CHARACTERISTIC OF MOBILE DEVICE AND FACTORS OF DEVELOP MOBILE APPLICATION IN EDUCATION

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Abstract

Widespread ownership of mobile phone and tablet had created a new trend in education named Mobile Learning (M-Learning). Due to the functionality of mobile phone and tablet, mobile device can link several societies together and the learning environment is no longer restricted in the classroom with the help of technology. Thus, this study discusses the issue of implementation mobile device and mobile learning in education. The issues that discussed in this study are elicited from several article reviews based on the thematic analysis. There are two factor that discussed which are usability and technical for mobile. These issues are important to consider as the factor to develop a mobile application in education for teaching and learning purpose. A well-developed mobile application can influence the teaching and learning environment among the teachers and students.

Keywords: Mobile Learning, Mobile Application, Issues, Usability, Technical, Development

1.0   Introduction

Nowadays, technology was playing an important roles in human being's lifestyle especially mobile device (Schweighofer & Heričko, 2013). A report shows that the ownership of mobile device was increase since 2010 and the number still increasing at this moment (Telstra, 2011). According to Telstra (2011), most of the users are more prefer use mobile internet on their smartphone and email, mobile internet search and social networking sites are visited most frequently by smartphone users. This tendency was created an opportunity in education field which is named as mobile learning (M-Learning) (Liaw, Hatala, & Huang, 2010). Mobile learning is a new trend in education field (Wu et al., 2012). Mobile learning is the combination of mobile computing technologies and e-learning (Vinu,

Sherimon, & Krishnan, 2011). This type of learning environment allow the learner to decide the timing or location by themselves. Besides that, learners also able to access the learning materials from mobile internet or downloaded mobile application (Schweighofer & Heričko, 2013; Telstra, 2011; Vinu et al., 2011). Mobile applications are widely use in several industry included retail, media, travel, healthcare, finance, social, business application and education (Schweighofer & Heričko, 2013). Thus, the reliable and work faultlessly of the mobile application is important to gain a user's trust to use the mobile application. Hence, the specification or functionality of mobile device should be consider before develop a mobile application. This paper discussed two factor of mobile device that needed to be consider before develop a mobile application. Two factors that discussed are usability and technical of mobile device.

2.0 What is mobile learning

Mobile technologies are now used widely in information and communication and this trend make more individuals to use mobile device in their daily life to connect themselves with others people and gaining information through mobile internet (Gedik, Hanci-Karademirci, Kursun, & Cagiltay, 2012; Ho & Syu, 2010). This also supported by Goggin (2006) that the increasing use of mobile device such as smartphone, tablet or iPad is a trend in international phenomenon. This phenomenon created the opportunity in development of mobile application. The development of mobile technologies able the users to link with mobile application store such as Apps Store for Apple and Google Play for android, through internet and download variety of applications for free (Ho & Syu, 2010). Mobile technologies also able to integrated in education field and named it as mobile learning (M-Learning) (Bidin & Ziden, 2013). Mobile learning can defined as any sort of learning that happens at anywhere and anytime when learner use the functions of mobile technologies to take its advantages in learning opportunities by using a tiny, portable and independent device named mobile device (Bidin & Ziden, 2013; Vinu et al., 2011). Besides that, mobile learning emerge or link individuals or a group of people by using mobile application to conduct learning session or discussion (Bidin & Ziden, 2013). Thus, mobile device and mobile application needed to conduct mobile learning and there are many types of mobile device sell in the market. Selection of mobile device to use in teaching and learning process is important because some of the mobile application may not able support the mobile device (Bellman, Potter, Treleaven-Hassard, Robinson, & Varan, 2011; Economides & Nikolaou, 2006). Therefore, the characteristic of mobile device is important in teaching and learning process and also development of mobile application.

3.0 Characteristic Of Mobile Device

There are two characteristic of mobile device discussed in this paper. The characteristics of mobile device is important because this allow the teachers to choose the suitable mobile device to integrated in the subject (Economides & Nikolaou, 2006). Besides that, there are some criteria need to be consider when purchase mobile device which is usability of mobile device and technical of mobile device. The figure as below illustrates the characteristics of mobile device.
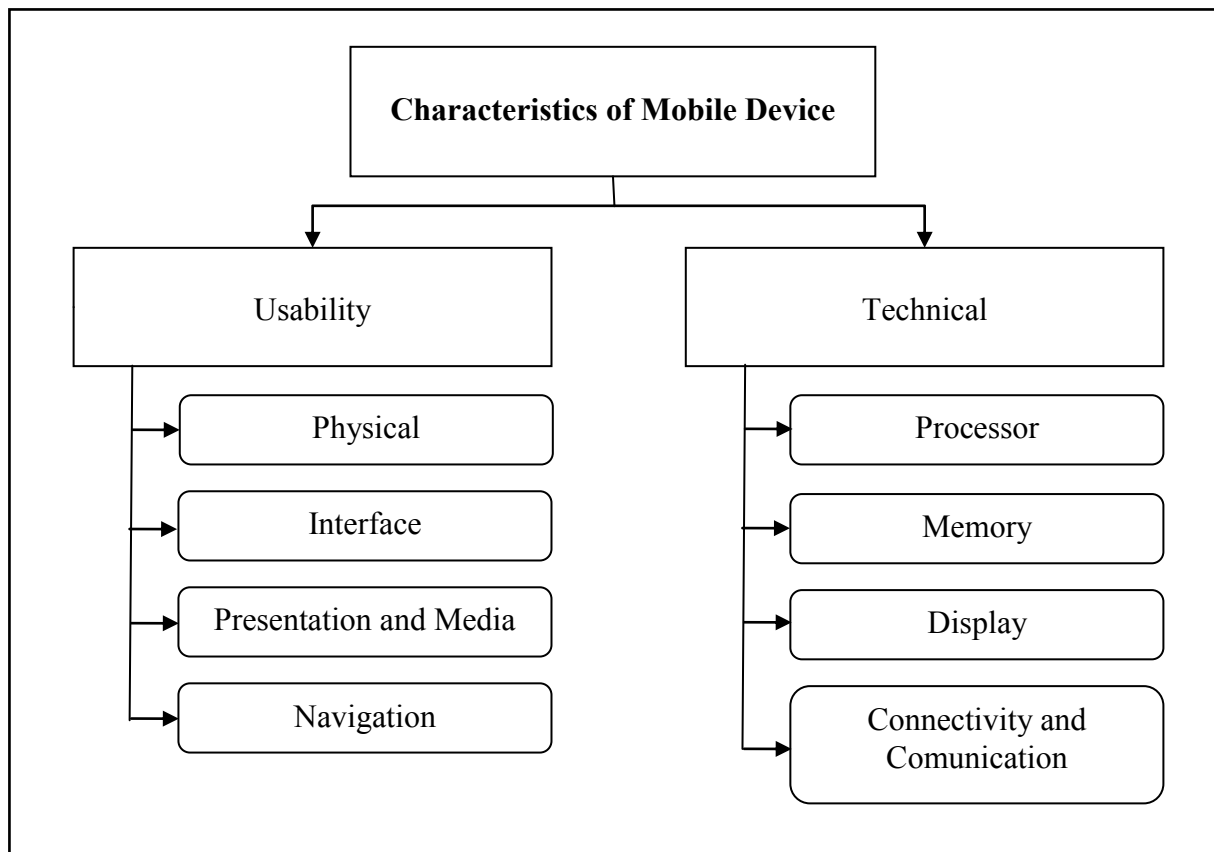
Figure 1 Characteristics Of Mobile Device

3.1 Usability

Usability of mobile device can be defined as the easiness of understanding, learning, remembering and using the device and the tools (Economides & Nikolaou, 2006). Integrated mobile device in teaching and learning is a new trends in education field (Lee Boon Kiat, Noor Dayana, & Halijah, 2015a) because mobile device able to enhance the teachers' teaching technique and have the significant result in learning achievement (Chiong & Shuler, 2010; Falloon, 2013; Vinu et al., 2011). According to Economides and Nikolaou (2006), there are four characteristics are categorized as usability of mobile device which are physical, interface, presentation and media, navigation.

Mobile device is a fundamental infrastructure to support mobile learning (Bidin & Ziden, 2013). Most of the mobile device especially smartphone PDA are designed in small size, moveable and autonomous to have better mobility ability (Bidin & Ziden, 2013) except tablet have the bigger physical size (Oostveen, Muirhead, & Goodman, 2011). Due to this characteristic, mobile device can be used anywhere, anytime and easy to carry because the physical of mobile device is small. This is aligned with Thornton and Houser (2004) that in japan, there are majority of the students carry mobile phones in university campus for composing or reading email. Mobile device is lighter and the size is smaller than books and this enable the students for take note when they having their lecture or class directly into the mobile device (Hashemi, Azizinezhad, Najafi, & Nesari, 2011). Thus, the interface layout such as button, menus, toolbar must be fully utilized to achieve the educational tasks. For an educational mobile application, the interface layout and the mobile device should be friendly to use for the users to increase the opportunity to participate in every educational activities that organized by teachers and students (Economides &

Nikolaou, 2006). Since the interface of a mobile application should be fully utilized in a mobile device, the presentation of the information also has close relationship with interface design (Economides & Nikolaou, 2006). The well presentation of the media or information able to encourage the learner to participate in educational task and it also able to increase the motivation in study (Wu et al., 2012). The ability of mobile device to display the multimedia such as pictures, audio and video is important because this can enhance the understanding of the content by the students and also help the teachers to explain some subjects which are need the video for the explaination (Lee Boon Kiat, Noor Dayana, & Halijah, 2015b). To enhance the teaching and learning process by using mobile application, the design of navigation in an application also important because the navigation is one of the factor to engage the students in learning and encourage them to exploring the application (Economides & Nikolaou, 2006; Lee Boon Kiat et al., 2015b). The flowchart of navigation should analyze and well design because it might be used to provide the process of scaffolding to lead the students to explore or engage the students to certain subject or topics.

3.2   Technical Of Mobile Device

The mobile application that developed should able to install in all the mobile device. A high performance mobile device able to support a lot of applications and it also allow the users to use the functions of mobile device in several ways (Economides & Nikolaou, 2006; Hashemi et al., 2011). Before develop a mobile application, there are some parameters of the mobile device need to be consider such as processor, memory, display, connectivity and communication (Economides & Nikolaou, 2006). The more powerful of processor ability able to improve teaching and learning process because it enable the mobile device to perform multiple task with consume low power and fast responding to the interaction between teacher and mobile device. Besides that, the capacity of memory of mobile device also need to be consider when develop mobile application because usually the operating system is stored in read-only memory (ROM) and the random access memory (RAM) to process the file. However, currently most of the mobile device are integrated with expandable memory slot for addition storage memory incase the storage memory is insufficient. There are several studies stated that mobile device restriction on screen which is the size of the screen is too small (Hashemi et al., 2011; Nordin, Embi, & Yunus, 2010). However, the technology is getting advance and solved the screen size restriction problem by launch the product named tablet which has bigger screen compare with smartphone (Oostveen et al., 2011). Some of the subjects are required bigger screen for better view and also allow the students to share a tablet in group discussion. Lastly, the developed mobile application should support the connectivity and communication functions such as Wi-Fi and internet to connect and communicate with other devices or individual and groups. Connectivity and communication function able to extend the information of the mobile application by using internet (Ozdamli & Cavus, 2011). This is important to encourage the students in discover and determine their learning style.

4.0   Discussion

Mobile learning is a new trend in education field. Integrated mobile device in teaching and learning can help the teachers to achieve the teaching objective with more effective and efficient (Lee Boon Kiat et al., 2015b). Besides that, integrated mobile device in teaching and learning process also can encourage and motivate the students to stay focus in class and increase their interest toward the subject that taught by teachers (Lee Boon Kiat, 2014). Hence, mobile device play an important roles in teaching and learning process when teacher conduct mobile learning in classroom. At the same time, the characteristics of

mobile device that use in teaching and learning also need to be consider. This paper discussed two characteristics of mobile device which are usability and technical of mobile device to develop a mobile application in teaching and learning purpose. There are four sub-characteristic of usability deliberated which are physical, interface, presentation and media and navigation. The size of mobile device especially smartphone is manufactured in small size and light weight. As mentioned, the size and weight for mobile device is lighter and smaller than books. Meanwhile, mobile device is more easy to carry out and use at anywhere and anytime. However, when mobile device manufactured in small size, the screen of mobile device also become smaller and this may become an disadvantage to use in teaching and learning purpose by using educational mobile application. So, the interface of the mobile application should be designed well in term of buttons, menus and toolbars. The developer should fully utilize the screen space to design the interface. Besides that, well designed interface may encourage the teachers have more motivation in teaching process and also engage the students' interest in that subject. The presentation and media that used in design mobile application also need to organize well. The media that used in mobile application should easy to read and view. There are some media that able to help in teaching and learning process such as pictures, audio and video (Lee Boon Kiat et al., 2015b). The flow of the mobile application play important role to encourage the students to explore the application. The flow of content should develop in scaffolding method, simple and easy structure. When teachers and students are use the application, they may easy to navigate to the content in mobile device.

Second characteristics if mobile device that discussed is technical. When develop a mobile application, the technical of mobile device need to be consider because the mobile application that developed should supported by all types of mobile device. There are some criteria need to be consider which are processor, memory, display and connectivity and communication. The processor is important because some of the mobile application only supported by high performance processor such as 3D mobile application. The mobile device which have low performance of processor may delay the teaching and learning process. So, the developed mobile application should be in moderate level to allow the application use in every types of mobile device. Capacity of memory for mobile device also important because some device need to install several mobile application and file storage for teaching and learning purpose but has insufficient memory. Fortunetaly, most of the mobile devices are integrated with memory expand slot (Economides & Nikolaou, 2006). Teachers are able to store some related pictures and videos in mobile device and show to the students during class. However, the size of the screen may not big enough to show to the students especially use smartphone. This problem able to solve when the tablet was introduce in teaching and learning process. Tablet have bigger screen compare with smartphone (Oostveen et al., 2011). Lastly, the mobile device that use in teaching and learning purpose should have the function of connectivity and communication to the Wi-Fi or internet so the teachers and students are able to search the information or connect with others individual at anywhere and anytime. On the other hand, mobile application also should designed to able expand the information by using internet. For example, the educational application provide video link in Youtube for more information.

5.0   Conclusion

Today, the mobile technologies is getting advance. Mobile technologies is not longer just for call and send message purpose only but also use as communication or connect with huge group of people. Besides that, mobile technologies also used in education field. Mobile learning is a type of teaching method which make educational activity integrated with mobile technologies to facilitate, support, enhance and extend of teaching and learning (Hashemi et al., 2011; Holzinger et al., 2005). This paper also discussed the factors of develop mobile application in education and characteristic of mobile device. There are two factors

mentioned in this paper which are usability and technical of mobile device. Each of the factors able to effect the teaching and learning process when the mobile application is developed not meet the criteria of usability and technical of mobile device. The teachers and students need to choose the better performance of mobile device because the mobile device may support more application in teaching and learning process. This paper also may help the researcher who plan to develop mobile application and give some idea in mobile application development in term of system criteria requirements. Table 1 shows the recommendation of technical mobile device.

Table 1 Recommendation of Technical Mobile Device

Hardware	Specfication
Processor	At least Quad-core 1.4 Ghz
Ram memory	At least 2 ram
Storage	At least 8 GB
Expansion	Microsd, up to 64 GB
Connectivity	Wi-fi, Bluetooth, USB
Network	At least 3G
Display	At least 5.5 inches At least 720x1280 resolution Touch screen
Camera	At least 5 megapixel
Features	SMS, MMS, Email, Browser Video recorder, Voice recoder MP3, MP4 Photo/ Video Editor Document viewer
Battery	Li-ion 3000 mah battery

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