

MOBILE DEVICES: TOYS OR LEARNING TOOLS FOR THE 21ST CENTURY TEENAGERS?

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ABSTRACT

Learning is interwoven in daily life and so it can be take place at anytime and anywhere by using mobile device. In the 21st century, mobile devices have become ubiquitous, affordable and accessible for the teenagers. The teenagers have the opportunity to perform the learning activities by using the mobile devices. However, what are they used their mobile devices for? Many quantitative studies have been done for investigating the perception of technology use in education, but the studies done do not specifically focus on the use of mobile devices into ubiquitous learning by the teenager especially in Malaysia. Therefore, this research is conducted to obtain an in depth understanding of the usage pattern of the teenagers on their mobile devices and to clarify to what extent they used the mobile devices in performing learning activities. The study also analyzes the factors affecting the teenagers from using mobile devices to perform learning and provides a snapshot of how the teenagers perceive the use of mobile devices qualitatively. The study shows that teenagers possessed positive attitudes towards using mobile devices in performing ubiquitous learning. The teenagers perceived that the mobile devices can be used for gaming, entertainment as well as learning because they are very convenient, fast response and easy to use to access to knowledge of information. However, using mobile devices to perform ubiquitous learning is much depends on the individual's preference, interest and self-motivation. Learning facts, languages and skills using mobile devices are the most preferable activities among the teenagers.

Keywords: Ubiquitous learning, mobile devices, teenagers

INTRODUCTION

With the development of Information and Communication Technology (ICT), everyone has the opportunity to explore in the world that is full of information by using various types of technology devices. The role of these technology devices also could not be neglected. According to Fabunmi (2012), ICT is now the modern means of improving teaching and learning in the education system. At the same time, Livingstone (2012) also agreed that both educational institutions and homes, information and communication technologies (ICT) are widely seen as enhancing learning.

According to the reports on global ICT trends in the year 2012, 92% of the world's population now has a mobile phone (ITU, 2013) and 78% of the teenagers from age 12 to 17 own a cell phone and almost 50% of them indicated that their phone is a smartphone (Lenhart, 2013). The ubiquitous availability of these portable devices has changed the learning methods and learning strategies of today's teenagers. In the MNC Horizon Report 2012, there is a research indicates that the tablets are the foster key to 21st century skills in education which includes creativity, innovation, communication, and collaboration in students due to the design of the device that make the user easily to share their screens (Johnson, Adams, & Cummins, 2012). This has shown that the teenagers in this mobile-technology era can perform ubiquitous learning easily. They can simply gain access to the information and content from different resources in the web. Furthermore, the teenagers have more variety of choices to obtain knowledge and information. Hence, this study is conducted to analyze the usage pattern of the teenagers and also to provide a snapshot of mobile and ubiquitous learning in the 21st century.

Problem Statement

Various studies have investigated student's readiness, attitude and perceptions towards mobile learning by using quantitative method (Al-Fahad, 2009; Donaldson, 2011; Rahamat, Shah, Din, & Aziz, 2011) or examining the challenges and opportunities of mobile devices supporting teaching and learning in a designed learning context (Cobcroft, Towers, Smith, & Bruns, 2006; Serrano-Santoyo & Organista-Sandoval, 2010). Most of these researches are mainly focus on the study of formal learning. However, qualitative research on identifying teenagers' perception on using mobile devices as educational tools for ubiquitous learning is yet to be conducted. Thus, the research is carried out to investigate teenagers' preference and perception of using mobile devices in ubiquitous learning. As the trends go by, the technology has been emerged onto the students' daily life. Most of

the students are known as digital natives and the research is ought to be carry to listen to the students especially the teenagers in school who is so close with the technology. With the ubiquitous availability of these portable devices, to what extent the teenagers are using these devices to perform their learning is still unknown. Thus, this study creates a better understanding of identifying the influencing factors of integrating mobile devices as learning tools by the teenagers.

Research Objectives

The purpose of this study is to explore teenagers' perceptions of learning and engagement that occurs as a result of using mobile devices in performing ubiquitous learning. The specific objectives are stated as follows:

- i. To figure out the level of usage of mobile devices by teenagers.
- ii. To observe and track the usage pattern of teenagers using mobile devices.
- iii. To explore the experience of teenager using mobile devices in ubiquitous learning.
- iv. To identify the influence factors towards the teenagers' attitude of using mobile devices in ubiquitous learning.
- v. To identify methods of acquiring knowledge of information by using mobile devices.

Research Questions

The specific research questions are stated as follows:

- i. How often the mobile devices are used by the teenager?
- ii. What is the usage pattern of teenagers using mobile devices?
- iii. What experiences do teenagers have in using mobile devices in ubiquitous learning?
- iv. What are the stimulating and deterring factors influencing teenagers' attitude in using mobile devices to perform ubiquitous learning?
- v. What are the methods used by teenagers in acquiring knowledge of information by using mobile devices?

Limitations of the Study

The study has the following limitations that can be remedied in future research:

- i. This study is geographically limited to Penang State, Malaysia.
- ii. Response is limited by the participants' willingness to honestly self-report and ability to reliably recall.
- iii. The results come from a single community and may not be generalized to another community.

LITERATURE REVIEW

The Trends of E-learning, M-learning and U-learning

The development of the ubiquitous learning (u-learning) is related to e-learning and m-learning. Dochev & Hristov (2006) identified that the ubiquitous learning is tightly connected with the general e-learning progress. According to Yahya et al. (2010), the advancement of computing and communication technologies have promoted the learning paradigms from conventional learning to electronic learning (e-learning), from electronic learning to mobile learning (m-learning) and now it is evolving to ubiquitous learning (u-learning).

The E-learning

Garrison (2011) pointed that the term 'e-learning' has come into use in the mid-1990s along with developments in the World Wide Web and interest in asynchronous discussion groups. In late 1990s, e-learning is formally defined as electronically mediated asynchronous and synchronous communication for the purpose of constructing and confirming knowledge. The technological foundation of e-learning is the internet and associated with the communication technologies. With the development of technology, the abundance of resources and relationships made easily accessible via the internet. Wikis, Educational Blog, Virtual World and Podcast are the tools of Web 2.0 providing a platform for the development of e-learning (Gaiyert, 2008).

The M-learning

Taylor (2011) identified that mobile technologies has changed the practice of many people's social life compared to the previous ICTs due to the reason of the previous ICTs were not so intimately connected to the trajectory of a person's social live. This has shown that, the innovation of mobile technologies has made mobile devices become a part of individual's daily life. In the last decade, the ICTs is only used in classroom, however, with this dramatic change in mobile technology, it promotes a new way of learning which mobile learning is. Through the mobility of the devices, learners can perform their learning at anyplace and anywhere. As similar to the view of Pegrum (2013), a mobile handheld device makes m-learning and e-learning qualitatively different. This can be observed through the nature of these mobile devices, they lead to an expansion of the spaces and times of learning, where the students can perform their learning outside the places of formal education and also the hours

of formal timetables. Besides, mobile learning can also be integrated with non-learning activities such as shopping or entertainment (Sharples et al., 2005).

The U-learning

According to Lyytinen & Yoo (2002), the evolution of ubiquitous computing has been accelerated by the improvement of wireless technology and the flexibility of the technology. In general, a widely accepted definition of mobile learning is using mobile technologies to facilitate learning while a popular definition of ubiquitous learning is emphasizing on the learning context where learning can happen at anywhere and anytime with the ubiquitous tools (Hwang, Tsai 2011).

Tsai (2011) indicated that ubiquitous learning is usually defined as an education system that uses the technologies of ubiquitous computing, wireless communication, mobile devices and context-aware technologies in an educational context. Therefore the u-learning placing less emphasis on mobility and contextual independence, but it is more emphasis on the contextualized and situated learning that mobile devices can be provided (Pegrum et al., 2013). In general, Yahya, Ahmad, Jalil & Mara (2010) and Hwang & Tsai (2011) defined that u-learning is using mobile devices as the learning tools in accommodating learners' learning style regardless of the constraint of time and space. Thus, in other words, ubiquitous learning can be defined as the application of mobile technology in the learning process at anytime and anywhere.

Mobile Devices and Ubiquitous Learning

Lee, Lee, & Kweon (2013) indicated that mobile devices can be used to deliver digital textbooks and other educational content to students at anywhere and anytime, and they can effectively contribute to the early growth of ubiquitous learning in education. Besides, Devaney (2012) discovered that the students used mobile technology in school for creating presentations and media, play educational games, and conduct virtual experiments. These activities are more to self-directed and self-paced learning and thus it shows that mobile learning can be used to support micro-learning as long as the learning resources are well-designed and developed (Yuan & Guo, 2013).

The Usage Pattern of Mobile Devices by the Teenagers

Rideout, Foehr and Roberts (2010) highlighted that over the past five years, the ownership of laptop, cell phone and iPod has increased dramatically. Research has shown that majority of young people now carries devices on which they play games, listen to music, and, in many cases, connect to the internet and watch videos (Rideout, Foehr, & Roberts, 2010). Both *NMC Horizon Report (2012 K-12 Edition)* and Rideout, Foehr and Roberts (2010) have identified that mobile devices become one of the primary ways that the teenagers interact with and learn from each other and rapidly cemented its place as a media delivery platform for young people. Moreover, Lenhart (2013) also found out that the smartphone adoption among the teenagers has increased substantially and mobile access to the internet is pervasive in the *Teens and Technology 2013 report*. In the case study, Vahlberg (2010) summarized that the list of activities of teenagers go online which included commenting on friends' pictures on social networks, commenting on friends' pages or walls, sending private messages on social networks, going online to obtain news about current events and politics, sending instant messages or text messages on social networks, buy things online and sharing content. The finding has shown that cell phone and internet have become ubiquitous in teenagers' daily life.

The Use of Mobile Devices in Learning by the Teenagers

Smartphones, tablets and other mobile devices become ubiquitous and are overtaking desktop PCs in popularity, especially with younger users (Pelleg, Savenkov&Agichtein, 2013). Pegrum, Oakley and Faulkner (2013) claimed that a key advantage of smartphones is that many students today already own these devices and carry them with them at all times.

As summarized by Oblinger (2003), the key traits of today's students as being digitally literate, 'always on', mobile , experimental and community oriented (Cobcroft, Towers, Smith, & Bruns, 2006). These students are born in the technology-era, hence, they explore, adapt and use the technologies in different kind ways. Indirectly, the pattern of learning for the generation of digital native has moved towards into the trends of ubiquitous learning and self-paced learning if they integrate the mobile devices into learning. However, to what extent the mobile devices use for ubiquitous learning by the teenagers is still unknown.

Recent research shows the interest in the use of application of mobile learning. According to Petrova and Li (2009), mobile learning has attracted significant research interest in recent years, the research topics includes the theories underpinning learning design and factors affecting learner experiences and influencing mobile learning adoption including social interaction. Besides, some of the researchers have shown the interest in studying the

acceptance and engagement of students towards mobile learning in higher education (Al-Fahad, 2009; Donaldson, 2011; Jairak, Praneetpolgrang, & Mekhabunchakij, 2009; Martini, 2011; Rahamat, Shah, Din, & Aziz, 2011).

Many researchers focus on mobile learning while some researchers have started to investigate the ubiquitous learning over the past few years but the studies were mainly focus on the ubiquitous learning with the context aware support system in designing an environment (Hwang, Yang, Tsai, & Yang, 2009; Jones & Jo, 2004; Ogata & Yano, 2004; Yang, 2006). Although there are some research studies shown that the major usage of the mobile devices among teenagers (Lenhart, 2012; 2013), but little research appears to have an in-depth understanding of teenagers' usage pattern and preference towards the mobile devices in learning. In the meanwhile, research has not examined the perception, attitudes and acceptances towards integration of mobile devices into ubiquitous learning by teenagers. Besides, most of these researches employed the quantitative method in acquiring the outcome. With the innovation of technology, ubiquitous learning by mobile devices has become common and learning can happen on every individual but there was still little qualitative research has done to identify the determinants for teenagers use and preference of using mobile devices in ubiquitous learning.

Perception of Mobile Devices in U-learning among Teenagers

Learning cannot be separated but interwoven from other daily activities. These daily activities include conversation, reading or watching television and they can be the resources and context for learning (Sharples, Taylor et al., 2005). Based on the research conducted by Bay'a and Dahir (2009), learners perceived the uses of mobile devices in learning as playful, dynamic and in the nature, moreover, the learners have the opportunity to explore the learning subject independently as well as through the collaboration of team work. Besides that, based on the study done at the Saudi Arabia University by Al-Fahad (2009), the majority of the student indicated that mobile devices with wireless network increase the learners' flexibility in engaging into various types of learning process, therefore, the mobile technologies are perceived as an effective tool in improving communication as well as individual and team learning.

Hussain and Adeeb (2009) also identified that students use different kinds of portable technologies and devices that promote mobility and flexibility in terms of time and place. The study from Rahamat et al. (2011) confirmed that students are technologically, economically and competently ready with the use of mobile technology in their learning.

From the article of eSchool News, Devaney (2012) stated that students preferred personalized learning with the use of mobile technology. In practice, Malaysia has little qualitative research on the teenagers' perception and attitudes on using mobile devices in performing the ubiquitous learning which is more to self-oriented learning.

METHODOLOGY

The research used qualitative method with supporting by quantitative data. The quantitative method has been used in figuring the level of usage and usage pattern of the teenagers using mobile devices in a certain period of time. The quantitative data is used for supporting the qualitative evaluation for each individual. The qualitative method is focused on subjective and perceptual aspects of the teenagers' personal background and self-related experience in using mobile devices and how they integrate the mobile devices into learning process which this research is mainly focused on. Furthermore, in order to gain the necessary insights into the process of integrating mobile devices into ubiquitous learning, particularly at the interface between the subjective and the background and experience of the teenagers, the qualitative method is selected for the study.

Research Design

The research has been carried out in Penang state, Malaysia. Six teenagers have been invited to take part in the study. They are of different gender from three age groups, which are 13, 15 and 17. Each participant has been engaged in two semi-structured interviews separately. The semi-structured interview will allow the participants to bring out new ideas during the interview. However, an interview questions which is in accordance with the research objectives and research questions has been prepared in advance as the outline to follow in the interview session. The interviews have been recorded by audio recorder with the participants' permission and then transcribed verbatim.

Research Procedure

Two sessions of interview have carried out. Six participants have been interviewed by the researcher for between forty minutes to one hour separately in each session. All interviews have been recorded by notes and recorder with the permission of the participants. The first session of the interview reveals the background of the

participants, figures out the level of usage on mobile devices and identifies their experience towards the use of the mobile devices in performing learning.

After the first interview session, the participant is required to learn how to use prezi by using their mobile devices. Besides, the daily activities checklist has been given to the participants to fill about their daily activities and how much time they spent on the mobile devices in a week. Participant daily activities checklist was to track the usage pattern of the participants in a week using mobile devices.

The second interview has been carried out to investigate each of the participants' perception of using mobile devices in performing their learning tasks assigned after a week. The participant has been required to explain the method they used in performing the learning tasks assigned and showed how they understand the process of learning by using mobile devices with an explanation and demonstration. From this session, the study of the deterring and stimulating factors and attitude towards using mobile devices in ubiquitous learning and the methods of acquiring knowledge of information by using mobile devices have been identified. After the interviews, the recordings have been transcribed into the computer files. The data have been interpreted manually.

Instrumentation

A list of 22 interview questions has been prepared. The interview questions have been categorized into two sessions. First session consists of four parts: (A) demographics; to understand the background of the participant by asking the participant fill in the participant background checklist, (B) ownership, accessibility and level of usage, (C) usage pattern, (D) experience .The second session of the interview consists of two parts: (E) attitudes towards the use of mobile devices in ubiquitous learning and (F) method used.

The participant's background checklist and daily activities checklist were the second instrument to collect the data to identify the participant background and to figure out the level of usage quantitatively. From the daily activities checklist, the learning activity and non-learning activity are observed.

The instruments have been verified by the experienced lecturer from a higher education institution with at least 8 years of teaching experiences in the field of teaching English language. The pilot study has been conducted to prove the validity of the instrument in the study. Two participants were invited to take part in this study. This is to show and prove the reliability and validity of the instruments.

DATA ANALYSIS

There were six participants took part in this research and their gender and age can be seen in Table 1.

Table 1: Category of participants

Age	Male	Female
13	Participant A	Participant B
15	Participant C	Participant D
17	Participant E	Participant F

Five participants claimed that they own at least two mobile devices in their home. Majority of the participant agreed that owning a mobile device is a need in the 21st century. However, the frequency of the usage varies among the participants. All of them claimed that they had the experience of using the mobile devices in performing learning for at least a year. Four participants claimed that they used mobile devices to learn were mainly driven by their curiosity. Three of the participants used mobile devices to look for the things they interested in and some participants used mobile devices to perform some hobby-related learning tasks. Non-learning activity performed by the participant is slightly higher than the learning activity using mobile devices among the participant. The non-learning activities included use social networking site or instant messenger for chatting, check emails, read news, play games, listen music and watching video. However, the activities done for non-learning tasks are varied. The level of usage among the participants can be seen in Table 2.

Table 2: Level of usage among the participants

Participant	Use of mobile devices			Comments
	Total hours spent (hours)	Learning activity	Non-learning activity	
		Level of usage (%)		
A	65.9	0.3%	99.7%	Use for social networking especially chatting with friends
B	40.8	7.4%	92.6%	Use for gaming and search for information
C	17.7	17%	83%	Use for multitasking
D	57.3	37.5%	62.5%	Consistent ubiquitous learner and also use for multitasking
E	24.4	6%	94%	Use as communication tools and look for news
F	26.4	51.1%	48.9%	Consistent ubiquitous learner and social networking

The level of usage of mobile device in learning activity for participants D and F are high among the six participants. Whereas for the participant A, the level of usage was extremely low. The level of usage in learning activity for Participants B and E were low too. On the other hand, Participant C who use the mobile device for multitasking was slightly higher than participant B and E.

Differences between male and female participants

It has been found that three of the male participants shown low usage of using their mobile devices in performing ubiquitous learning compared to the female participants. Two male participants used the mobile devices for communicating and social networking purpose. Another male participant showed low usage of mobile devices in all type of activities. In the meanwhile, the level of usage for three female participants ranged between medium to high for both learning and non-learning activities. Two of the female participants were the ubiquitous learner. For the eldest participants, both affirmed that they will share their content knowledge with their friends because they think that it is good to share and wanted their friends to know and being knowledgeable. However, for the rest of the participants, they said that they will not share what they learned because they thought that their friends may not be interested in the content of their learning and thus learning by using mobile device is considered as personal activity.

Similarities between male and female

From the observation, YouTube, Google and Wikipedia are the most preferable website for the participant to learn and to obtain information. As such, all the participants used their mobile devices to access to these websites in helping them to perform assignments and projects in school due to its conveniency. Besides, four participants spent relatively more hours on Sunday. It has been found that high frequency of usage also been observed on a Friday or weekends. Friday is the last day of school in a week, hence, without the time constraint teenagers spend most of their free time in using mobile devices during Friday and weekends. A female participant spent 6 to 8 hours in performing the learning activities using mobile devices during the weekends. This was the longest hour spent in learning activities among the participants. For the rest of the participants, who performed learning by using mobile devices, they just spent one to two hours per day on the learning activities. This has shown that some of the teenagers' concentration on learning using mobile devices is relatively short compared to other activities.

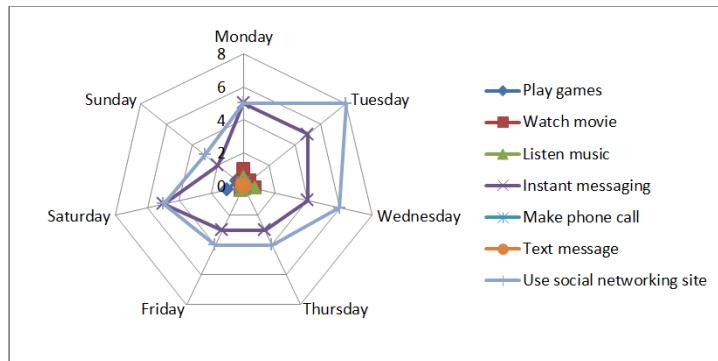
Participant A


Figure 1: Usage pattern and level of usage by participant A

From the findings, participant A was a passive learner. Participant A spent an average of nine hours using mobile devices in a day. He only played games during the weekends as gaming was only allowed by his parents during the weekends. He watched videos, logged into social network sites, and instant messaging every day. He spent very long hours in these activities. Besides, he spent relatively much time on chatting with friends by using Facebook. He downloaded dictionaries which were “English-Chinese dictionary” and “Urban dictionary” to learn new vocabulary. This is the only learning activities performed by him using mobile devices. From the findings, participant A only used the downloaded dictionary once in a week to check on new vocabulary. In general, participant A used his mobile devices for gaming, entertainment and social networking purpose.

Although participant A spent very little time in performing learning activities using mobile devices, but he perceived that he learned vocabulary and general knowledge from the games he played using his mobile devices. One of the games is GTA gaming (Grand Theft Auto). It is the video game series and the series is set in fictional locales heavily modelled on American cities. Participant A claimed that he learned the name of a few American cities through the game. Besides, the game “Romance of the Three Kingdoms”, it is a series of turn-based tactical role-playing simulation grand strategy war games enable him to understand and learn the history of the three kingdoms in China during the period of A.D 220-280. Furthermore, from the DOTA (Defence of the Ancient), he claimed that he had learned many new English vocabularies from this real time strategy video game. Although gaming is being labelled as non-learning activity in the first place, however, from the findings, it can be observed that an individual can learn from games in the mobile device.

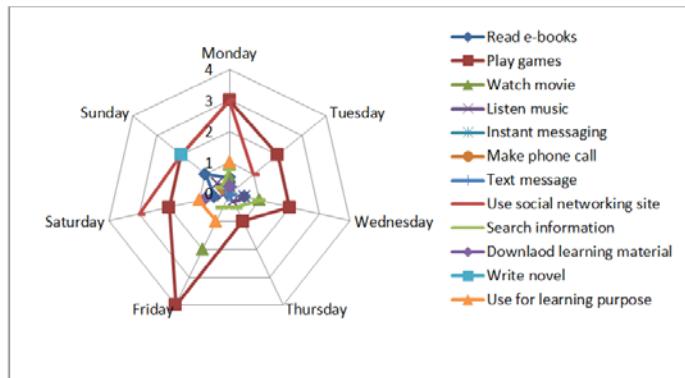
Participant B


Figure 2: Usage pattern and level of usage by participant B

Participant B spent an average of five hours using mobile devices daily. The level of usage is relatively high on Friday to Monday. Participant B used mobile devices for different kind of tasks. She spent most of her time in gaming and social networking sites. The main activity performed by her using mobile devices was playing games. She only performs ubiquitous learning in three days in the week and two of the days were on the weekend.

Participant B likes to use her mobile devices because the mobile devices can perform all types of tasks she wanted. She perceived that learning can happen as long as she is interested. She said that “*For me, learning can*

be at anytime and anywhere.... From reading e-books, I can see the improvement in my English subject in school...I learned how to make rabbit cage, how to design bottle from YouTube video.... From the lyrics of the music, I learned English and Korean Language... Besides, it (mobile devices) helped me to translate the words that I don't know. From the findings, mobile devices have prepared a good platform for her to perform her ubiquitous learning especially watching YouTube video to learn certain drawing techniques. She claimed that this has not been taught by the school teachers. Besides, the mobile devices enable her to perform school project easily because knowledge of information are all time available online. She is interested in writing novel and reading others novel from a website named "Fan fiction". She claimed that from this website, she can practice her writing skills and improve her English grammar through reading.

Participant C

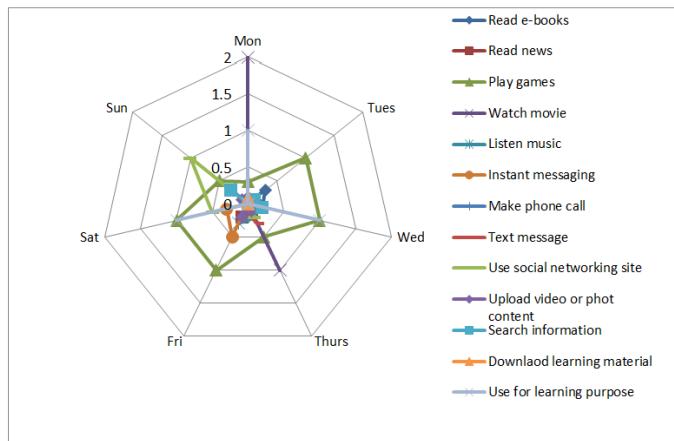


Figure 3: Usage pattern and level of usage by participant C

The main activity that constantly performed by participant C is using mobile devices to play games. Participant C spent around two hours daily using mobile devices. Participant C fully utilized the function of mobile devices by performing various tasks even though the time he spent on mobile devices is relatively low compared to other participants. This is because his parents only allowed him to use mobile devices for few hours per day. In addition, the time spent on ubiquitous learning is relatively low and he only performs it on selective days. Most of the activities done by participant C were within 30 minutes. He spent the longest time in watching video form YouTube and he mentioned that he subscribed to a few entertaining videos on YouTube.

He is interested in science and the universe, hence mobile devices enables him to learn the facts by searching the knowledge of information online. He blended the formal and informal learning by using mobile devices. He used the mobile devices to complete the school project. Besides, he used mobile devices to look for information and knowledge clarification if he found any doubts in his study especially on science subject. In addition, he downloaded e-books to read as he thought that books are expensive and downloaded e-books are free of charge. He was affected by his friends two years ago where owning a mobile device is a need for him as he would like to be an "up-to-date" teenager.

Participant D

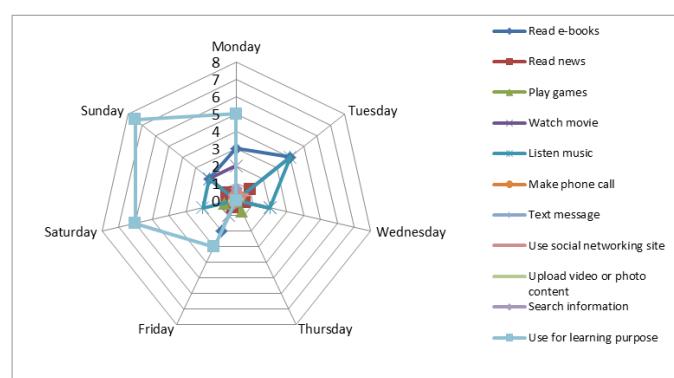


Figure 4: Usage pattern and level of usage by participant D

From the findings, participant D is an active learner by using mobile devices. She also used her mobile devices to perform various tasks. Participant D spent around five hours daily using mobile devices. Her usage was relatively high during the weekends. She spent most of her time in performing learning using mobile devices especially from Friday to Monday. Besides, she spent around two hours in performing non-learning activities in other days.

The learning activities she performed by using mobile devices are learning broadcasting skills through a website named “YYyuyin”. It is a network-based voice communication platform. The teaching activities included singing, dancing and speaking. Participant D used this platform to learn the speaking and singing skills. She can interact with other online user and learn from each other through this platform. The online teacher will correct and comment on her tasks performed. This is where she felt the learning is happening and she learned the technique of broadcasting. She mentioned that *“From school, I learn nothing. Like the skill of broadcasting and drawing. Teacher doesn't teach the skills but just give suggestion on our work. I have to learn by my own. Through the mobile devices, I learned the skill of singing, health information, philosophy, history....and sometimes the knowledge wasn't even mentioned in my textbook.”* From the observation, participant D can perform the ubiquitous learning independently because of her motivation and interest; the learning task can be carried out at any time.

Participant E

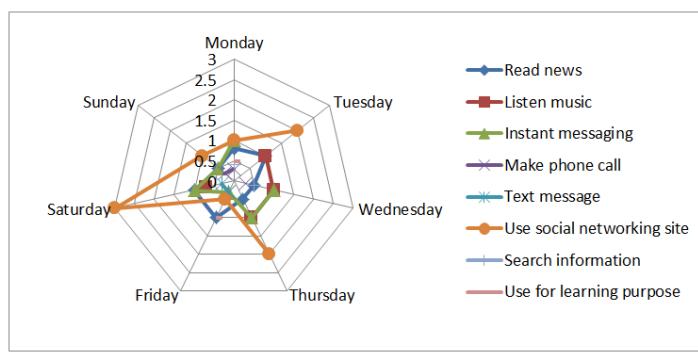


Figure 5: Usage pattern and level of usage by participant E

Participant E used his mobile device in messaging and social networking. His only mobile device was the smartphone. Participant E was the one who only owned one type of mobile device among the participants. He spent an average of two hours using his mobile device daily. He seldom used his mobile device to perform learning activities. He claimed that the only learning activity performed by him was searching information when he has some doubts in his study. Besides, participant E used Facebook as one of the tool for obtaining the news. He claimed that he has to read the sports news every day. He spent relatively long hours in social networking site on Sunday. The activities performed by him were chatting with friends and reading news.

Participant E perceived mobile device as a communication tool. He spent most of his time using mobile devices to chat with his relatives and friends. Besides, for learning related activities, participant E downloaded the dictionary apps where he needs it for translation purpose and learning new vocabulary. This is the only learning related activity performed by him using mobile device. Participant E explained that he had been using the mobile device to perform ubiquitous learning in the past few years, however; it has been maintained for a short period of time due to his lack of interest. The learning activity performed by him before was learned the origami through from the YouTube video.

Participant F

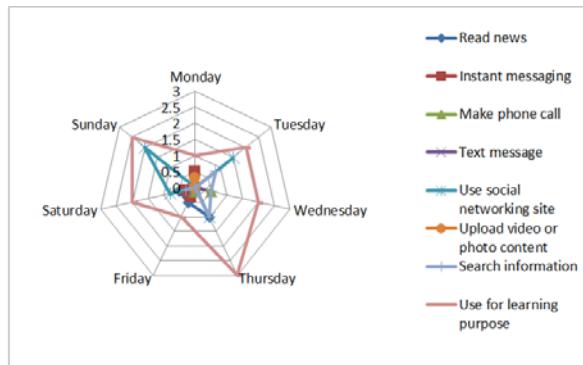


Figure 6: Usage pattern and level of usage by participant F

From the observation, it has been found that Participant F used her mobile devices to perform her learning consistently. She spent an average of two hours in using mobile devices to perform the learning activities. Although Participant F still uses the mobile devices to perform other non-learning tasks, however, she spends more hours in learning related tasks. Participant F subscribes to the Korean language learning apps and English idioms apps which will remind her to learn a new vocabulary every day. This has been shown that participant F is an active learner using mobile devices. She followed the “Let’s taking English” through a mobile application, and subscribed to daily idioms and vocabulary in order to receive a new words for her to learn every day. This has shown that participant F is a disciplinary and independent learner. Besides, she also downloaded the apps in her smartphone such as “Korean pronunciation”, “English Digest”, “Radio BBC” and some games related to learning.

Participant F claimed that using mobile devices to perform learning activities are very convenient. It meets her learning expectation and it is fun for her to perform learning using her mobile devices. However, she felt that the learning process can be easily distracted by other features from the mobile devices such as social networking sites. She was unable to concentrate on her learning unless she has strong determination of turning off the chat in the Facebook. Besides, she is quite annoyed when the internet speed is low and she found difficulty to perform the activities smoothly.

Summary of Findings

Figure 7 shows the summary of the usage pattern among the participant using mobile devices. At first, male participants used the mobile devices to perform learning were mainly due to their curiosity or influenced by their friends. However, for female participants, they used mobile devices in performing learning were due to their self-interest. As the age increase, self-exploration and motivation have become another factor that stimulates them to use the mobile devices to perform the learning. Participant B and C learned about the science facts and performing school project using mobile devices. Participant C and D used their mobile devices in performed different tasks. They were the pair who fully utilized the functions and features of their mobile devices. Participants A and E claimed that they learned from the games in their mobile devices. Participant C and E obtained news and information from the social networking site. The information and news were about the sports. Participant B and D used mobile devices to read and write a novel. Participant B read and wrote about the English novel whereas participant D read and wrote about Chinese novel. Both of them perceived that their language skills and writing skills have significant improvement. Participant D and E were the ubiquitous learner using the mobile devices. Participant D used her mobile devices to learn the skill of drawing and broadcasting whereas participant E used the mobile device to learn English vocabulary.

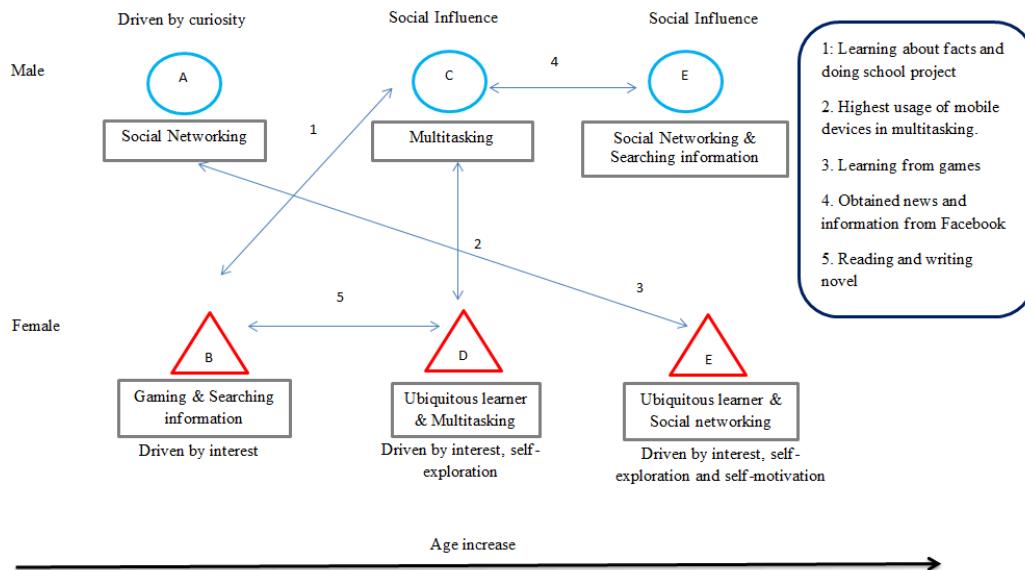


Figure 7: Interrelation of activities performed among the participants

Highlights

Total hour spent on the week in using mobile devices for a male teenager is relatively high among the participants. Most of his time spent on using Facebook or instant messenger to chat with his friends in groups. The content of the discussion is regarding to the daily activities performed in school. Besides, it has been observed that the trends have shifted from paid service especially using Short Message Service (SMS) to free downloaded apps. Participants preferred to use the free apps such as *Facebook* chat room, *whatapps* and *wechat* to chat with their friends. Making phone call using line service is only served for emergency purpose.

Using the laptop to read text is still preferable by teenagers instead of using the smartphones due to the screen size of the devices. Four participants agreed that the screen size of the laptop created a better reading experience for them compared to using the smartphone. On the other hand, two participants have the same viewpoint where using mobile devices reduce their concentration in learning. This is because the accessibility of social networking site downloaded games will distract them from learning.

All the male participants preferred teachers in schools compared to the use of mobile device in formal learning. Two of the male participants posited that learning through “face to face” interaction is better than using the mobile devices to learn. However, one female participant stated that not all school subjects can be learned using mobile devices. In the meanwhile, all participants agreed that learning by using mobile devices based on their interest is workable.

DISCUSSIONS

The perception of the participants

The majority of the participants still perceived and used the mobile devices as communication tools, gaming tools except for two participants who have started to integrate mobile devices into ubiquitous learning for more than 3 years.

Participant A claimed that the majority of his knowledge is learned from the school and had little ubiquitous learning experience using mobile devices but then the enthusiasm to learn only maintain for a few weeks. He perceived that he could not learn from the mobile devices by explaining that “*Face to face interaction with teachers is still important.....Teacher is there for you to explain and clarify your doubt. But for mobile devices, if you have any question, we cannot ask, they just ‘show’ you. Even though you can ask question, the response to your questions is not as fast as you ask directly from the teacher. If too many question posted, I don’t think they (the online host) will response to you one by one. I think I will still prefer the instantaneous response and learn through face to face from the teacher.*” This has shown that Participant A did not convinced by the use of the mobile devices to perform the learning.

Participant B pointed out that she can learn by using mobile devices based on her interest but she did not prefer to learn the school subjects by using mobile devices. She is more preferred on using books. This is because she

claimed that, the information obtained online may not be as detailed as in the books. However, for the learning based on her interest, she is more preferred to use mobile devices to learn. Mobile devices are used to support informal learning based on the participant's preference and interest.

Participant C perceived that the mobile devices can be used for multitasking and the response of obtaining information is very fast compared to using other resources such as looking for books in the library or waiting the feedback from the teacher.

Participant D claimed that she can learn almost everything by using mobile devices. "*I read novel... it improved in my writing skills... I practice my intellectual by playing chess and games on the Facebook.... I used to watch YouTube video... to learn the skills such as drawing and playing guitar....I learned pronunciation and broadcasting skills from YYyuyin....I used to listen to the song when waiting for bus.*" Through the informal learning by using the mobile devices, Participant D learned the skills and some other knowledge that she claimed that they could not be learned from the schools. However, these skills are one of the workforce demand skills. Thus, Participant D has prepared herself with those skills even though she is still in the secondary school. It shows that some teenagers are well-prepared with the work force demand skills when they are still schooling since the skills and information can be obtained easily as long as they possess the technology devices.

Participant E showed not much interest in using mobile devices to learn because he thought that learning is the activity which required human interaction. He is more preferred face-to-face learning rather than using mobile devices. Other than this reason, he pointed out that the screen size of his mobile device (smartphone) is small and it makes him difficult to view the text on the screen for a long period of time.

Participant F said that "*I did not feel any difficulties in using mobile devices to perform learning... Mobile devices have made good use of my free time.*" From the past learning experience, participant F perceived that mobile devices bring a lot of conveniences for her in terms of speed, time and its usability.

In short, participant's perceptions on the use of mobile device are the key factor that influences their decision in making use of the mobile devices to perform various types of activities. Besides, it can be found that some workforce demand skills such as languages, speaking skills and other technical skills has been learned and practiced by some of the participants through the ubiquitous learning.

The experience of the participants

All the participants spent most of their time using their mobile devices at home as their house has the internet service. However, it doesn't seem to be any problem for them to use mobile devices in performing the ubiquitous learning at home. The majority of the participants felt that using mobile devices to perform ubiquitous learning is comfortable and convenience. There was only one participant had negative experiences when using mobile devices to perform the learning. It has been found that, in the past, the participant A failed to look for a solution to his doubts regarding the computer knowledge and it has become a deterring factor for him from using mobile devices in performing learning. He claimed that sometimes he was unable to obtain answers or solution to his questions or doubts of his problems. He sometimes will suspect the validity and accuracy of the source of information. For the rest of the participants, they all have a positive learning experience by using mobile devices. They affirmed that they will use mobile devices to perform learning in the future.

Moreover, all participants have the experience of using mobile devices to learn new vocabulary or language. Some of them downloaded the dictionary apps whereas some use Google translate to look for the definition and pronunciation of the new words. From the findings of Chen (2013), it is also shown that mobile devices are an ideal language learning tools.

The attitude of the participants

Although the usage level and purpose vary among participants in using mobile devices, all of the participants possess a positive attitude towards using mobile devices in performing learning. The finding is correspond with the study done by Chen (2013) where teenagers have a positive attitude towards the usability, effectiveness and satisfaction of mobile devices because they are the generation that has grown up using these technologies. Besides, the speed of obtaining the knowledge and information is fast and the content of the knowledge is easily access to. These are the main concerns for the teenagers. For participant A, to his level of age, mobile devices did not play very important role in his learning but he still possesses a positive attitude in using mobile devices in learning in the future. Participant E perceived the usefulness of mobile devices as convenient and can bring them to anywhere as it makes learning happened regardless of time and place constraint as information can be obtained at any time. All participants claimed that they will feel uncomfortable when the mobile devices are not

with them for a long period of time. This has shown that mobile devices have become one of the important things in their daily life.

CONCLUSIONS

From the observation of this research, the participants had little experience of using mobile devices in performing learning. It has been found that using mobile devices to perform ubiquitous learning is much dependent on individuals. Learning is much depending on the individual's preference, interest and self-motivation. Participants perceived that ubiquitous learning is more towards informal learning, which is much depend on the participant's interest. From the findings, it has been shown that female participants are more active in using mobile devices in performing learning based on their interest compared to male participants. Male participant is more depend on teacher or instructor in performing learning. On the other hand, female participants are much independent when the learning tasks are related to their interest.

Besides, mobile devices do not only support informal learning especially learning based on individual's interest but they are also used to support formal learning such as performing school project and finding extra information about the subject in order to get more clarification in the study. Teenagers can look for other alternatives as the source of information. However, the disadvantages of using mobile devices were the screen size of the mobile devices is small and the learners are easily distracted by the features embedded in the mobile devices especially games and social network site. The learners are unable to concentrate on their learning tasks.

The initial method used by teenagers to learn is to look for information from the YouTube, Wikipedia and Google search. Teenagers preferred to use any of these three websites to obtain the knowledge of information after that they only proceed further with the learning. Moreover, it has been found that, learning fact, language and skills using mobile devices are the most preferred activities by the teenagers. By learning through mobile devices based on teenagers' interest, it increases the interest of learning among the teenagers.

The result of this study suggested that self-interest, determination, motivation are the key factors that make the ubiquitous learning successful. Learner' passionate and determination will help them overcome all the difficulties encountered during their learning process using mobile devices. It is easier for an active learner to perform ubiquitous learning due to their passionate and determination. Passive learner needs more positive learning experience to encourage and convince them in performing the learning using their mobile devices.

RECOMMENDATIONS

The design of the mobile devices especially the screen size will be one of the factors that need to take into consideration when designing the learning material. Besides, the easiness of obtaining the content of knowledge must also take into consideration as the teenagers are concern about the speed and the simplicity. The teenagers may not want to explore further if the knowledge of content is complicated and hard to obtain. As suggested by Al-Fahad (2009), people can learn more effectively if the information is broken down into simple and easy to comprehend form. Besides, by embedding the knowledge of content into the games, it may increase the interest of the teenagers to learn. In addition, the knowledge content must be simple and shorter rather than complicated and lengthy. Besides, it will add value to the learning experience if the content is easily accessed and shared. On the other hand, since teenagers can easily get an access into the open resources and content, the validation of the data and information should have a scalable evaluation before they publish online.

Research in the area of integrating mobile devices into ubiquitous learning is relatively new. More research is needed in the future in order to obtain deeper understanding in the field of ubiquitous learning. A continuation of this research using different community could add more details and create new inputs to the study. Besides, research could also focus on examining the factors of integrating the mobile devices into ubiquitous learning by the teenagers or to study the behavior change of the teenagers after using mobile learning.

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APPENDIX: Daily Activities Checklist

Name:
Date:
<p>1. For what purpose and for how long you use your mobile device(s) today?</p> <ul style="list-style-type: none"><input type="radio"/> I used my mobile device(s) to read e-books for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to read news for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to play games for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to watch movie for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to listen to music for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to chat/ instant message for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to make phone call for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to text the message for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to log in the social networking site for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to upload video or photo content for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to maintain my own blog/website for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to search information for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to download learning material for _____ minutes/hour(s)<input type="radio"/> I used my mobile device(s) to _____ for _____ minutes/hour(s)
<p>2. Did you perform learning-related task(s) using mobile device(s) today?</p> <p>Yes, I used for _____ hour(s) <input type="checkbox"/> No</p> <p>I have use my mobile devices to learn _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>