all levels to increase the success rate.

Many of their friends recommend them to use mobile learning. The students quoted that due to their friend's recommendation they know the applications for mobile learning.

Finally, they quoted that the Government systems are highly motivating them to use mobile learning, but they want the Tamil Nadu Government to concentrate more in bringing many facilities and awareness for mobile learning among students community.

Overall respondents felt that there is no support from these factors to use mobile learning, if it gets then it will increase the intention and satisfaction of the learners.

4.4 LEARNER SATISFACTION

Mobile learning students are satisfied with their decision to take the courses via mobile learning because information received from mobile learning system is very satisfying.

If they had an opportunity to take another course via mobile learning, they are glad to do so.

Most of the respondents found that their expected improvements in learning are achieved through m-learning.

Mobile computing devices are allowed for interaction with the course content and other classmates which is highly through mobile learning.

The students are satisfied and also felt they had opportunities for reinforcement of course materials when using mobile computing devices. They felt that this mobile learning serves their needs well.

Many students felt that they are confident, create more interest and their level of learning is increased due to learning which is easy through mobile. M-Learning gives them a self-motivation among students.

4.5 LEARNER INTENTION

The students mentioned clearly that they planned to use m-learning in their studies during semester time and according to courses, and also when hand copies are not available. They intend to use mobile learning strategies in the next semester and recommending other students also.

Many of the mobile learning users are intend to increase the mobile offers in the future for learning and also to improve the motivational camp for the students, but Government must bring many new ideas and schemes for mobile learning and services.

Students come out with the point of providing free Wi-Fi systems even in rural areas to increase and access the mobile learning in effective manner.

Some students enjoy using m-learning systems, but some students stated that the social networking applications that are not being used for class potentially threatened their concentration.

Students stated that if mobile devices are used for learning then understanding, concepts of subjects reduce the difficulty, so due to usage of mobile phones for learning gives more benefits like, to avoiding to carry books to classrooms, understanding subjects are easy, taking courses via mobile is time save.

Students said that after integration of mobile computing devices learning environment are positively changed because education become more standard, sharing

information's are increased, everyone can learn easily but also some students stated that due to emergence of m-learning the interaction with the staff is reduced due to self-learning. However, they also felt that it is very easy to respond to a text message received and just as quickly return to the task at hand when using the devices for coursework, demonstrating that they were able to manage their time on appropriate tasks.

Many students agreed that they did not feel distracted while doing mobile learning courses and have also recommend others to use m-learning systems through their experiences, as a personal suggestions.

4.6. M-LEARNING EFFECTIVENESS

Mobile computing students are happy and stated that the mobile learning can be an effective method of learning as it can give immediate support in learning anywhere anytime. The use of the mobile devices improved the learning value of the course.

The mobile learning will bring new opportunities of learning in future. They felt it is very effective and efficient. It improves the study convenience and helps to finish the study related task more quickly.

Many students quoted that the mobile learning is more flexible in accessing the resources used for the learning as it can be done anywhere at any time. It will be an effective learning aid or assistant for studies and a supplemental tool for any existing course and covert any wait time into productive time.

Mobile learning is a quicker method of getting feedback in learning, but getting feedback in all time is not flexible because of network problem.

Mobile learning students felt that it is an effective method for present and future generation to increase the level of education and bring more job opportunities for the youngsters.

5. DISCUSSION AND CONCLUSIONS

The present study gathered and analyzed data to understand student's perception and intention towards mobile learning effectiveness and practices among undergraduate engineering students. The result confirmed that students generally have a satisfaction and positive intention towards mobile learning with some limitations supports that of previous research (Rajendran et al. 2018). Many advantages of mobile learning are shared by the students mainly stated that the accessing course documents, uploading, posting and getting feedback anywhere anytime are easy for them and highlighted the values of mobile learning. They were using several mobile learning application that came out in this discussion like Sololearn, Edx, Coursera, i-learn, Onenote, Feedly, Geeks for Geeks, w3school, Free-Books., etc. The students found using mobile devices more convenient with statements such as "It's just more convenient, I think, like I hardly ever take my laptop to class".

Technology acceptance is the strongest predictor of behavioural intentions, it is consistent with previous research (Wang, Wu and Wang 2009). Wang (2009) suggest that it is important that m-learning systems be designed to be user friendly with easy to use. Perceived usefulness, perceived ease of use of m-learning exhibited significantly strong impacts on intention to use m-learning (Cheng 2012; Igbal and Bhatti 2015).

The information and system quality jointly or separately affect user satisfaction the result strongly supports previous research (DeLone and McLean 1992). Social influence is found to be a significant determinant of students' intentions to adopt m-learning also supported the previous research (Brown 2005; Venkatesh et al. 2003; Mtebe, J. and Raisamo 2014; Venkatesh and Davis, 2000).

Overall, the students felt m-learning improves the effectiveness and efficiency of learning using m-learning. However but at the same time they need some support from their parents and teachers. The findings of this study suggest that mobile technologies

have the potential to provide new learning experiences. In these experiences, students can engage more frequently in learning activities outside of class, providing them with more learning opportunities in their community of practice.

The student's participants in this study recognized change in their learning regardless of the identified limitations, including fear of the technology which is not working properly, small mobile device keyboards making typing difficult and potential device distractions. The students are satisfied and happy in using mobile learning systems. Furthermore, students may drive technology integration: however it is the instructor who must lead effective ways to implement devices in learning.

The immediate access to each other impacted how the students are interacted. The students seemed to leverage the structure of their course assignments with the anytime, anyplace convenience of learning from classmates. The participants considered communicating more often and usually in smaller devices are more effective and efficient. The present study has some limitations. First, while this research will add to the discussion on m-learning acceptance in higher education institutions, there are some areas which could be investigated in future studies.

This study focused solely on the view of the student population. However, the success of any m-learning initiative is highly dependent on the University educators as well. Therefore, future work will incorporate the acceptance perceptions of the University lecturers, who are ultimately responsible for the design and delivery of the courses. This study focused only on engineering students the others students, are like arts and science students can be included.

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