

The Use of Mobile Technology in Promoting Education 4.0 for Higher Education

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Abstract: As technology advances, using gadgets like smart phones, ipads, tablets and other mobile devices is becoming popular among people today as the rise in technology is overwhelming. Recently, mobile technologies are playing an increasingly significant role in tertiary level students' academic lives. Moreover, the popularity of mobile technologies among higher education institutions (HEIs) students is increasing dramatically. Many higher education institutions (HEIs) now use mobile technologies and create mobile-optimized versions of their websites or build stand-alone applications that can be downloaded from mobile application stores. Thus, this paper explores the perspectives and practices of mobile learning in higher education 4.0. A survey about students' mobile technology ownership and learning practices show that is high and continues to increase among students. The data were analyzed by calculating the frequencies of the answers to the questionnaire. The paper concludes with a brief discussion of the reviewed studies and it implicates that mobile technology practices has good prospects for teaching and learning in higher education 4.0. Based on these results, it was recommended that more research should be carried out to provide additional knowledge with regard to the replication of the current study for developing students' mobile technology practices toward the era of the Industrial Revolution 4.0 (IR 4.0).

Key words: *mobile technologies, education 4.0, higher education institutions(HEIs), students*

INTRODUCTION

Recently, the fast developments of information and communication technology (ICT) is not only has an impact on the world of industry but it also has a significant impact in the world of education. As technology advances, using gadgets like smart phones, iPads, tablets and other mobile devices are becoming popular among people today as the rise in technology is overwhelming. Mobile learning has various definitions and is known by many names like m-learning, u-learning, personalized learning, learning while mobile, ubiquitous learning, anytime/anywhere learning and handheld learning. Mobile learning or M-learning

offers modern ways to support learning process through mobile devices, such as handheld and tablet computers, MP3 players, smart phones and mobile phones. According to Crescente and Lee [1], learners can learn anywhere and at any time with the use of mobile devices. Therefore, mobile learning has a potential to support teaching and learning environment in the 21st century. Therefore, this paper would like to explore the students' perspectives and practices of mobile learning in higher education 4.0 and reviewed some studies that connects its practices which has good prospects for teaching and learning in higher education 4.0.

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OVERVIEW OF MOBILE LEARNING

In recent times, flexible e-learning become the primary mode for student access by using mobile learning environment. It is already forecast that in the near future the number of mobile communication devices such as mobile phones and handheld computers will exceed the number of personal computers. Pinkwart et. al [2] defines e-learning as learning supported by digital electronic tools and media and by analogy. Many researchers and educators viewed mobile learning as the immediate successor of e-learning.

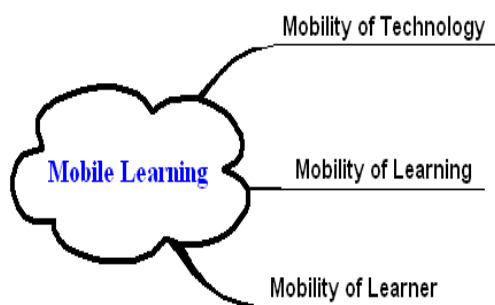


Fig 1 The Concepts of Mobile Learning [3]

Figure 1 is a graphic illustration of the three concepts of mobile learning that can convey a higher level of educational instruction. The concepts of mobility can be divided into three significant areas which are mobility of technology, mobility of learners and mobility of learning especially in the higher education environment. The successful provision of higher education instruction depends on the multilateral significance of the word mobility as it used in the context of higher education. Thus, these three concepts are interdependent and are correspondingly important in making mobile devices feasible as devices for the delivery of higher education instructional contents. The design and development of mobile learning application is not an easy task which needs software programming knowledge, graphic design knowledge, instructional design knowledge, content localizing. According to Savill-Smith and Kent (2004), the use of mobile devices for learning can assist students' motivation, help organizational skills, encourage a sense of responsibility, support both independent and collaborative learning, act as reference tools, track students' progress and deliver an assessment. Therefore, some educational institutes, universities or schools started to develop specific mobile applications for their students according to their curriculum and particular needs. Many researchers have explored research in mobile learning since the last decade. This leads to the various developments of mobile learning applications. Kulkuska-Hulme et al. [5] indicated that mobile learning can work, reaching places that other learning system cannot, it is best provided as part of a blend of learning

activities, it offers a collection of pieces to be fitted to a learning need rather than a single solution, it is not simply a tool for delivering teaching material but can be used for learning through creativity, collaboration and communication. Some of mobile learning projects that have been established by researchers worldwide are 'bubble sort' and 'binary search' applications, the mobile DNA, AMULETS, MUSIS and MobileMath. Recently, researchers have supported mobile technology for education. Therefore, the adoption of technology in language learning has advanced from Computer Assisted Language Learning (CALL) to Mobile-assisted Language Learning (MALL). Mobile-assisted language learning (MALL) has been defined as the use of mobile technologies in language learning, especially in situations where device portability offers specific advantages [6] (Kulska-Hulme,2013). For example, researchers expect learners to use their mobile phones, simply because they own one [7]. Stockwell [8] predicted mobile learning in the next generation because of the popularity of mobile devices among learners using technologies.

Mobile learning is now very much part of the educational technology and can be used in many different subjects. In the case of Malaysia, the adoption of m-learning is becoming popular in recent times. Some research has been conducted to study the potential of mobile technologies in enhancing classroom teaching-learning activities in Malaysian schools and higher education institutions (HEIs). For example, the potentials of m-learning was studied in English language literature [9] and Mathematic for primary schools [10]. According to Azar and Nasiri [11], mobile learning has also proven to be effective to enhance language skills even in writing based on several past studies. Even among ESL students, studies showed that university students have a positive perception of MALL [12]. Chong [13] examined the key factors include perceived ease of use, perceived usefulness, quality, services and cultural factors that influence the attitude towards m-learning among Malaysians. University students were found to be more interested in the benefits of mobile learning [14] and satisfied by the use of it [15]. Norazah Nordin et al. [16] surveyed that 120 post-graduate students in Universiti Kebangsaan Malaysia agreed that mobile phones had effectively improved the teaching and learning process and the activities with mobile learning helped to encourage and raise interaction among the students. Moreover, Naji Shukri Alzaza and Abdul Razak Yaakub [17] indicated that the higher education environment has the required infrastructure to utilize m-learning services based on their study on students' awareness and requirements of mobile learning services among Malaysian students in the higher education environment.

EDUCATION 4.0 FOR HIGHER EDUCATION INSTITUTIONS (HEIS)

Education 4.0 in the 21st century is all about implementation of digital technology. One of Malaysia government's aspirations is to have the tech-savvy generation in future. Therefore, all universities have to be prepared to adapt and change their curriculum and delivery so that graduates are able to fill in jobs which are yet to begin. The educators also have to keep up with this fast pace as technology is moving rapidly. In addition, in the Education 4.0 framework, challenges of the fourth Industrial Revolution (IR4.0) are addressed in relation to the Malaysia Education Blueprint for Higher Education 2015-2025. Figure 2 illustrates the stages of evolution of education over the years. The evolution can be divided into four stages of educational transformation. This diagram shows how things have transformed from education 1.0 to the emerging education 4.0 paradigm. There are changes in reading and learning habits that need the educators to create new pedagogical techniques as depicted in these four stages. Furthermore, the rapid pace of development of Industry 4.0 also leapfrogs from the Education 2.0 framework to Education 3.0/4.0.

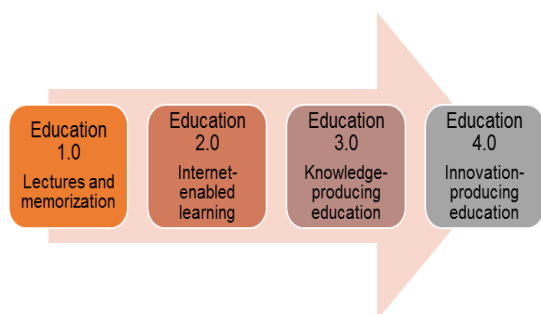


Fig 2 Education evolution

Digital technology can supply the framework to support new learning methods that engage students, bolster new revenue streams, cut operational costs and preserve highly valued school and university brands and reputations. From video-recorded lectures to online access to course materials, students can attend classes anywhere, anytime, via any device. In the era of smartphone classrooms, robotic home help and online examinations, it is not really difficult to visualize what Education 4.0 holds for us. Education 4.0 in a way concludes the phenomenon of digital penetration in our everyday lives. Norzaini et al. [18] highlighted that Malaysian universities must challenge the new realities by creating and structuring appropriate models that can determine future modifications of the university systems.

Being more available and flexible for students can also empower teachers to deliver more innovative,

exciting lectures, whether face to face or online learning while offering more personalised feedback and mentoring. Thus, Malaysia universities planning of the virtual university model corresponds with the convenience of a digital age. This is when ubiquitous learning, transdisciplinary and value formation rule utmost.

METHODOLOGY

This is a preliminary study and first part of development in mobile learning application for writing course. For development of the mobile learning application, the researchers used ADDIE model as in Figure 3 which includes five processes which are (1) review the analysis of mobile phone use among students, (2) the process of designing mobile learning application, (3) process of mobile learning application development, (4) the implementation of mobile learning modules and (5) the evaluation process of mobile learning application.

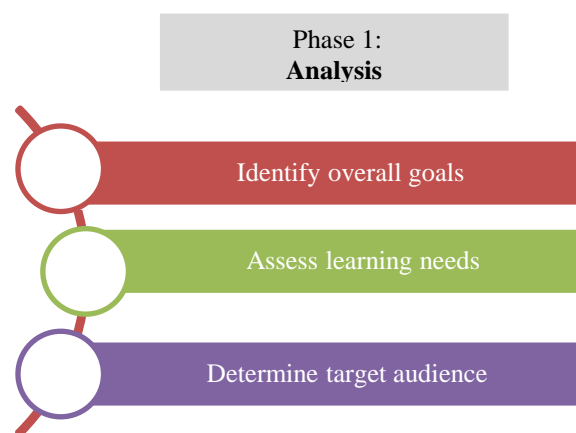


Fig 3 Phase Analysis

This needs analysis from this study is important because the findings will be used to help in the following review of the mobile learning application development for the students. The purpose of this study was to identify the perspectives and practices of mobile learning among undergraduate students from the components of usage of mobile devices for learning, types of mobile devices used for learning and time spent on using mobile devices for learning. This study also described the reviewed studies which involve mobile learning practices as good prospects for teaching and learning in higher education 4.0. To accomplish this, a quantitative survey technique was utilized by the researchers. The research study described in this paper was carried out in order to answer the following research questions:

- Are respondents using their mobile device for learning?

- What types of mobile device respondents usually use for learning?
- How much time do respondents spend on mobile devices for learning?

Participants

The research involved 45 undergraduate students who studied Diploma program in Universiti Teknologi Mara, Malaysia. The respondents were deemed to be well-familiar with at least basic mobile technology tools in teaching and learning environment. The small scale survey research was administered to the respondents during the teaching conducted in the classrooms. While the sample size too small to have the findings be generalizable, the findings can provide valuable insights into the body of research on students' perspectives and practices via mobile phone technologies. Of all respondents, 38 were female (84%) and 7 (16%) were male respondents. Overall, there were two distinct age groups of respondents, which are 42 respondents (93%) (range 19- 20 years) and only 3 respondents (0.7%) (20-22 years). All of the respondents were Malay students.

RESULTS AND DISCUSSION

A total of 45 selected respondents was inquired to answer the questionnaire. Then, the data were collected and analysed by using Statistical Package for the Social Sciences (SPSS) 21.0 software.

The Use of Mobile Device for Learning

Figure 4 shows the use of mobile device for learning. Most of the respondents (97.7%) used their mobile device for their learning.

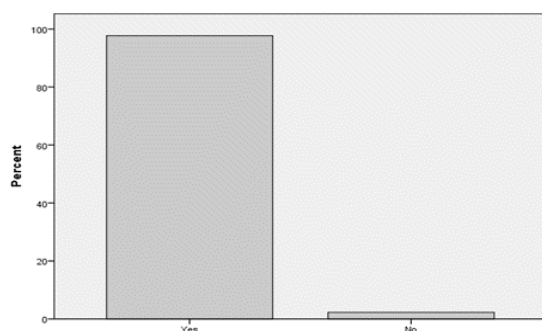


Fig 4 The Use of Mobile Device for Learning

While the findings showed that only (2.3%) of the respondents did not use the mobile device for their learning. This result indicates that most of the time

respondents like to use the mobile devices especially for studying or learning.

The Types of Mobile Device Used for Learning

Mobile phone, smartphone, tablet, personal digital assistant (PDA), eReader are the types of mobile device that are listed in the questionnaire. Figure 5 shows the types of mobile device that the students usually used for their learning.

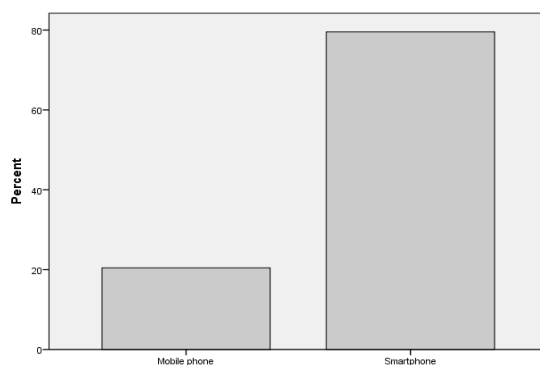


Fig 5 The Types of Mobile Device Used for Learning

The most common mobile device used by the students (79.5%) is a smartphone for their learning while the second most common mobile device used by the respondents (20.5%) for their learning is a mobile phone. This finding showed that most of the students have a smartphone and they are most likely prefer to use their smartphone for learning purposes.

Time Spent on Using Mobile Devices for Learning

Figure 6 depicts the total hours per day the respondents spent using their mobile devices for learning. Most of the respondents (52.3%) spent time on using mobile devices for 1 hour or more, but less than 3 hours per day for their learning. A total of 27.3% of respondents spent on their mobile devices for 3 hours and more, but less than 7 hours per day for learning. While 18.2% of respondents spent only less than an hour per day for their learning. However, the findings showed that only 2.3 % of respondents did not spend time at all on using mobile devices for learning each day.

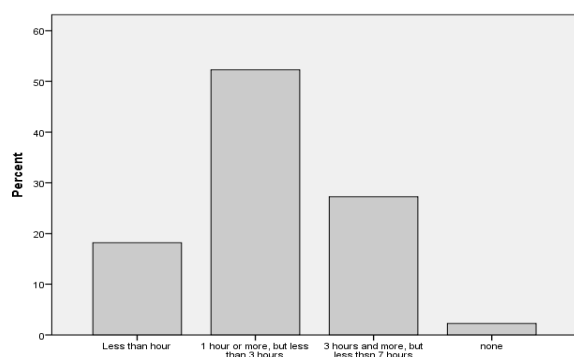


Fig 6 Time Spent on Using Mobile Devices for Learning

The results revealed that almost all of the respondents agreed that they used their mobile devices for learning and most of the time they spent their day on using mobile devices for learning as there is only one student did not spend his/her time for learning each day.

CONCLUSION

Regarding the students' technology acceptance and their practices specifically on mobile learning for Education 4.0, this study exposed that the tertiary students' perspectives and practices on the use of mobile devices is highly positive. Overall, most of the students believe that mobile devices can help them in learning. This finding supports with the results of some research about the positive impact of mobile learning behaviours and performance in Network Education College, Shanghai Jiaotong University, among 178 students. The study showed that the students use their mobile devices for activities such as discussing course content with classmates, asking classmates' questions and exchanging ideas with classmates about the class materials [19].

However, the future of mobile learning depends largely on the level of social acceptance it accepts. In reality, learners in developing countries also have the same need for mobile learning to be mobile, accessible and affordable like those in developed countries do. It is because mobile learning has a potential to make learning mobile, away from the classroom or workplace. A report from the European Commission [20] stated that around 10-50% of jobs are exposed to digitalization, but for many occupations it might be that only certain tasks will

be computerized especially for repetitive job routines in production, the service sector and office work. Thus, it was suggested that more research should be done to provide more insights with regard to the reproduction of the present study for developing tertiary students' mobile learning practices toward the era of the Industrial Revolution 4.0 (IR 4.0).

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