CHAPTER 5

DETECTING THE PATTERNS OF SMARTPHONE USAGE AMONG UNIVERSITY STUDENTS

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ABSTRACT

Smartphone users have been spending an increasing amount of time on their devices, indicating a virtual-world fixation. Smartphone users, especially young adults ranging from high school students to university students are the most frequent users of smartphone and its applications. Their continuous use of smartphones has generated concerns about whether it has become an addiction with adverse effects on their academic performance. With regards to these issues, the present study aims to study the patterns of smartphone use and smartphone use experience among university students, and also to identify whether there are any significant differences of smartphone use among university students in Malaysia based on gender, level of study, type of university and discipline of study. This study employs a descriptive-correlational research design to collect data through an online survey questionnaire. The data analysis was conducted using descriptive statistics such as mean, standard deviation, frequency and percentage. Besides, inferential statistics such as independent samples t-test was also employed to analyse the data. The study was conducted at tertiary institutions located in Selangor, consisting of a public and a private university. The respondents involved both undergraduate and postgraduate students. A total of 453 students were randomly selected to participate in the survey, which was conducted online using Google form. The findings indicate that the students spent 50% of their smartphone time engaging in educational and learning activities. They estimated that they spend 22 to 26 hours weekly on using their smartphone. Besides that, the study also found that these tertiary students do not perceive themselves inflicted with mobile addiction. They also did not agree that smartphone use has a positive effect on university students. However, they somewhat agreed that to some extent excessive smartphone use has a negative effect on the students. The independent samples t-test indicated that there was a significant difference in smartphone use between genders. Males seem to indicate a higher level of smartphone usage than females. The findings

also indicated that there was no significant difference in the mean score of smart phone use in relation to level of study, type of university and disciplines of study. Consequently, it is expected that the findings from this study will help higher learning institutions to better understand the pattern of smartphone usage among university students and will be able to develop more appropriate guidelines to reduce and control academically disruptive smart phone usage among students in higher education.

Key Words: Smartphone, usage patterns, university students

1. INTRODUCTION

According to technopedia "a smartphone is a cell device with extremely developed features," (2019). A typical smartphone features a high-resolution touchscreen, WiFi connectivity, web browsing capabilities, and the capacity to integrate advanced applications. Additionally, Ebiye (2015) states that a smartphone is a smart device utilised for quick access to information and knowledge, and it is a useful device which can help students to complete their learning tasks as well as to fulfil their academic research goals. The exponential growth of smartphone users coincides with the surge in social media users. A survey by the International Telecommunication Union found that roughly 60% of the world's population has access to mobile phones (Sarfoah, 2017). Research also notes that developing countries have more mobile phone users than advanced countries (Henry & Quansah, 2013), implying that emerging countries use smartphones more. For example, Malaysia has the highest smartphone usage rate among developing countries, with 55% of Malaysians using their phones to listen to music, half (50%) of them playing online games, and nearly seven out of ten (67%) Malaysians watching online films on their phones.

Obviously, mobile communication technology has virtually affected a society's accessibility, security, safety and coordination of business and social activities. Undeniably, it has become part of the world culture in the 21st century. Baig (2014) revealed that the use of smartphones in schools and colleges are problematic to some extent as it disrupts the mission of schools. Due to the large number of applications available on smartphones, the majority of the worldwide population especially smartphone users among college and university students have been increasing in recent decades. Smartphones, while advantageous in many aspects, have drawbacks which decrease work productivity, individual attention, social distraction, and cognitive addiction. The current rate of smartphone addiction among students is 24.8% to 27.8%, and it is increasing exponentially year after year (Jeong & Lee, 2015). Students are found increasingly relying on their cell phones to manage key issues and maintain social interactions (Roberts, Yaya & Manolis, 2014).

Over use of mobile phones has the potential to impair thinking capacities, impair cognitive functioning, and cause over reliance on mobile phone. Symptoms relating to mobile addiction include the need to constantly check the phone for no reason, feeling anxious or restless without it, waking up in the middle of the night to check the phone and communication updates, a delay in professional performance as a result of prolonged

phone activities, and being distracted with smartphone applications. Collectively these symptoms are ascribed to smartphone overuse or also known as smartphone addiction (Chen, 2016). Moreover, mobile addiction has caught the attention of sociologists, psychologists, and educationist as a mental handicap caused by modern technology (Babadi-Akashe ent al, 2014). Normally, anger, anxiety, melancholy, impatience, and restlessness are associated with mobile phone addiction. This emotional malady may affect physiological behaviour and diminish work efficacy and student's performance academically. Based on these reasons, the current study was designed to investigate the patterns of smartphone use amongst university students in Malaysia.

The research objectives of this research are stated as follows:
1. To identify the patterns of smart phone use among university students in terms of time spent, and activities involved among university students.
3. To identify smart phone use experience among the university students.
4. To determine whether there are any significant differences in smartphone use among university students based on demographic factors such as:
   a. gender (male/female)
   b. level of study (undergraduate/postgraduate)
   c. type of university (public/private university)
   d. discipline of study (social science/pure science).

2. RESEARCH METHODOLOGY

The research methodology is explained in this section. It covers how the findings were obtained and analysed as well as the research design used in the study. A quantitative method employing a survey instrument was used to obtain the data. Since the purpose of this study is to identify the patterns of smartphone usage amongst university students in Malaysia, a set of questionnaires was deemed the most appropriate research instrument to be used. An instrument, according to Creswell & Creswell (2018), is a tool suitable for measuring, examining, and reporting quantitative data from a survey. The questionnaire used in the current study was adapted from Noradilah's (2019) study entitled "Perceived stress, smartphone dependency, coping behaviours, and psychological well-being among undergraduate students in Malaysia"**.**

The study was conducted at local universities located in Selangor which consist of one public university and one private university, and involved both undergraduate and postgraduate students from various disciplines of study. A total of 453 students were randomly selected to participate in this survey, which was conducted online through a Google form. The samples were chosen based on a simple random sampling technique. A quantitative research method involving descriptive statistics and inferential statistics were used to answer the research objectives of this study. Basically, descriptive statistics such as mean and standard deviation were used to describe the patterns of smartphone use and smartphone use experience among the students. Besides, an independent samples t-test was used to identify the significant differences in smartphone use among the students based on gender, levels of study, type of university and discipline of study. Four different hypotheses were crafted to be answered in the data analysis of this independent t-test

analysis. This method allows the variables to be measured using numbers and analysed via statistical procedures (Haruna Rabiu et al., 2016).

3. FINDINGS

Based on the Demographic Profile of the respondents, majority of the respondents (73.7%, n=334) were female and only 26.3%, n=119 were male. In terms of ethnicity, majority of the respondents were Malays, yielding 72.8% (n=330) of the total number of respondents. This was followed by other ethnic groups 12.0% (n=54), Chinese 8.6% (n=39) and Indian 6.6% (n=30). The students' age ranged from 18 to more than 56 years old throughout the undergraduate and post graduate programs. The highest age distribution of the respondents entailed 18-22 years old, yielding 61.4% of the majority (n=275). The second highest average age group was 23-27 years old, yielding 27.7% (n=124) followed by the age ranged from 28-32, yielding 2.9% (n=13) respectively. Regarding the level of education, student's status, and the pattern of smartphone use among the students, the findings indicated that the highest percentage of respondents are diploma students (44.4%, n=201), followed by bachelor's degree (30.9%, n=140), and *Sijil Pelajaran Malaysia* (SPM) (17.2%, n=78) students. majority of the respondents have been identified as "full time students" (90.7%, n = 411). As for marital status, most of the students are single, yielding 90.3% (n=409). The demographic section ended with a dichotomous question regarding the patterns of daily smartphone use with an optional answer of "yes" or "no", and most respondents stated that they use their smartphone daily, yielding 99.6% (n=451).

Table 1 Patterns of Smartphone Use among University Students

Average number of hours respondents spent on their smartphone daily

Hours	Frequency	Percent
Less than 1 hour	3	.7
1-2 hours	16	3.5
11-15 hours	65	14.3
7-10 hours	184	40.6
3 - 6 hours	185	40.8
Total	453	100.0

How long do respondents typically spend on their smartphone per use

Minutes	Frequency	Percent
Less than 2 minutes	2	.4
3-5 minutes	10	2.2
6-9 minutes	21	4.6
10-14 minutes	49	10.8
15-19 minutes	54	11.9
20-29 minutes	81	17.9
More than 30 minutes	236	52.1
Total	453	100.0

Average number of hours respondents spent each week on their smartphone

Average Number of Hours	Frequency	Percent
Less than 1 hour	4	.9
2-6 hours	16	3.5

7-11 hours	42	9.3
12-16 hours	57	12.6
17-21 hours	98	21.6
27-31 hours	113	24.9
22- 26 hours	123	27.2
Total	453	100.0

Proportion of time spent using smartphone for learning purpose

Proportion of Time	Frequency	Percent
Zero	2	.4
Less than 10%	15	3.3
Almost always (95% - 100%)	24	5.3
10% - 20%	54	11.9
Approximately three-quarters of the time (75%)	56	12.4
Approximately a quarter of the time (25%)	119	26.3
Approximately half the time (50%)	179	39.5
Total	453	100.0

When do I use my smartphone

When do I use my smartphone	Frequency	Percent
Does not matter whether I am alone or with others	208	45.9
Depends on how much time I have available	249	55.0
Depends on my mood	285	62.9
During some particular activities	287	63.4
Total	453	100.0

Type of activities on the smartphone

Type of activities on the smartphone	Frequency	Percent
News	1	0.23
Pornography	1	0.23
Tik-Tok	1	0.23
Google Meet	1	0.23
Calendar	1	0.23
Netflix	1	0.23
Driving directions or GPS navigation	8	1.8
Voice calls	8	1.8
Text messages	10	2.29
Books	28	6.4
Camera or camcorder	42	9.7
Microsoft Team (online classes)	45	10.3
Music	53	12.2
Emails	54	12.4
Movies, TV shows and videos	74	17.0
Games	77	17.7
Apps or applications	105	24.2
YouTube	105	24.1
Social networking (Facebook/Twitter)	165	37.9
Internet Search	173	39.8
WhatsApp	321	73.8
Total	435	100.0

As reported in Table 1, it has been identified that the majority of the students indicated the average number of hours spent on using their smartphone each day is ranges from 3-6 hours (40.8%, n=185), followed by 7-10 hours (40.6%, n=184) and 11-15 hours (14.3%, n=65) daily. Regarding the question on how long do respondents typically spend their time per use when they are using their smartphone, majority of the students answered that they usually spend more than 30 minutes every time (52.1%, n=236), followed by 20-29 minutes (17.9%, n=81) and lastly 15-19 minutes (11.9%, n=54). In relation to the question on the average number of hours they spend each week on their smartphone, most students indicated that they spent 22-26 hours (27.2%, n=123), followed by 27-31 hours (24.9%, n=113) and 17-21 hours (21.6%, n=98). Regarding the question on the proportion of time spend on using smartphone for learning, majority of the students stated that they spent approximately half of their time (50%) using smartphones for learning (39.5%, n=179), followed by approximately a quarter of the time (25%) using smartphone for learning (26.3%, n=119) and lastly approximately three-quarters of their time (75%) were used for learning (12.4%, n=56). In addition, this research is also interested in finding under what circumstances that usually attracts these students to use their smartphone. The result showed that majority students use their smartphone during some particular activities (63.4%, n=287), followed by depending on their on their mood (62.9%, n=285), and lastly depending on how much time they have available (55.0%, n=249). Lastly, in relation to the type of activities they are usually involved when using their smartphone, it was found that they use WhatsApp as their main activity (73.8%, n=321), followed by internet search (39.8%, n=173) and lastly social networking (Facebook/Twitter) (37.9%, n=165).

Table 2 Descriptive Analysis of Smartphone Use Experience (n=435)

Smartphone Use Experience	Mean	Standard Deviation
Mobile addiction	3.41	.90
Positive effects of smartphone use	3.91	.82
Negative effects of smartphone use	4.25	1.01

Note. Likert scale: 1=Strongly Disagree, 2=Disagree, 3=Somewhat disagree, 4=Somewhat agree, 5=Agree, 6= Strongly Agree

The findings relating to the students' smartphone use experience are further divided into three dimensions which are, mobile addiction, positive effects of smartphone use and negative effects of smartphone use (Table 2). The first dimension relates to mobile phone addiction. This dimension is to measure the student's perception of their mobile phone addiction. It was found that the students somewhat disagreed that they are afflicted with mobile addiction (M=3.41). Next dimension is looking at the positive effects of mobile phone use among the students. This dimension is to observe the student's perception of the positive effects of smartphone use. It was found that the students somewhat agreed (M=3.91) that smartphones can have a positive effect on users. However, the students also somewhat agreed (M=4.25) that smartphone use can have a negative effect on its users. In brief, the overall findings showed that excessive use of smartphones will induce more harm than benefit to students in educational institutions.

Table 3 Independent Samples t-test of Smartphone Use between Genders

	Gender	N	Mean	SD	SE Mean
Smartphone Use	Male	119	3.61	.909	.083
	Female	334	3.34	.880	.048

Note: t= 2.837, p < .01; F = .010, p > .05

The following section answers the hypothesis crafted for the independent samples t-test analysis in this study.

Ho_1 = There is no significant difference between males and females regarding smartphone use (gender)

Based on the results in Table 3, there was a significant difference in the mean score of smartphone use [t(451)=2.837, p<.05] based on gender. Hence, it can be concluded that there is a significant difference in smartphone use between male and female students in higher education.

Table 4 Independent Sample t-test of Smartphone use between Undergraduates and Postgraduates

	Program of Study	N	Mean	SD	SE Mean
Smartphone Use	Undergraduates	436	3.40	.889	.043
	Postgraduates	17	3.78	.987	.239

Note: t= 1.748, p > .05; F = .713, p > .05

Ho_2 = There is no significant difference between undergraduate and postgraduate students regarding smartphone use (level of study)

Based on the results in Table 4, there was no significant difference identified in the mean score of smartphone use [t(451)=1.748, p > .05] based on the level of study. Hence, it can be concluded that there is no significant difference in smartphone use between undergraduate and postgraduate students.

Table 5 Independent Sample t-test of Smartphone Use between Public and Private Universities

	Types of University	N	Mean	SD	SE Mean
Smartphone Use	Public University	314	3.46	.844	.048
	Private University	5	3.49	1.087	.486

Note: t= -.097, p > .05; F = .617, p > .05

Ho_3 = There is no significant difference between public and private university students regarding smartphone use (type of university)

Based on the results in Table 5, there was no significant difference in the mean score of smartphone use [t(317)=-.097, p<0.05] based on types of university. Hence, it can be concluded that there is no significant difference in smartphone use between public and private university students.

Table 6 Compare Means between Disciplines of Study in Smartphone Use

	Type of Programme	N	Mean	SD	SE Mean
Smartphone Use	Social Sciences	244	3.46	.841	.054
	Pure Science	75	3.45	.867	.100

Note: T= .039, p > .05; F = .771, p > .05

Ho$_4$ = There is no significant difference between Social Sciences and Pure Science students regarding smartphone use (discipline of study)

Based on the results in Table 6, there was no significant difference in the mean score of smartphone use [t(317)=.039, p > .05] based on the discipline of study. Hence, it can be concluded that there is no significant difference in smartphone use between the social sciences and pure science students.

4. DISCUSSION

In a nutshell, as stated earlier in the introduction section, the study has three objectives, firstly to identify the patterns of smartphone use, secondly identify smartphone use experience and finally to determine whether there are any significance differences in smartphone use among university students in Malaysia based on gender, level of study, type of university and discipline of study in the university.

The first question relating to the patterns of smartphone use is to identify the amount of time students spent on their smartphone each day, each time, each week and also the amount of time spent using their phone for the purpose of education and learning. As per prior discussion, the students admitted that they spent a substantial 50% of their smartphone time indulging in educational and learning activities. Next, they estimated that they use between 22 to 26 hours weekly on their smartphones. These findings contradict with the findings obtained by Woodcock et al. (2012) who found that students spend more time on their phones playing games and engaging in other leisure activities than in lecture. In addition, White and Mills (2012) also discovered that students were increasingly adopting smartphones for personal usage rather than educational purposes.

However, the students in this study perceive that excessive smartphone use will bear more negative consequences than positive effects even though they do not perceive themselves to be addicted to mobile phone use. This finding contradicts Norries, Hossain, and Soloway (2011)'s who found that students' academic performance increases dramatically when they learn using mobile learning devices, such as smartphones,

throughout schooling hours. This could be because as long as they have the device, their time on task will grow which means they will be engaged in learning much longer than traditional teaching and learning processes. Additionally, Kumar (2011) added that students nowadays are using smartphones to obtain teaching materials and skimming materials through internet, mobile applications such as YouTube and e-books can be used to increase their knowledge. Mtega, Bernard, Msungu, and Sanare (2012) in their study on the advantages of smartphone use in learning have also revealed that students are now using mobile learning applications such as camera, voice calls, emails, Google drive, and other cutting-edge applications to create, upload, download, and share educational information with their friends. The data cited above demonstrates that smartphones have provided advanced learning opportunities for students, and it is undisputable that more students are spending more time using mobile apps.

Additionally, the type of activities varies when students are engaging with their smartphone. The result of this study has found that the top three activities students engage when using smartphones are WhatsApp which is an online chatting/messaging application, information seeking tool, and social media applications for socializing online such as Facebook and Instagram. One previous research done by Dey & Parabhoi (2017) had found that WhatsApp is indeed a popular platform for connecting and engaging with others. According to the findings of the research, majority of students utilise WhatsApp on a routine basis, and 80% of the students believe WhatsApp is highly useful for finding and disseminating information pertaining to their studies. The previous study adds that majority of respondents use WhatsApp for a variety of purposes which includes activities such as group conversation, sharing academic resources, sharing academic program updates, and also sharing information on job openings (Dey & Parabhoi, 2017).

The present study has also found that students who participated in the study have moderate levels of smart phone use experience. At this juncture it is interesting to note that their level of use has not degenerated to the point of addiction as they are well aware the positive and negative effects of smart phone use. This statement is supported by the data presented earlier in this study whereby the students somewhat agreed that excessive smartphone use will harbour negative effects on them. Jafari, Aghaei & Khatony (2019) cited despite the numerous advantages that mobile phones provide, overuse can lead to a variety of issues, including mobile addiction. Askarizadeh, Poormirzaei & Hajmohammadi (2017) also added that mobile phone addiction is among the most serious social issues resulting from excessive use of mobile phones. Besides, Roberts,Yaya & Manolis (2014) further elaborated that technological addiction is a behavioural and non-chemical addiction that is developed by engagement with smartphone. Askarizadeh, Poormirzaei & Hajmohammadi (2017), in their research findings classified mobile addiction as a form of technology-related condition. Thus, it can be concluded that having the realisation on both the positive and negative side effects of mobile phone can hinder the problem of overuse and therefore forestall mobile addiction issues.

Finally, this research has also strived to find out whether there are any significant differences in mobile phone use in terms of gender, program of study, type of university and discipline of study. Based on the results discussed earlier, there was a significant difference in the mean score of smart phone use regarding gender. However, there were

no significant difference identified regarding the level of study, type of university and discipline of study. The significance in gender difference identified in this study is supported by Bianchi and Phillips (2005) who studied the relationship of personality traits such as extroversion, neuroticism, self- esteem, gender, age and mobile phone use. Bianchi and Phillips (2005) in their study, found that young people and male users, in particular, appeared to be highly susceptible to mobile phone use as compared to the much older and female users. Another study was conducted by Toda, Monden, Kubo, & Morimoto (2006), on mobile phone dependence and health related life style of university students in Japan shared the similar findings. This study revealed that there were also significant gender differences in mobile phone dependence. Nevertheless, more conclusive evidence is required regarding this issue. Therefore, it is suggested that future studies should also focus on variables such as personality traits, gender and age group and its effect on mobile phone use. Regarding the present study, to the best knowledge of the researchers, there are no findings available on the significant differences of smartphone use with regards to level of study, type of university and discipline of the study in the past. Hopefully, the findings of this study will provide a source of reference for future study.

5. CONCLUSION

In this study, the students admitted that they spent 50% of their smartphone time indulging in educational and learning activities. Besides that, it was found that university students spend roughly between 22 to 26 hours weekly on using their smartphone. Based on prior discussion, smartphone use can benefit students if it is not overused and balanced between learning activities such as attending online classes and using the phones capabilities to do internet research. Overall, the findings indicate that smartphones can induce both positive and negative consequences based on duration and purpose of use. Excessive use can cause mobile addiction and induce negative consequences on students. The findings also indicate that male students tend to have a higher level of smartphone use experience than female students. However, there are no significant differences in smartphone use based on level of study, type of university and discipline of study of the students in the Malaysian context. These findings imply that educational leaders and managers need to design and construct guidelines to monitor smartphone use among university students in Malaysia. on a more cautious note, more attention needs to be paid to the male students since they seemed to have demonstrated higher levels of smartphone usage.

6. ACKNOWLEDGEMENTS

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