The Influence of Mobile Self-efficacy, Personal Innovativeness and Readiness towards Students' Attitudes towards the use of Mobile Apps in Learning and Teaching

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Abstract

Mobile devices are commonly used among higher education students and becoming the daily culture of almost every students. Mobile apps is one of the applications used in teaching and learning via mobile devices. However, it is important that students should have positive attitudes towards adopting these mobile devices in learning. This study explored students' attitudes towards integrating mobile apps in the teaching and learning process and factors corelated with their attitudes. A total of 223 undergraduate students who registered in MCLass were randomly selected from a stratified cluster sample. The research examined three factors postulated to impact students' attitudes namely, mobile self-efficacy, personal innovativeness and readiness towards Mclass. The findings showed students had positive attitudes towards Mclass teaching and learning. Further analysis indicated students' attitudes towards MClass were positively correlated with students' mobile self-efficacy [r = .254; p <.01], students' personal innovativeness [r = .404; p <.01] and readiness towards MClass [r = .718; p <.01]. Further analysis using multiple regression indicated that mobile self-efficacy (β = .145), personal innovativeness (β = .117) and readiness towards MCLass (β = .655) influence students' attitudes towards using MCLass.

Keywords: Mobile Apps, Mobile Self-Efficacy, Personal Innovativeness, Technology Readiness, Attitudes Towards Using Mobile Apps.

Introduction

During the last decade, the rapid development of telecommunication technology and the use of information technology tools have gained momentum (Saraubon, Nilsook & Wannapiroon, 2016). The preferences for mobile learning (m-learning) over e-learning is started to take hold n the academic segments, the primary delivery platform for learning content will be mobile learning. Mobile technologies have become an emerging paradigm in educational

technology. The use of mobile technologies in learning or mostly referred as mobile learning (m-learning) helps students and educators to get instant learning just by using the tip of their fingers. m-learning is considered as a further step in electronic learning (e-learning) where learning is transmitted via wireless mode and mobile devices such as mobile/Smartphones, laptops, personal digital assistants (PDAs), and tablet PCs (Attewell, 2005). In the education context, m-learning refers to learning using wireless mobile devices such as smart phones, PDAs, iPods, palmtops, laptops or digital cameras in the process of teaching and learning (Naismith, Lonsdale, Vavoula, & Sharples, 2004). In other words m-learning refers to any form of learning that occurs when the individual is not permanently at a location or time. It occurs at anytime and anywhere through the services offered by mobile technology equipment (Georgieva, Smrikarov, & Georgiev, 2005; Kukulska-hulme & Shield, 2007; Abu-Al-Aish, Love, & Hunaiti, 2012). This accessibility has provided educators with an idea to support learning inside and outside the classroom. Hence m-learning via the use of mobile learning applications (mobile apps) is a new concept in the learning environment. This learning environment has the potential to support student learning and increase student involvement in learning.

Mobile apps consists of a software that runs on a mobile device and performs certain tasks for the mobile user. Mobile apps was developed to help users to access information, content, entertainment and others to help them perform tasks more easily (Pollara, 2011). Mobile apps can be downloaded to a particular platform depending on the type of mobile devices used and the appropriate storage (*Apple Apps Store, Google Play, Nokia Ovi Store, Windows Phone Marketplace* dan *Amazon App Store*) (Mobile Marketing Association, 2008; OnGuardOnline.gov, 2011). The innovation in mobile apps has raised interests among educators because it facilitates teaching and learning (Johnson et al., 2012). Within the learning and teaching process in the classroom or outside it, the use of mobile apps helps higher education students to accomplish a higher degree of precision and efficiency as well as making it a fun way of learning or teaching.

However, in the higher learning context, successful implementation of m-learning is not about how good the technological products or mobile apps are but also on how much they are related to students' participation. According to Liaw (2007), the acceptance of m-learning depends much on students' personal attitude. He contended personal attitudes are a major factor that affects the individual usage of mobile device. Hence, it is very essential for educators to understand students' attitude towards m-learning within an appropriate m-learning environment. (Sánchez-Franco, Martínez-López & Martín-Velicia, 2009). Stockwell (2008) proposed attitude as a factor that could prevent students from using mobile phones in learning. Previous studies however showed there were positive attitudes among higher education students towards m-learning. For instance, a study by Dashti and Aldashti (2015) on 300 college students in Kuwait indicated a majority (80.3%) of students were favorable to the use of mobile devices in the learning and teaching process and found it important and beneficial. In another study, (Jaradat, 2014) undergraduate students' attitude towards m-learning was examined and the findings indicated it was fairly accepted among students. Most students supported the fact m-learning could increase the flexibility of accessing a variety of resources in learning independently at anytime and anywhere. Yang (2012) studied on the use of mobile devices in m-learning and his findings indicated students demonstrated positive attitudes towards m-learning and they were competent enough in using the mobile devices.

Besides students' attitude, students' mobile self-efficacy in m-learning environment was investigated. According to Lee, Hsieh and Huang (2011), self-efficacy was a major factor affecting attitude and behavior. Usher and Pajares (2008) stated self-efficacy was related to the individuals' determination on their effort, perseverance and anxiety when engaged in a particular task. Meanwhile, Saleem, Beaudry and Croteau (2011) defined self-efficacy as an individual judgment on his/her capabilities to organize and take necessary actions to achieve the decided target. Students' self-efficacy and attitudes were among the core factors that would determine the success of their participation in mobile learning (Isman & Celikli, 2009). Previous studies had shown students' attitudes and self-efficacy were related to information technology and these have become important issues in educational research. Students with higher self-efficacy in information technology had shown more positive attitudes towards information technology (Tsai, Tsai, & Hwang, 2010). Yang (2012) investigated students' attitudes and self-efficacy in the use of mobile devices in language learning at a technical university in Taiwan. He indicated students demonstrated positive attitudes towards m-learning. Students were reported to possess high mobile self-efficacy and thus they could relate the authentic materials with the learned materials.

In the innovation diffusion theory introduced by Rogers, he defined the adoption of innovation as the introduction of ideas, products, processes, systems and technologies which depended on individual differences (Rogers, 1995). Individuals with high innovations would be very active in seeking new information and capable of dealing with high uncertainties (Rogers, 1995). Hence, in an information technology study related to new innovations, it is important to explore individual personal innovativeness towards the innovation. Agarwal and Prasad (1998) referred personal innovativeness to the degree to which a person believes that he/she is positively predisposed towards the use of new technologies. In other words, individuals with higher level of personal innovativeness are expected to develop more positive beliefs about new technologies (Lewis, Agarwal, & Sambamurthy. 2003; Loʹpez-Nicolaʹs, Molina-Castillo & Bouwman., 2008) and it is an important predictor of technology acceptance (Lewis, Agarwal, & Sambamurthy. 2003).

Individual readiness is also an important element in adopting new technology such as mobile apps. Technology readiness towards m-learning means the provision of technology and support to educators, as well as the need to assess and consider the awareness of and acceptance of m-learning (Wagner, 2005). Meanwhile, Abas, Peng and Mansor (2009) proposed technology readiness to mean the extent of ownership of mobile devices and the readiness to be a mobile learner. Individuals who are not ready with new technologies, will find their acceptance of technology innovation are affected. Parasuraman (2000) had introduced Technology Readiness Index to measure the tendency of individuals to use new technologies to achieve the goals in life at home and work. Mahat, Mohd Ayub and Su Luan (2012) studied on the use of Short Messaging Service (SMS) as a medium of communication between 210 trainee teachers. Findings of this study indicated students had a high level of personal innovativeness and mobile readiness but moderate level of mobile self-efficacy.

The use of mobile apps in teaching and learning process will narrow down the communication gap and increase the interaction between student-student, student-lecturer, student-content and student-technology. Students can actively involve in self-learning while develop their own knowledge accordingly their time and place. This study will also help Malaysian of higher

education to implement or improve the use of technology especially m-learning among the higher education. In general, there is very strong literature support from theories and also empirical researches that showed attitude as a factor to be taken into account in the studies related to mobile learning. Besides, factors that correlate with attitudes are also essential when studying mobile devices and m-learning. Past literatures had also showed factors like mobile self-efficacy, individual personal innovativeness and technological readiness are related to attitudes towards m-learning.

Objectives of the Study

The objectives of the study are to:

1. identify university students' attitudes in using mobile apps in teaching and   learning.
2. identify university students' readiness towards using mobile Apps for teaching and learning
3. identify university students' mobile self-efficacy.
4. identify university students' personal innovativeness.
5. determine the relationship between university students' readiness, mobile self-efficacy and personal innovativeness with students' attitudes in using mobile apps in teaching and learning.

Methodology

For the purpose of this study, a mobile application (mobile apps) known as MClass for the undergraduate students' usage was developed. MClass is a mobile application used as a tool in learning and teaching. MClass is similar with learning management system (LMS) except it can only be accessed via mobile in the m-learning environment. MClass offers a variety of functions to users. Among them are class announcement by lecturers, course materials including lecture notes and assignments that can be downloaded as a *pdf* file, general and group discussion forums, on-line quizzes, and classmate information display. By using MClass, students can interact with lecturers and classmates without time and location constraints. Every week lecturers will also upload notes and course materials for the students to download. They will post issues or topics related to lectures in the particular week to be discussed using the forum platform. Mclass can be freely downloaded via Apps Store. Students need to register with MClass and approval by the lecturer is needed before they can start using MClass.

This research employed a survey research in which the responses of the undergraduate students in one of the local universities were obtained. The population of this study is students who registered for MClass. A stratified simple random sampling technique was used to select 223 undergraduates from various programs as respondents. The survey research design allows for unbiased collection of data from representative respondents (Krysik & Finn, 2013). Data gathering was done using a survey questionnaire, designed by the researcher adapted from previously validated inventories. It covers the following areas: Mobile self-efficacy, personal innovatiness, readiness towards mobile Apps and students' attitudes towards using Mobile Apps.

For the purpose of the study, the researchers developed an instrument consisting of five sections based on information derived from relevant literatures. These sections solicited information on participants' demographic background, students' attitudes towards mobile

Apps, students' mobile self-efficacy, students' personal innovatiness and students' readiness towards mobile Apps. Students' attitudes towards using Mobile Apps, the dependent variable, were measured by nine items adopted from MacCallum (2009). Attitudes toward mobile apps refers to the extent to which respondents received positively or negatively the use of MClass as a form of learning and teaching.

The measurement for the independent varaiables, students' mobile self-efficacy and personal innovatiness consisted of six items. Students' mobile self-efficacy items were adopted from Compeau and Higgins (1995). Mobile self efficacy refers to individual beliefs on his/her abilities and capabilities to get involved in the learning and teaching activities in the MClass. Students' personal innovativeness items were adopted from Agarwal and Prasad (1998). It refers to the respondents' willingness to try new innovations in the learning process by using Mobile devices. Lastly, students' readiness towards using Mobile Apps consisted of 15 items adopted from Supyan, Mohd Radzi, Zaini and Krish (2011). Mobile readiness refers to the extent to which the individuals are willing to use MClass as a medium that supports the learning and teaching process.

Participants responded by using a five-point Likert scale indicating whether they strongly disagreed (1), disagreed (2), were neutral (3), agreed (4), or strongly agreed (5) with the questionnaire statements. All the dependent and independent variables were found to be reliable instruments in measuring students' attitudes towards using Mobile Apps in a pilot study conducted on 40 undergraduated students in the same university. The reliability coefficient, Cronbach Alpha, for each subscale ranged from 0.712 to 0.889 (Table 1).

Table 1:
Reliabilty

	Cronbach Alpha
mobile self-efficacy	0.712
personal innovatiness	0.877
readiness towards mobile Apps	0.834
students' attitudes towards using Mobile Apps.	0.889

Findings

Table 2 shows the Students' attitudes towards MClass scored the highest mean among other variables (Mean = 3.85, SD = .820). This implied students showed positive attitudes on the use of Mclass as a form of teaching and learning. Two independent variables shared the same overall mean; mobile self efficacy (Mean = 3.70, SD = .619) and students' readiness towards using mobile apps (Mean = 3.70; SD = .514). This showed the respondents beliefs on their abilities and capabilities to get involved using Mclass in the teaching and learning activities. Findings of this study also showed the respondents willingly used MClass as a medium that supported the teaching and learning process during their study at the university. The last section measured the respondents' willingness to try new innovations in the learning process using Mobile Apps. Results showed the respondents willingly tried new technology for academic purposes as the mean was 3.60 (SD = .822).

Table 2:
Mean and Standard Deviation of Variables Studied

	Mean	Standard Deviation
Mobile self-efficacy	3.70	.619
personal innovativeness	3.60	.822
readiness towards MCLass	3.70	.514
students' attitudes towards using MCLass.	3.85	.585

Table 3 shows the Pearson correlation coefficients between the independent variables (mobile self-efficacy, personal innovativeness and readiness towards MClass) and the dependent variable (overall students' attitudes towards using MClass). There were positive correlations between Mobile self-efficacy (r = .254), students' personal innovativeness (r = .404) and readiness towards MClass (r = .718) with students' attitudes towards using MClass. These findings revealed mobile self-efficacy, students' personal innovativeness and students' readiness towards using MClass can develop students' attitudes towards using MClass. University students with high mobile self-efficacy will develop their positive attitudes in using MClass during their teaching and learning process. Personal innovativeness is also an important aspect in developing positive attitudes in using new technologies such as Mclass, On top of it, this study also shows that students with high readiness towards using mobile apps will also have positive attitudes in using Mclass during their study at the university

Table 3:
Correlation Coeefficients between Mobile Self-Efficacy, Personal Innovativeness and Readiness towards MCLass with Students' Attitudes towards Using MCLass

		Mobile self-efficacy	personal innovativeness	readiness towards MCLass
Students' attitudes towards using MCLass	R	-.254**	.404**	.718**
	Sig (2 tailed)	P < .001	P <.000	P <.000

A multiple regression was subsequently performed to predict factors (mobile self-efficacy, personal innovativeness and readiness towards MCLass) that influence students' attitudes towards using MCLass. The assumptions for normality, linearity, homoscedasticity, independence of residuals and sample size had already been met. The model summary is given in Table 4. The coefficient of determination is 54.9%, which is the extent of variation in the dependent variable that is explained by the independent variables. This shows that all five variables gave 54.9% contribution that would influences their students' attitudes towards using MCLass.

Table 4:
Test of Significance of Regression Model

R	R Square	Adjusted R squared	Std Error of the estimates
.745	.555	.549	.39402

A regression analysis was also conducted to test the proposed hypotheses and to investigate how different factors affect students' attitudes towards using MCLass as a dependent

variable. Table 5 indicates that the test statistic was significant at the 0.05 level of significance [$F(3,221) = 90.630$, p=0.000]. Three of the factors in this study could be a significant predictor for students' attitudes towards using MCLas as shown in Table 5.

Table 5:
ANOVA for Multiple Correlations between Mobile Self-efficacy, Personal Innovativeness and Readiness towards MCLass and Students' Attitudes towards using MCLass

	Sum of Squares	df	Mean Square	F	Sig.
Regression	42.212	3	14.071	90.630	.000
Residual	33.846	218	.155		
Total	76.058	221			

As Table 6 illustrates, the results of the multiple regression indicated that mobile self-efficacy, personal innovativeness and readiness towards MCLass influence students' attitudes towards using MCLass. The relative order of importance of the predictive factors of students' attitudes towards using MCLass, based on beta values (β) (see Table 6), maybe summarized as follows: mobile self-efficacy (β = .145), personal innovativeness (β = .117) and readiness towards MCLass (β= .655). These three variables were statistically significant at the 0.05 level.

Table 6:
Multiple Regression between Mobile Self-efficacy, Personal Innovativeness and Readiness towards MCLass and Students' Attitudes towards using MCLass

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.267	.237		1.131	.259
mobile self-efficacy	.138	.045	.145	3.086	.002
personal innovativeness	.083	.036	.117	2.332	.021
readiness towards MCLass	.748	.056	.655	13.419	.000

Discussion

Mobile technology is ubiquitous in the lives of university students. The need to use mobile phones in education has become very important. With the advance of technology, mobile phones can be used in sharing information resources through Infrared, Bluetooth and Wi-Fi devices. Various types of mobile features are being utilized for educational practices. These include the use of Short Message Services (SMS), camera, internet browsing, uploading and downloading, bluetooth, Wi-Fi, voice calls, gaming and others that can equally be used for educational practices. The latest development in using mobile technologies for educational purposes is mobile apps. The large number of educational apps that exist can create potential opportunities for more impendent learning and develop more engaging students in m-learning (Benson & Morgan, 2013). Despite the massive advantages that mobile phones have in the teaching and learning process, they are factors that need to be investigated. The effective use of these mobile technologies relies much on the acceptance of the users (educators and students) to use them in the teaching and learning process. Therefore, the preparedness in using these technologies in university education should be based on the concept of conviction and acceptance to use it in the teaching and learning process.

In summary, this study was to investigate the relationship between three variables namely, mobile self-efficacy, personal innovativeness, readiness towards MClass with students' attitudes towards using MClass in teaching and learning. Descriptive analysis showed university students had positive attitudes on the use of Mclass as a form of teaching and learning. Studies by Dashti and Aldashti (2015), Jaradat (2014) and Yang (2012) also showed positive attitudes among university students towards m-learning.

This study had shown positive attitudes among the students in using mobile apps (Mclass) as a tool in teaching and learning process. It is therefore important for students to have positive attitudes for such attitudes will lead to acceptance of m-learning as part of the teaching and learning process (Liaw, 2007), Sánchez-Franco, Martínez-López & Martín-Velicia, 2009). Simple correlation analyses indicated factors like Mobile self-efficacy, personal innovativeness, and readiness towards MCLass were positively correlated with students' attitudes towards using MCLass in teaching and learning.

In the m-learning environment especially when introducing new applications such as mobile apps, students' attitudes play an important role in the integration of these technologies in the teaching and learning process. Their attitudes are influenced by many factors. Among others, the readiness of the students to use mobile apps will lead them to develop a culture that embraces mobile apps as a tool to improve teaching and learning. With all these findings, it is essential that more mobile apps for educational purposes should be developed. As mentioned earlier, with mobile apps, teaching and learning process could occur at anytime and anywhere through the services offered by mobile technology equipment.

Hence, it is suggested to ensure the effective use of mobile apps successfully, students' need to be more competent in handling mobile devices. By this, students with high mobile self-efficacy will not face many problems in using MClass. However, students with low mobile self-efficacy are unlikely to use MClass. Therefore, students need to be exposed on this type of learning. Lastly, this study found out that personal innovativeness is also another factor that contributes to attitrudes. It is therefore important for university students to willingly participate in using new technology applications.

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