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MOBILE LEARNING READINESS AMONG MALAYSIAN PRE-UNIVERSITY STUDENTS

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ABSTRACT

Numerous learning opportunities have been opened up by the progress of mobile technology to fulfil the need for students' learning of Mathematics. The rapid development of mobile technologies has made it possible for mobile learning to play an essential role in learning. Due to the ability of mobile learning to make the process of learning possible anytime and anywhere, it is viewed as a significant aid to learning. With technological advancement in mathematics education paving the way for improvement in mathematical performance, the sustainability of mobile learning lies in its ability to address current educational needs as well as its capability in adapting to possible changes. Probability is a branch of mathematics that can benefit greatly from the freshness accorded with the advancement of mobile learning. However, before developing a mobile learning environment for the learning of probability, students' readiness needs to be taken into consideration. Even though mobile learning has numerous advantages, it is largely not researched at pre-university level, namely in the Malaysian Matriculation system. This study investigated the readiness of matriculation students on using mobile learning for learning. 35 students from a matriculation college located in the northern region of Malaysia participated in an online questionnaire. The purpose of the questionnaire was to determine students' mobile learning readiness pertaining to equipment, technological skill and psychological readiness' respectively. Data were analysed quantitatively by means of descriptive statistics. The findings showed a good level of readiness by the students, signifying that they were ready to get on board with mobile learning. Therefore, the preliminary study done has given vital evidence to exploit the usage of mobile learning in the development of a mobile learning environment which will be of essence to the process of teaching and learning probability.

Keywords: *Mobile Learning, Higher Education, Readiness*

INTRODUCTION

Profound change has occurred to the approaches to statistical subjects through the past decade. This conceptually happened via conscious utilisation of computer packages in data analysis and the process of investigation and including exploratory data analysis as well as graphical techniques. Probability is one of the disciplines in mathematics of which its usage is experienced in daily happenings (Yusuf et al., 2022). Among them include traffic flow control, accident predictions, forecasting the weather and even in rumour spread estimations (Batanero et al., 2016). This makes it an area significant to have interesting means of learning for so that its use in predicting the outcome of future events can be maximised for the greater good. Through the incorporation of conceptions' awareness related to crucial

ideologies such as variability and chance, the approaches have been pedagogically demonstrated. This scenario was an occurrence both to courses at universities as well as that of schools. Zooming in specifically to probability shined light to the scarcity concerning changes to the approach in this particular area. Changes with regard to probability predominantly occurred in schools, especially in primary schools, with pre-university and university levels at tertiary level still lagging behind.

Technology when integrated in teaching and learning acts as a means of assistance to students who face difficulties in grasping complex concepts. The exposure towards a range of technological tools will enable the content of probability to be conveyed in a variety of ways. These days, mobile devices and interactive e-books are tools that enable probability to be delivered for learning in a mode that is more active. The incorporation of a variety of media, comprising visual, written and audio promotes a deep approach to the learning of probability, thanks to the opportunity offered through greater engagement with the material of probability.

Mobile learning is a platform for learning utilising wireless technology in the education world. This platform enables limitless learning, giving students the opportunity to learn at their own convenience (Muasaad, 2014). The interest in mobile technologies' usage in mathematics teaching and learning is booming especially within the circles of practitioners and researchers of education. Since mobile devices are widely accepted among all segments of the population, namely that of the youth, mobile devices have become an agent that emerged to push the boundaries of mathematics learning and instruction to go past beyond what is offered within the four falls of the classroom. This advantage is coupled with mobile devices' exclusive characteristics encompassing internet accessibility, portability and its ease of access. White and Martin (2014) put forth that the opportunities afforded by mobile devices such as information capture, gathering of information, fostering of collaboration and communication with others, media consumption and critique as well as personal forms of both expression and representation creation provides the avenue for ready mapping of the highlighted practices onto scientific, mathematical and engineering practices (NGSS Lead States, 2013). Mobile technologies have the ability to affect the attitudes and achievements of students. Mobile technologies elicit positive responses from students when it comes to their perception of the mobile activities (Fabian et al., 2018). Students viewed the use of mobile technologies positively and found the learning activities to be fun, useful and engaging.

Productivity is an essential reason that massively contributes to the success of learning in this manner. The productivity of the teaching and learning that occurs is measured by the quality gained from the mobile learning environment. To give room for an improved learning experience, students' having access to multimedia content that is wholesome would certainly benefit from having an increased understanding of the subject matter. While there is truth to the belief that research highlighting advantages and usefulness offered by mobile technologies is growing, it is still limited in the area concerning mathematics education. Nonetheless, ways on how this form of technology can be maximised for use in mathematics teaching and learning has been thoughtfully addressed in the research reports by Larkin and Calder (2015) and Crompton and Traxler (2015) as well as Larkin and Calder (2015).

Technological development has pushed for innovation in learning to ensure that the manner of learning stays relevant with the times. McDevitt and Ormrod (2013), rightfully pointed out that a student's innate motivation and interest are the cores that drive learning. Therefore, these elements should be given due support in the classroom. Educationists picked up on this, sparking an encouraging interest towards mobile learning. Over the last few decades, especially the last ten years, provision of anytime, anywhere learning support started to become widely available, a privilege that was made possible due to the mobile technology advancement. Studies have reported the benefits to courses ranging from language, science to social science when mobile technologies in the form of laptops and smartphones are brought in to assist with the learning activities (Hwang & Chang, 2011). Mobile learning fosters social interaction and collaboration and hence, it provides the opportunity for students to assist their peers who may be struggling with their learning (Ghavifekr, 2020). By making use of mobile learning, students in possession of their mobile devices get to make linkages using sound, images, words, pictures and animations with the original contexts they are given to work with. To assist with students acquiring the

foreseen outcomes in authentic real-world environments, studies have proven that the consideration of proper tools or strategies of mobile learning need to be given adequate attention (Looi et al., 2010).

A very common definition of mobile learning is abstracting it in terms of its technologies and hardware. Hardware in this context generally refers to devices. It is the type of learning that is established or supported predominantly through the usage of mobile and handheld technologies such as smartphones, tablets and laptops (Traxler, 2007). Undeniably, mobile devices and technologies are prevalent and ever-present in a large number of modern societies. It is clear that the nature of knowledge in these societies is increasingly changing and this causes an alteration to the delivery of learning in formal and informal settings alike. Learning, which previously was delivered in a just-in-case situation can now be delivered just in time and just enough. According to Kadar Abdillahi and Zoraini Wati Abas (2015), learning via mobile devices enriches the experience of learning by taking it to a whole new level. Discovering information rather than owning it becomes the most important feature of learning and with regards to mobile learning exclusively, it is highly likely that this will take learning back to the community. The nature of mobility is also a focus when exploring the description of mobile learning. For every learner, the word 'mobility' itself has numerous associations and this will paint a vibrant picture and idea of mobile education. It may mean learning wherever comfortable to the learner (Muasaad, 2014) such as while driving and travelling. It may also be regarded as eyes-free or hands-free learning. The interpretation of 'mobility' plays a part in mobile learning's implementation.

Without the commitment portrayed by students and lecturers, implementing mobile learning would be an uphill task. Commitment alone however does not determine the effectiveness of mobile learning's implementation, but it is also important to find out whether or not students are ready to use technology for learning; i.e., their technological readiness (Mahat et al., 2012). Parasuraman and Colby (2015) defined technological readiness as the propensity related to acceptance and usage of a new technology to achieve a goal be it at home or in the office. According to Brown (2005), there is a close connection in the nature between e- learning and mobile learning. In an effort to examine readiness of students towards mobile learning, Trifonova et al. (2006) found that attitude of students towards mobile learning was dependent upon the manner in which e-learning has been used by people. There were expectations of mobile learning to give services with integration to solutions of e-learning, bearing in mind the considerations of the costs of the devices and the prices of the supplied services for successful usage of mobile learning.

Previous studies discovered that university students were ready for the implementation of mobile learning (Abdall & Hegazi; 2014; Jacob & Isaac, 2008). Students were found to possess mobile phones and were well versed at using it for their university purposes such as for group discussions and looking for course materials. In addition, there were thoughts that mobile learning would act as a useful tool to make the learning process more enjoyable. Al-Fahad (2009) put forth that the usage of mobile technologies among college students in their learning environment showed an encouraging acceptance among the students' community. Wireless networks provided the students with increased flexibility in using mobile learning tools through devices such as laptops and mobile phones, thus enabling them access to information at anytime and anywhere. This shows that mobile learning activities help with students' engagement in the process of learning. There is a strong belief that when it comes to the future of learning, the growth of mobile learning as an innovative technology is foreseen (Lam et al., 2011).

Padmanathan and Jogulu (2018) defined mobile learning readiness as students' readiness in making a choice whether to choose and make use of mobile technologies like mobile phones and tablets as their means for learning. the readiness of students to choose and use mobile technology such as tablets or mobile phones as one of the means of learning (Padmanathan & Jogulu, 2018). Since the number of mobile phone users have been increasing, pre-university colleges in Malaysia, namely the Malaysian Matriculation Colleges should embrace this new technology of learning. However, before implementing mobile learning, students' mobile learning readiness needs to be studied first to ensure the successful implementation of it. This is an essential step to ensure good coping with the technology as well as chances of positive changes in the teaching and learning process in matriculation colleges. Previous

studies pertaining to mobile learning readiness in Malaysia often focused on university students, making studies of this area among matriculation college students scarce. Therefore, this study intends to provide insights on mobile learning readiness among matriculation college students as a preliminary step for the development of a mobile learning environment for the learning of Probability. The aspect of mobile learning readiness in this study focuses on three elements which are equipment, technological skill, and psychological readiness'. Thus, this study will be investigating the readiness of students on using mobile learning for learning and will answer the following research question: what is the level of students' readiness on using mobile learning for learning?

METHODOLOGY

This study made use of the quantitative approach involving a survey via the administration of a questionnaire. The questionnaire which was administered online involved the participation of 35 second semester students from a matriculation college located in the northern region of the country. The respondents were chosen through cluster random sampling. The collected data was analysed quantitatively by means of descriptive statistics. With regard to determining sample size, Israel (1992) put forth that any sample size is sufficient if descriptive statistics is used to analyse data.

In order to determine students' readiness for using mobile learning, the Mobile Learning Readiness survey instrument (Padmanathan & Jogulu, 2018) was used to assess this component. Padmanathan and Jogulu (2018) adapted this questionnaire based on the e-learning readiness needs assessment model by Chapnick (2000). Chapnick (2000) considered her e-learning needs assessment model as a tool to answer the questions of 'can we do this', 'if we can do this, how are we going to do it?' and 'what are the outcomes and how do we measure them?'. Chapnick (2000) claimed that there were several factors that required consideration to assess readiness and listed 66 factors in question format which were grouped into 8 categories namely psychological, sociological, environmental, human resources, financial readiness, technological skill, equipment and content readiness. In the field of education, Yun and Murad (2006) claimed that two main factors that influenced e-learning readiness were psychological readiness and technical skill readiness. Since Brown (2005) mentioned that e-learning and mobile learning were closely connected in nature, Padmanathan and Jogulu (2018) adapted their Mobile Learning Readiness survey instrument from Chapnick (2000) by focusing on the most relevant readiness for investigating mobile learning readiness among students in Malaysian Polytechnics, which were equipment readiness, technological skill readiness and psychological readiness. This instrument is considered very relevant to the mobile learning environment, particularly in the Malaysian context and hence, it was adapted for this study. The survey questions focussed on elements most relevant concerning the investigation involving readiness related to mobile learning in the Malaysian context that were readiness pertaining to equipment, technology and psychology. The questionnaire consisted of 38 items involving three constructs; equipment readiness (17 items), technological skill readiness (11 items) and psychological readiness (10 items). The questionnaire was validated by three experts who are all postgraduate degree holders of which, one of them has a Ph.D and two of them have a Masters degree each respectively. All three experts possessed more than 10 years of experience in the Malaysian Matriculation system and are actively involved in publications and presentations on the subject of mobile learning.

Table 1 reports on the mobile learning readiness constructs. As can be noted from Table 1, the Cronbach's Alpha reliability coefficient reported for the three constructs were more than 0.7 for equipment readiness, technological skill readiness and psychological readiness respectively, signifying a good internal consistency of the instrument (Sekaran, 2000).

This study sought to establish the mobile learning readiness among Malaysian students at pre-university level. The level of readiness was determined by the percentage values of the responses for the items under equipment readiness, technological skill readiness and psychological readiness as well as the overall mean score for technological readiness and psychological readiness respectively as follows: (0-2.4=low, 2.5-3.4=moderate, 3.5-5=high) (Shuib et al., 2018).

Table 1
Reliability Coefficients for the Mobile Learning Readiness Variables

Variable	Number of Items	Items Dropped	Cronbach's Alpha
Equipment Readiness	17	-	.708
Technological Skill Readiness	11	-	.852
Psychological Readiness	10	-	.933

FINDINGS

Demographic Information

In the pool of respondents, female students represented a larger proportion (71.4%) as compared to the male students (28.6%). This difference in percentages reflected the proportion difference between the male and female students in the matriculation college in general. With regard to ownership of devices networked to the internet, majority of the respondents had one smartphone (62.9%) whereas less than half of the respondents had one networked computer or notebook (42.86%). This was followed by 28.6% of them having more than one mobile device connected to the internet while a mere 5.7% had more than one networked computer or notebook. Most of the students who participated in this study rated the internet connectivity in their area of access to be good (82.9%). More than half of the respondents considered themselves to be highly skilled in their usage of computers or notebooks (94.3%) as well as smartphones or mobile devices (97.1%).

Equipment Readiness

Table 2 puts forth the respondents' equipment readiness. The table shows a high level of equipment readiness pertaining to mobile learning. All items for this construct received an affirmative percentage of more than fifty. With reference to Table 2, all the respondents had a messaging application on their handphones. All of them also had a social media account on their handphones. The majority of the respondents could make video calls on their handphones as well as could send or receive e-mails on their phones. When it came to reading or opening of files, most of the respondents could read or open Word documents, PDF documents, Excel documents, PowerPoint, video files, audio files and photos or graphics. 97.1% of the respondents had mobile phones which had the ability to connect to the internet while 80% of them had a data plan subscription. It is worthy to take note that having a mobile phone with the ability to connect to the internet is useful for the students as Wi-Fi services are available on campus. Due to the provision of free Wi-Fi services for all students on campus, students at matriculation colleges have access to internet.

Table 2
Equipment Readiness

Items	Yes (%)	No (%)
Do you have a messaging app on your handphone (WhatsApp, Telegram, WeChat, Viber, Others)?	100.00	0.00

Do you have a social media account on your handphone (Facebook, Instagram, Twitter, LinkedIn, Others)?	100.00	0.00
Can you make video calls on your handphone?	77.10	22.90
Do you send /receive e-mails on your phone?	91.40	8.60
Can your handphone connect to Wi-Fi?	97.10	2.90
Do you subscribe to any data plan?	80.00	20.00
Can your handphone read/open up the following files?		
Word document	97.10	2.90
PDF document	77.10	22.90
Excel document	74.30	25.70
PowerPoint	85.70	14.30
Video files	97.10	2.90
Audio files	77.10	22.90
Photo/graphics	77.10	22.90
Does your handphone have a video editing app?	60.00	40.00
Does your handphone have photo editing app?	60.00	40.00
Is your handphone's camera more than 5 Megapixel?	51.40	48.60
Is the size of your handphone storage 8 GB or higher?	91.40	8.60

Technological Skill Readiness

Table 3 shows the respondents' technological skill readiness results. The table indicated that the level of technological skill readiness was good among the respondents. Among the frequent noteworthy doings of the respondents with regard to this construct were pertaining to messaging (74.3%) and social media applications (71.4%) usage, using video call services (37.1%) as well as sending or receiving e-mails (37.1%), handphone usage as a hotspot (40%), opening or reading documents (48.6%), viewing video files, audio files and photos (65.7%), downloading document files, video files, audio files and software (65.7%) and editing photos (37.1%) or video files (42.9%).

Table 3
Technological Skill Readiness

Items	Never (%)	Occasionally (%)	Sometimes (%)	Often (%)	Always (%)

I use messaging app (WhatsApp, Viber, Telegram etc) to text or share files.	0.00	0.00	0.00	25.70	74.30
I use social media app on my handphone.	0.00	0.00	8.60	20.00	71.40
I use video call service on my handphone.	0.00	11.40	28.60	22.90	37.10
I send or receive emails on my handphone.	0.00	14.30	20.00	28.60	37.10
I use Wi-Fi to connect to the internet using my handphone.	2.90	17.10	25.70	17.10	40.00
I use my data (data plan) to connect to the internet using my handphone.	0.00	2.90	0.00	25.70	71.40
I open/read (Word document, Excel document, PDF document or PowerPoint) on my handphone.	0.00	8.60	11.40	31.40	48.60
I view video files, audio files and photos on my handphone.	0.00	0.00	8.60	25.70	65.70
I download files (document, video, audio or software) using my handphone.	0.00	0.00	14.30	20.00	65.70
I edit video files using my handphone.	2.90	5.70	40.00	8.60	42.90
I edit photos using my handphone.	2.90	8.60	31.40	20.00	37.10

The respondents averaged a score of 4.23 on a 5-point Likert type rating scale. This indicated that on average, they exhibited a good level of readiness as far as their technological skill was concerned.

Psychological Readiness

Table 4 displays the findings of the respondents' psychological readiness towards mobile learning. The mean score of 3.69 averaged by the respondents on a 5-point Likert type rating scale showed that they were psychologically ready. As shown in Table 4, their responses indicated that they had knowledge and were open to knowing more about mobile learning. The respondents preferred mobile learning to conventional learning and were receptive of paying extra for mobile learning. Their responses signified readiness towards mobile learning implementation. They showed their likeness towards lecturers integrating mobile learning, recognising that it indeed saved students' learning time. In addition to that, students were in agreement of the idea that mobile learning could be a substitute to traditional learning and thought that their college was ready for handphone usage in the integration of mobile learning. They realised that in the teaching of a few lecturers, mobile learning was being made use of.

Table 4
Psychological Readiness

Items	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Disagree (%)
I know what mobile learning is all about.	0.00	0.00	40.00	37.10	22.90
I want to know more about mobile learning.	0.00	0.00	28.60	45.70	25.70
I prefer mobile learning than conventional learning.	2.90	14.30	37.10	22.90	22.90
I don't mind paying extra money for mobile learning.	2.90	22.90	40.00	11.40	22.90
I am ready for mobile learning if the college implements it now.	2.90	8.60	37.10	25.70	25.70
I would like my lecturer to integrate mobile learning in my class in addition to face-to-face meetings in the class.	0.00	5.70	37.10	34.30	22.90
Mobile learning will save my learning time.	2.90	8.60	37.10	31.40	20.00
Mobile learning is an alternative to traditional learning.	0.00	0.00	34.30	40.00	25.70

I think my college is ready for mobile learning using handphone facility.	2.90	8.60	45.70	20.00	22.90
Some of my lecturers are already integrating mobile learning in their teaching.	0.00	0.00	31.40	45.70	22.90

DISCUSSION

The process of learning today occurs outside just the four walls of the physical classroom. In this respect, mobile learning has been viewed as a significant aid to learning. The sustainability of mobile learning lies in its ability to address current educational needs as well as its capability in adapting to possible changes. An important aspect to look into when it comes to mobile learning is the consideration involving students' readiness. In this study, the responses for three elements concerning readiness, namely that of equipment, technological skill and psychological readiness were analysed and interpreted to determine their mobile learning readiness for learning.

Mobile learning aids with the facilitation of collaboration between students and this provides them with the opportunity in better engaging with the learning activities. Mobile learning also offers a flexible learning environment as students can learn at any time anywhere, thus improving their accessibility to the learning materials. This flexibility reduces time wastage on the part of students and encourages the interaction between students and their peers as well as lecturers (Al Aish et al., 2014). With regard to equipment and technological skill readiness, the results showed that most respondents were well-prepared with regard to the equipment and knowledgeable in their operating of mobile devices. This is in line with studies which found that students were proficient in their usage of mobile devices for learning (Jacob & Isaac, 2008; Abdall & Hegazi, 2014; Shaqour, 2014). It seems that the affordance of using mobile learning materials like watching videos at their preferred time acts as a means of attraction to students as they can now have an amount of independence in their learning. The ability to pause, rewind, replay and fast-forward the videos gives them a chance to take charge of their learning and use these features afforded by the videos to maximize their gain in acquiring what they are trying to learn (Howard et al., 2017). With regard to psychological readiness meanwhile, students who participated in this study had a good attitude towards mobile learning. This echoes the findings of Shaqour (2014) as well as Alzaza and Yaakub (2011) who found that students had a positive attitude towards using mobile learning for learning.

This positive attitude comes from the realization of the convenience that stems from the fact that mobile learning module such as that in the form of videos are compact in size, hence facilitating student access across a variety of devices easily. The short duration of videos enables students to review the more challenging concepts numerous times, eliminating the dire possibility of sitting through an entirely recorded lecture which would definitely span through a much longer duration (Hew & Lo, 2018). Mobile learning increases the motivation levels of students which in return contributes to an improved level of engagement with their learning. The integration of mobile learning increases students' confidence levels concerning the content they learn (Lancellotti et al., 2016). This boost in confidence will definitely contribute to a rise in their motivation to acquire knowledge. Interacting with material through pausing and working on problems before viewing solutions will pave the way for students to stay engaged with the learning (Howard et al., 2017). , The efficiency and pace offered by mobile learning maximizes

learning for the time available and this is an essential criteria in learning when it comes to the digital natives (Lee, 2019).

With that, based on this study, there is a good level of readiness among students on using mobile learning for learning. Respondents were open to the integration of mobile learning in learning as there is familiarity when it comes to activities involving computing and communication that may be required in mobile learning. Lecturers should take the opportunity to create an environment that can develop students' potential and promote learning since students are positive about their readiness towards using mobile learning for learning. It is indeed wise to make use of mobile technologies' emergence for learning.

CONCLUSION

This is a mobile learning readiness study concerning Malaysian students at pre-university level which was done as a preliminary step for the development of a mobile learning environment for the learning of Probability. In a nutshell, this study showed students' readiness to use mobile learning for learning was very much present as they were equipment, technologically and psychologically ready. Therefore, this establishes their readiness for using mobile learning in learning Probability. More research can be carried out with a larger sample size from similar Higher Education Institutions. Lecturers' and administrators' views should also be studied pertaining to the identification of improved knowledge, performance and skills to see if the usage of mobile devices or mobile application was indeed benefitting the education purpose.

This study will add to the existing body of knowledge with regard to mobile learning readiness, encouraging the usage of mobile technology in learning and an opportunity to discover effective manners to incorporate it into the tasks of teaching and learning. This study will pave the way for lecturers to assist students in their learning by making more convenient content with easily accessible formats that can be accessed using commonly used mobile devices. With portability becoming an essential characteristic of learning, it certainly encourages frequent usage of mobile devices together with using other means of technology for learning (Hussin et al., 2012). The benefits of this manner of learning need to be taken advantage of in higher education through the planning of the best possible ways to employ mobile learning.

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