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Exploring the Use of Mobile Apps for Learning: A Case Study on Final Year Engineering Undergraduates in Malaysia

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Mobile devices as a learning tool has shown great possibilities in and out the classroom and has revolutionised how we teach. By providing flexible access, these devices have been instrumental in facilitating the use of online technologies for teaching and learning. The main purposes of this study is to explore undergraduates' use of mobile applications (apps) for leaning. A total number of 59 engineering undergraduates from a higher learning institute (HEI) participated in this study through a survey. The study found that most students used WhatsApp for communication and sharing of learning contents. Their main method of internet access is through their personal internet plan. Concurrently, the most used application for learning are internet browsing and email and the least is cloud storage, educational games and time and schedule manager. It also emerged that mobile apps for learning are mainly used for non-formal learning activities and majority of students view mobile apps influential for teaching and learning in HEIs.

Keywords: Mobile apps; online learning; engineering undergraduates; Malaysia

I. INTRODUCTION

The use of mobile devices as a learning tool have shown great possibilities in and out the classroom (Sung, Chang, & Liu, 2016). Devices such as mobile phones, tabs and laptops have been influential in enabling mobility in regard to accessibility of the learning material. In addition, Arokiasamy (2017) claims that mobile devices have revolutionised teaching methods and the way people perceived education. In view of that, one of the most commonly used tools in today's classroom for mobile learning is the smartphone (Anshari, Almunawar, Shahrill, Wicaksono, & Huda, 2017). The smartphone has extended its functionality from just being a communication device towards becoming a tool that facilitates learning (Thakre & Thakre, 2015). Through the concept of "Bring Your Own Device" (BYOD) and the ubiquity of smart devices, educators are having students use their own phones to facilitate learning (Dassa & Vaughan, 2018; Twyman & Heward, 2018).

One of the reasons mobile devices such as smartphones are becoming more influential in the classroom is due to having almost similar computational benefits with a personal computer yet being much more economical (Zainol, Yahaya, Mohamat, Nadia, & Zain, 2017), compact size and convenient due to its' portability (Arokiasamy, 2017; Briz-Ponce, Pereira, Carvalho, Juanes-Méndez, & García-Peñalvo, 2017; Zainol *et al.*, 2017). It provides infinite access to information and people (Dassa & Vaughan, 2018), enables learning content sharing especially through instant messaging (Güler, 2017) and social media platforms such as WhatsApp, Facebook Messenger and Telegram. Through the concept of 'back channel', informal learning communities are created outside the class that has developed means for communication and connectedness among peers (O'Keeffe, 2016; Stone & Logan, 2018). Its benefits have paved the way for higher educational institutions to explore more approaches in integrating mobile devices in the classroom (Anshari *et al.*, 2017).

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Nevertheless, the application of mobile devices in higher education are challenged by issues such as internet access, filtering by university and also economic issues (Murphy & Farley, 2012). Secondly, it may serve as an interference in the classroom (Dassa & Vaughan, 2018). Yet, it is obvious that despite these challenges, mobile devices are intended to be instrumental in improving access to education in Malaysia and globally (Arokiasamy, 2017).

All the same, in higher education, there has been limited research on mobile learning (Al-Emran, Elsherif, & Shaalan, 2016). There is a gap in understanding how tools such as social media and instant messaging may create engaging and interactive learning environment (Rambe & Bere, 2013). Tools such as WhatsApp and other social media have billions of active users worldwide and it will be a misfortune if educational researchers do not consider how to integrate these tools to enhance learning in the 21-century classroom. Stone and Logan (2018) claims that the dynamics of social learning in informal learning spaces are able to extend learning from just the classroom beyond the programme timeframe. Nevertheless, even with hundreds of potential benefits and without prior investigation on the actual use of mobile devices in a social context, Al-Emran *et al.* (2016) claims that it will be challenging to implement these tools for teaching and learning.

Therefore, this study focuses on identify the application commonly used through mobile devices for learning and the perception of respondents towards the use of these devices. We aimed to identify commonly used apps for performing learning task such as communication and knowledge sharing as previous studies have highlighted the importance of mobile based learning in creating learning communities in informal spaces. Secondly, we also investigate other commonly used application for learning such as internet browsing, email, cloud storage and LMS access. The study was conducted in a higher learning institute in Malaysia, focusing on final year electrical engineering undergraduates. As there is lack of research documented on mobile application frequently used in teaching and learning in HEI in Malaysia, this study will contribute to exploring the use of these application for future research in Malaysia.

II. METHODOLOGY

In this study, survey method using Google forms were used to gather the data from the respondents. The purposive sampling method was used to enlist participation through WhatsApp and the link to the questionnaire (Google forms) were shared to all students in that cohort (N= 78). The survey was intended to quantify types of mobile application in learning, internet access facilities and their overall perception on mobile devices as a learning tool. We mainly investigated applications commonly used for communication and content sharing followed by other learning task such as internet browsing for content development (e.g. Chrome, Firefox, YouTube), email (e.g. Gmail, Hotmail), cloud storage (e.g. Google Drive, Dropbox), LMS (e.g. Moodle, Google Classroom), creating offline documents (e.g. Word, notes), offline reading (e.g. epub, pdf, mobi), and time and schedule management (e.g. Google Calender).

All items were analysed based on a 5-point Likert scale to measure respondent's application of the mobile apps for learning based on these anchors: (1) Never, (2) Rarely, (3) Sometimes, (4) Most of the Time, (5) Always. We send out three soft reminders for a duration of a month to all students to respond to the questionnaire as the participation is voluntarily. Next, the data from Google forms were exported as a csv file into a Microsoft Excel format before being analysed.

III. FINDINGS

Based on the findings, only 59 respondents participated in the study. To identify the application most commonly used to communicate among peers, WhatsApp had the highest score (Mean = 4.351, s.d. = 1.026) followed by the application of Short Messaging Service (SMS) (Mean = 2.544, s.d. = .983) and Facebook Messaging) (Mean = 2.333, s.d. = 1.134) (Figure 1). Next, the same trend was observed for communication with lectures where WhatsApp had the highest score (Mean = 4.158, s.d. = 1.082) followed by the application of Short Messaging Service (SMS) (Mean = 2.193, s.d. = 1.187) and Facebook Messaging) (Mean = 1.684, s.d. = .985) (Figure 2). Therefore, it can be concluded that WhatsApp is the main means of communication for learning followed by the traditional SMS method. In regard to sharing of learning contents such as notes and information, WhatsApp still remains the most used application (Mean = 4.421, s.d. = 1.107) followed Facebook Messenger (Mean = 2.246, s.d. = 1.271) (Figure 3).

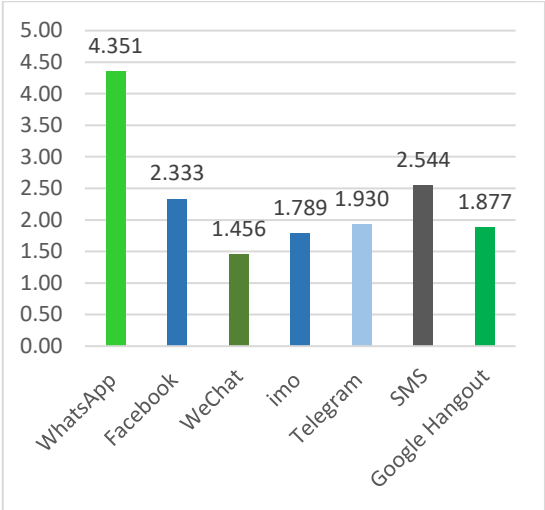

Figure 1. Mean score of mobile applications commonly used for communication with peers

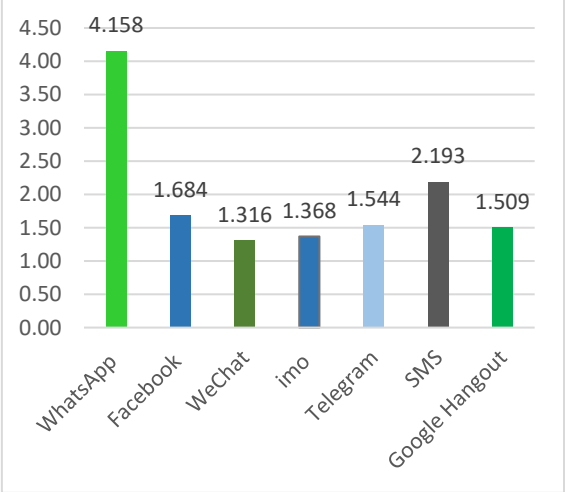

Figure 2. Mean score of mobile applications commonly used for communication with lecturer

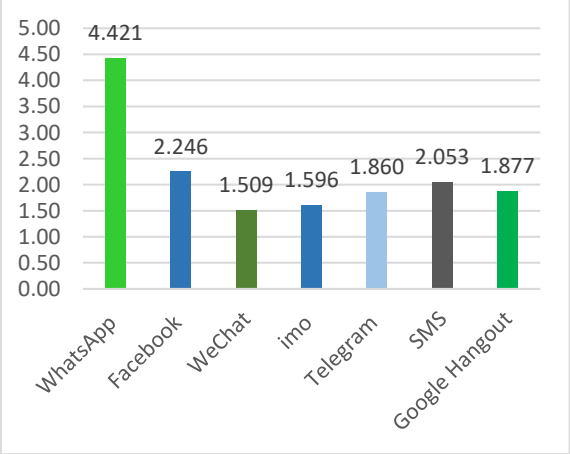

Figure 3. Mean score of mobile applications commonly used for sharing learning contents

As for the other mobile apps commonly used for learning, we categorise applications into learning task. It was found that Internet surfing for learning contents (Mean = 4.123, s.d. = 1.135) such as by using web browser (Chrome and Firefox) and YouTube had the highest score. The next learning task relates to email activities such as the application of Gmail and Yahoo Mail (Mean = 4.035, s.d. = 1.068). Offline reading (pdf and epub), access to online learning platforms (CIDOS, MOOC, Moodle, and Google Classroom) and creating documents offline (word processing, notes). The least used applications are related to time and schedule managers (e.g. Google Calendar), access to educational games and cloud storage (Figure 4).

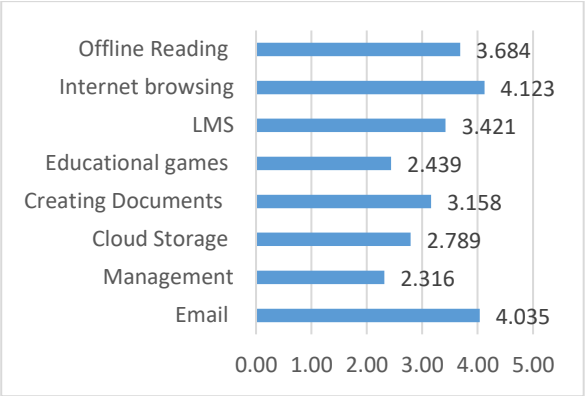

Figure 4. Mobile Applications commonly used to achieve learning task

Concurrently, we also intended to explore the main method of internet access for the respondents and thus found that most students were depended on their own Internet data package (Mean = 4.281, s.d.= 1.130) in comparison to using the institutions, home or public WIFI (Figure 5). Lastly, we enquired if the respondents viewed mobile apps as a learning tool and 96.61% (N=57) of the respondents' reporter affirmative.

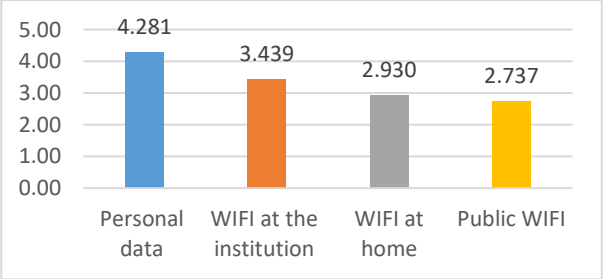

Figure 5. Internet access method applied by respondents

IV. DISCUSSION AND CONCLUSION

This study aimed to provide some insight on engineering undergraduates' perception and utilisation of mobile applications for learning. Overall, majority of the respondents found mobile apps to be an excellent tool for learning. The main method for internet access for their mobile devices is through their personal internet data plan. WhatsApp remains the most used application for communication and learning content sharing with peers and lecturers. We presume that this may be due to free usage of this application with majority of internet data plan in Malaysia. According to Stone and Logan (2018), WhatsApp provides a platform that creates a sense of connection which is similar in a learning community. In addition, there is no additional subscription needed to facilitate the communication with their learning community. However, we observe that even when the data providers offer unlimited use of WhatsApp and WeChat, the application of WhatsApp surpass WeChat by almost three times. WhatsApp also remains the most used application regarding content sharing followed by Facebook Messenger. We also observed that for communication, the second most used application is the short messaging system (SMS) which is a paid service. Hence, we conclude that functionality and affordance as the main motivating factor in the application of these apps for means of communication and content sharing. In both contexts, we speculate that the choice of application that facilitates and eases the formation of a learning community. We also hypothesise that availability of internet facilities/connection as a moderating factor. Nevertheless, WhatsApp as the most popular application worldwide has not merited much research on its application in the education environment (Güler, 2017) therefore we suggest further studies explore the possibilities and challenges that WhatsApp may offer. Secondly, we also explored the utilisations of other applications that facilitates learning task such as email, internet browsing and reading. We hypothesised that internet browsing via web browsers, wikis and YouTube had the highest mean score as it facilitates creating learning contents. These tasks are influential in establishing a supplementary learning source and assist in mastery learning. Other learning task commonly used are email and offline reading such as pdf and epub files. The least used applications are cloud storage, educational games and calendar. As for LMS and creating documents, the application of these tools is moderate. The findings of this study are similar to the findings reported by Al-Kindi and Al-Suqri (2017) where there claim that students mainly use their smartphones to search for information through search engines and access emails and did not favour using it for LMS. Stone and Logan (2018), also reported similar finding and claimed that the smartphone is used primarily for non-formal learning activities and not perceived as supportive in the context of creating learning communities in learning platforms such as Moodle. Nevertheless, the adaptation of an online learning tool through mobile devices is highly correlated with the need for communication and collaboration as defined by the lecturer (Cahill, 2014).

This study is not aimed at to provide answers to why one tool is more appealing than another for learning through smartphones but rather to investigate the use habits of the respondents which we hope will prompt future studies. We conclude that in the context of engineering undergraduates in Malaysia, mobile apps are seen as a tool for performing informal learning activities yet there is much potential in its application if there is more understanding on the user behaviour and challenges of its application in the learning environment.

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