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Smartphone Addiction among UTHM Students

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Abstract: This research aims to study the relationship between smartphone addiction and the characteristics of smartphone use among UTHM students. Smartphone users' characteristics such as tolerance, withdrawal, positive expectancy, and interference with daily routine affected smartphone addiction. There is a lack of local studies regarding smartphone addiction; therefore, this study carried out to demonstrates it. This study selected 375 respondents from students UTHM, and an online survey questionnaire was established to collect data. The questionnaires successfully collected from 283 respondents in UTHMs included the campus of Parit Raja and Pagoh. Data obtained was analysed using SPSS version 21. Statistical results confirmed the significant relationships between tolerance, withdrawal, positive expectancy, and interference, and smartphone addiction.

Keywords: Smartphone addiction, Tolerance, Withdrawal, Positive expectancy, Interference with daily routine

1. Introduction

During the last decade, smartphones have gained popularity all over the world. Smartphones can keep the increase due to the differences between smartphones and previous mobile phones, which are full-featured Internet access and easy installation of new applications through modern operating systems and platforms. Hence, smartphones are now considered handheld computers rather than traditional phones (Zheng & Ni, 2006). Just like smartphone users in Malaysia, it also increased from 75.9% in 2017 to 78% in 2018 according to the latest results of the Hand Phone Users Survey 2018 from the Malaysian Communications and Multimedia Commission (MCMC, 2019).

1.1 Research Background

One of the reasons for this unexpected popularity of smartphones is because smartphones bring a lot of convenience toward peoples' daily life. But on the other hand, this also poses many risks for such dependence over a smartphone. Excessive use of smartphones causes several physical symptoms, good and bad feelings, pathological addiction, depression, symptoms such as fear-anxiety, productivity, and low academic achievement (Yildiz Durak, 2019). This research will focus on university students

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because the youth, especially the university and college students, are the predominant users of smartphones. They are usually the ones who are always curious and inquisitive about the latest development and innovation in communication technology (Bhutia & Tariang, 2016). They will try to find out the different applications and features of a new technical invention. Yet, it is the reason why the youth has a higher possibility to become a victim of smartphone addiction.

1.2 Problem Statements

Sato (2006) mentioned that "To date, few studies have been conducted to study and examine the smartphone addiction". But according to Haug *et al*. (2015), the majority existing studies mostly focused on development and validation of the instruments designed to assess smartphone addiction such as the studies in Taiwan (Lin *et al*., 2014), China (Bhutia & Tariang, 2016), and Korea (Kim *et al*., 2014; Kwon, Kim *et al*., 2013; Kwon, Lee, *et al*., 2013).

In Malaysia, research conducted by Zulkefly and Baharudin (2009) in Universiti Putra Malaysia studied the relationship between mobile phone use and psychological health. In the study, they mentioned further research could investigate other underlying factors that exist within the ecosystems of the students that could shape their mobile phone behaviours, and the consequences of intense mobile phone use could be further explored in terms of the degree of psychological symptoms experienced by users of the mobile telephone. Ching *et al*. (2015) researched to determine the psychometric properties of the Smartphone Addiction Scale (SAS) by translating and validating it into the Malay language. The result showed that 46.9% of Malaysia students were addictive to smartphone and the Malay version SAS could be as a reference to give some insights to the health care professional team to conduct the limited studies regarding smartphone addiction in local settings (Ching *et al*., 2015).

The four-factor model smartphone addiction scale in this study is a resource from the research presented by Cho and Lee (2015). The smartphone addiction scale in the particular research was adopted from the research in Korea, Smartphone Addiction Scale by Kwon, Lee, *et al*. (2013). However, they are the only researcher who developed and used the four-factor model smartphone addiction scale. There is a lack of studies using the four-factor model smartphone addiction scale.

1.3 Research Questions

There are a few questions raised to provide a path toward this research:

(i) Is there a significant relationship between tolerance and smartphone addiction?
(ii) Is there a significant relationship between withdrawal and smartphone addiction?
(iii) Is there a significant relationship between positive expectancy and smartphone addiction?
(iv) Is there a significant relationship between interference with daily routine and smartphone addiction?

1.4 Research Objectives

The specific objectives of this study, derived from the identified research gaps in the literature, are stated as follows:

(i) To determine the significant relationship between tolerance and smartphone addiction.
(ii) To determine the significant relationship between withdrawal and smartphone addiction.
(iii) To determine the significant relationship between positive expectancy and smartphone addiction.
(iv) To determine the significant relationship between interference with daily routine and smartphone addiction.

1.5 Significance of the Study

The purpose of this study is to fill the gaps that have been identified in previous research and contribute to the theoretical and practical perspective. This study contributes to the smartphone literature by offering empirical analysis in smartphone addiction and education performance. This study is also expected to provide more ideas to university management and policymakers to offer training and policies in controlling smartphone addiction.

1.6 Scope of the Study

This study was conducted at Universiti Tun Hussein Onn Malaysia (UTHM). The respondents targeted in this study focused on the students in UTHM included the main campus of Parit Raja and Pagoh with a total population of 17,500. This study used a quantitative method. A survey questionnaire was designed to collect primary data intended for this study. Thus, the sample was selected randomly based on Krejcie and Morgan (1970), which is 375 respondents. The data was collected by distributing the questionnaire to the respondents by online Google Form. Then, the data were analysed using the SPSS software.

2. Literature Review

A literature review is a search and evaluation of the literature available in a selected topic area. In general, literary studies are used to analyse studies that have been developed by previous researchers. This section reviews several previous studies to provide guidelines and support for the development of this research framework and hypothesis.

2.1 Smartphone Addiction

According to Smartphone User Persona Report 2015 by Vserv (2016), smartphone users in Malaysia spent more time each day which is 187 minutes per day, or 3 hours 7 minutes with their devices compared to the neighbouring countries such as Indonesia, Philippines, and Thailand. Addiction is defined as a pathologic condition that once cannot tolerate without the continuous administration of alcohol or drugs; or the status of not being able to rationally judge or distinguish due to certain ideas or objects (Kwon, Lee, *et al*., 2013). The term was once limited to drugs or substances, but it is now also applied to gambling, internet, gaming, mobile-phone usage, and other behavioural addictions (Kim, 2006). Smartphone addiction also defined as a "compulsive, uncontrollable dependence on a substance, habit, or practise to such a degree that cessation causes a severe emotional, mental, or physiological reaction while overuse of smartphone" (Cho & Lee, 2015).

In the same way, there are also researchers from Malaysia started to research smartphone addiction. According to Kumar *et al*. (2011), the majority of selected private university students in Malaysia were facing mobile phone hazard, and they agreed that smartphones could cause headache, mental loss and sleep disorders. A study conducted by Zulkefly and Baharudin (2009) among university students in Malaysia found that students who spent more time with the phone were more susceptible to psychological disorders caused by unhealthy and uncontrolled smartphone use. Besides, the study conducted in 2018 by Ithnain *et al*. (2018) showed university students in Malaysia were inclined towards becoming addicted to smartphone and were exposed to anxiety and depression.

2.2 Characteristics of Smartphone use

According to Kwon, Kim, *et al*. (2013), the questionnaire developed using past studies, Kimberly Young's, and some items revised by six smartphone addiction field professionals (two psychiatrists, two clinical psychologists, and two counselling psychologists). Hence, they divided the questionnaire

into seven subscales or features which are “daily-life disturbance”, “disturbance of reality testing”, “positive anticipation”, “withdrawal”, “cyberspace-oriented relationship”, “overuse”, and “tolerance” (Kwon, Lee, *et al*., 2013).

Ching *et al*. (2015) adapted the SAS and changed it into Smartphone addiction scale Malay version (SAS-M) through adjustment and translation. They translate the English version of SAS into Malay version and adjust the “tolerance” into “primacy” due to the different age range of respondents.

The primary resource of the present study is the measurement of features used in the study of Cho and Lee (2015) in Korea. They started the research towards nursing students by using the adjusted SAS-SV from six features into four features which are “tolerance”, “withdrawal”, “positive expectancy”, and “interference with daily routine” (Cho & Lee, 2015).

In the psychology field, “tolerance” defined as spending more and more time on smartphone use, although he or she understands it is a crucial phenomenon (Lin *et al*., 2014). According to Kwon, Kim, *et al*. (2013), "withdrawal" can be defined as someone will being impatient, fretful, and intolerable without a smartphone. Besides, the researchers also described "interference with daily routine" as a disturbance in daily-life includes missing planned work, having a hard time concentrating in class or while working, suffering from light-headedness or blurred vision, pain on the wrists or at the back of the neck and sleeping disturbance (Kwon, Lee, *et al*., 2013). Positive expectancy generally is also known as positive anticipation in the study of Dosselaar (2017) refers to being excited about smartphone use and getting rid of stress with smartphone use and feeling empty without a smartphone.

2.3 Theory of Behavioural Addiction

Behavioural addiction can be defined as a disorder characterised by behaviour that functions to produce pleasure and to relieve feelings of pain and stress (Van Deursen *et al*., 2015). Besides, behavioural addiction also defined as a failure to control or limit the behaviour despite significant harmful consequences (Shaffer, 1996). When the use of the internet or smartphones becomes addictive, this might result in negative effects on financial physical, psychological, and social aspects of life (Young, 1998).

2.4 Hypothesis Development

Objective 1

H^1: There is a relationship between tolerance and smartphone addiction.

Objective 2

H^2: There is a relationship between withdrawal and smartphone addiction.

Objective 3

H^3: There is a relationship between positive expectancy and smartphone addiction.

Objective 4

H^4: There is a relationship between interference with daily routine and smartphone addiction.

2.5 Research Framework

The model for this research includes variables of characteristics of smartphone use and smartphone addiction. Characteristics of smartphone use is an independent variable, while smartphone addiction is the dependent variable. The characteristics of smartphone use in this study are measured through

tolerance, withdrawal, positive expectancy, and interference with daily routine that will be affecting smartphone addiction. Figure 1 shows the framework of this study.

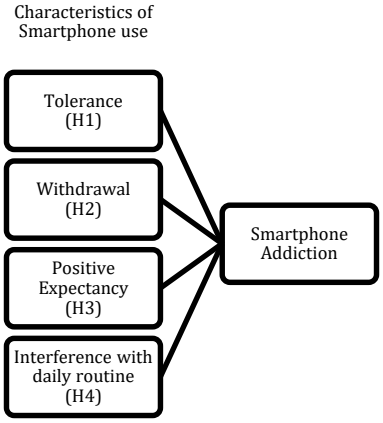

Figure 1: Research Framework

3. Research Methodology

Therefore, this section presents the methods used to achieve the purpose of this study. Among the topics that are discussed in this section include the research design, selection of respondents, instrumentations, measurement of variables, validity and reliability, the result of the pilot test.

3.1 Research Design

The quantitative method was used to carry out this current study. Quantitative data collection methods rely on random sampling and structured data collection instruments that fit diverse experiences into predetermined response categories. The results collected using quantitative method is easier to summarise, compare, and generalise compare with qualitative and mixed methods.

3.2 Respondents

The target population of this study is students in University Tun Hussein Onn Malaysia (UTHM) included the main campus in Parit Raja and campus in Pagoh. Based on Krejcie and Morgan (1970), the estimation of sample size is 375 respondents due to the amount of population. Therefore, 375 sets of questionnaires will be distributed through online to students UTHM.

3.3 Data Collection

The questionnaire was adapted from Smartphone Addiction Scale (SAS) developed by Kwon, Kim, *et al*. (2013) and the smartphone addiction test used before by Ching *et al*. (2015). The data will be collected by using Google Form and distributed to the targeted respondents. The link contains the online questionnaire were sent to the respondents through social applications. In the other hand, the respondents were questioned regarding their characteristics of smartphone use. The methods used are more likely to be applied to boosting response rates to online surveys than on-paper surveys.

3.4 Instrumentation

Section A mainly used to collect demographic data from respondents. Respondents must choose their personal information which including gender, age, race, faculty, duration of smartphone used (daily), main use of smartphone, end smartphone monthly expenses (RM).

In Section B, Four-factor model Smartphone Addiction Scale will be used, and it was developed by Cho and Lee (2015) after adoption and formulation. It was the first self-diagnostic scale for measuring smartphone addiction. 5-point Likert-type scale with 19 items. Each question has a response scale from 1 to 5 (1 = strongly disagree to 5 = strongly agree), reflecting the frequency of the symptoms. The respondent circles the statement that most closely describes their smartphone use characteristics.

In Section C, five items of 5-point Likert-type scale will be asked to measure the smartphone addiction of respondents. This instrument was adopted as part of the questionnaires used in the research done by Ching *et al*. (2015). Each question has a response scale from 1 to 5 (1 = never to 5 = always), reflecting the usage of smartphone according to lifestyle. The respondents required to circle the statement that most closely describes their smartphone usage.

3.5 Measurement of Variables

Five variables will be measured using Likert Scale with different amount of questions, respectively. The total number of questions to measure five variables are 24, while seven questions were used to collect demographic information from respondents as table 1 below.

Table 1 Survey format

Section	Item	Number of Questions
A	Demographic Information	7
B	Tolerance	5
	Withdrawal	6
	Positive Expectancy	5
	Interference with daily routine	3
C	Smartphone Addiction	5
Total		31

3.6 Validity, Reliability, and Pilot Test

The validity of an instrument refers to the extent to which an instrument measures what we want to measure (Creswell, 2003; Hair *et al*., 2009; Thi, 2010). Meanwhile, instrument reliability is often referred to as describing the stability and internal consistency of a concept (Creswell, 2009; Sekaran & Bougie, 2009). Cronbach alpha normally uses to measure reliability, and it was developed by Lee Cronbach (1951) to provide a measure of the internal consistency of a test or scale, it is expressed as a number between 0 and 1. If the items in a test are correlated to each other, the value of alpha is increased.

Table 2: Cronbach's alpha range and reliability level

Cronbach's alpha	Reliability Level
<0.5	Unacceptable
<0.6	Weak
0.6 to <0.7	Simple
0.7 to <0.8	Good
0.8 to <0.9	Very good
0.9	Excellent

According to Hassan *et al*. (2006), a pilot test can be defined as a 'small study to test research protocols, data collection instruments, sample recruitment strategies, and other research techniques in

preparation for a larger study. It also helps members of the research team become familiar with the procedures in the protocol, and help them decide between two completing study methods, such as using interviews rather than self-administered questionnaire (Hassan *et al*., 2006). 30 questionnaires were established first to 30 respondents in UTHM to conduct a pilot test before carrying out the research. Researcher assisted participants due to the prevention of misunderstanding of the unclear question. The result of the pilot test, as shown below:

Table 3: Pilot test with Cronbach's alpha value

Section	Variables	No of items	Cronbach's alpha value
B	Tolerance	5	0.873
	Withdrawal	6	0.860
	Positive expectancy	5	0.678
	Interference with daily routine	3	0.665
C	Smartphone addiction	5	0.786

According to Ghasemi and Zahediasl (2012), normality test is supplementary to the graphical assessment of normality. This study using a Kolmogorov-Smirnov test (K-S) that are designed to test normality by comparing the data to a normal distribution. If the p-value is over 0.05, the data is normal while p-value if below 0.05, the data is non-normal (Ghasemi & Zahediasl, 2012).

3.7 Analysis of Data

Descriptive Analysis. Nominal and ordinal measurement analysed by using the descriptive analysis to explain it mean clearly and median among respondents. Therefore, the descriptive analysis will be used in analysing the demographic data of respondents such as gender and faculty, which is section A in the questionnaire.

Inferential Analysis. Spearmen's rho was used to analyse the relationship between smartphone addiction and the other four existing variables, which are tolerance, withdrawal, positive expectancy, and interference with daily routine. It able to show is there a positive or negative, significant or not significant relationship between smartphone addiction and the four characteristics of smartphone use.

4. Data Analysis and Results

This chapter will analyse the data collected using the SPSS Version 22 software.

4.1 Survey Response

Questionnaires were distributed at UTHM, which targeted population was 17500 with a sample size of 375 students. However, there is only 283 response received, 75.47% compared with the expected response, which is 375 students. Table 4 below shows the responses rate of the respondents.

Table 4: Responses rate

Responses	Rates
Population	17500
Sample Size	375
Questionnaire distributed	Randomly through online
Questionnaire collected	283
Percentages	75.47%

4.2 Reliability Test

Table 5 shows the result of the reliability test in term of Cronbach's alpha value. The value of tolerance was 0.838, withdrawal (α = 0.874), positive expectancy (α = 0.810), interference with daily routine (α = 0.783), smartphone addiction (α = 0.839). The alpha value of each instrument is greater than 0.65, and it was classified as an acceptable value

Table 5: Reliability test with Cronbach's alpha value for each instrument

Section	Instrument	No of items	Cronbach's alpha value
B	Tolerance	5	0.838
	Withdrawal	6	0.874
	Positive expectancy	5	0.810
	Interference with daily routine	3	0.783
C	Smartphone addiction	5	0.839

4.3 Descriptive Analysis

Descriptive analysis analyses section A of the questionnaire distributed which the section required respondents to filling in their demographic data such as gender, age, and faculty.

4.3.1 Gender

The questionnaire was distributed through online among UTHM students, and the respondents were 39.6% of male and 60.4% of female.

4.3.2 Race

In the responses received, the majority of respondents are Malay which is 153 (54.1%) out of 283 respondents. The Chinese and Indian respondents involved in this research are 123 (43.5%) and 7 (2.5%), respectively.

4.3.3 Age

124 (43.8%) of the total response are 20-21 years respondents. 152 or 53.7% out of the total amount respondents are 22-23 years. There are 7 (2.5%) respondents were in the category of 24-25 years.

4.3.4 Faculty

In the main campus, 74 or 26.15% of respondents belong to Faculty of Technology Management and Business (FPTP). 55 or 19.4% of respondents belong to the Faculty of Civil and Environment Engineering (FKAAS). 24 or 8.48% of respondents belong to the Faculty of Mechanical and Manufacturing Engineering (FKMP). 41 or 14.5% of respondents belong to the Faculty of Computer Science and Information Technology (FSKTM). 21 or 7.4% of respondents belong to the Faculty of Electrical and Electronic Engineering (FKEE). 13 or 4.6% of respondents belong to the Faculty of Technical and Vocational Education (FPTV). The remaining two courses were under Pagoh campus of UTHM. 35 or 12.37% of respondents belong to the Faculty of Applied Sciences and Technology (FAST). 20 or 7.07% of respondents belong to the Faculty of Engineering Technology (FTK).

4.3.5 Duration of smartphone used (daily)

The data collected indicate that only one respondent is using his or her smartphone less than 1 hour daily, which represented 0.4% out of 283 respondents. 30 or 10.6% of all respondents used their smartphone 1-3 hours per day. Majority of the respondents which are 143 or 50.5% used smartphone

4-6 hours in a day. 80 or 28.3% of respondents used smartphone 7-9 hours per day, and 29 or 10.2% of the respondents used the smartphone more than 9 hours per day.

4.3.6 Main use of smartphone

The main usage of smartphone decided by the owner him or herself and following by personality. 10 or 3.5% of respondents selected call and SMS to be the primary use of their smartphone. 85 or 30% of respondents using a smartphone for social networking sites. Majority of respondents used their smartphone for application and games representing by 154 or 54.4% of respondents. 34 or 12% of respondents focus on news and information once they used the smartphone.

4.3.7 End smartphone monthly expense (RM)

Smartphone monthly expense categorised into two options which are less than RM 50 and RM 51 and above. Majority of the respondents which are 261 or 92.2% out of 283 respondents spend less than RM 50 on the monthly smartphone expense. In the other hand, 22 or 7.8% of respondents spend RM 51 and above monthly for their smartphone.

4.4 Normality test

The function of the normality test is to determine whether a parametric test can be used or not. This study is using a Kolmogorov-Smirnov test towards the result of 283 respondents.

The Kolmogorov-Smirnov test received the significant value for each instrument in characteristics of smartphone use which are tolerance (0.000), withdrawal (0.000), positive expectancy (0.000), and interference with daily routine (0.000). Spearman's rho will be used in correlation coefficient analysis because all the significant value is below 0.05, and it is representing non-normal. Table 6 shows the test result, which is the significant value of each instrument for characteristics of smartphone use hence conclude the normality of the data.

Table 6: Kolmogorov-Smirnov test for characteristics of smartphone use

Characteristics of smartphone use	**Statistic**	**df**	**Significant value**
Tolerance	0.254	283	0.000 (non-normal)
Withdrawal	0.188	283	0.000 (non-normal)
Positive Expectancy	0.154	283	0.000 (non-normal)
Interference with daily routine	0.233	283	0.000 (non-normal)

Meanwhile, in table 7 below shows the result of the Kolmogorov-Smirnov test of smartphone addiction. The value of significant-conclude the normality of the data.

Table 7: Kolmogorov-Smirnov test for Smartphone addiction

Smartphone Addiction	Statistic	df	Significant value
Smartphone Addiction	0.225	283	0.000 (non-normal)

The Kolmogorov-Smirnov test shows that the significant value of smartphone addiction is 0.000, and it is below 0.05. Hence, Spearman's rho will be conducted in the correlation coefficient test.

4.5 Inferential Analysis

Correlation analysis is used to test whether there is a significant relationship between the independent variable and dependent variable. Spearman's rho was used in this study due to the non-normal data collected. According to "SPSS Correlation & Regression Guide", a correlation coefficient has a value ranging from -1 to 1. Values that are closer to the absolute value of 1 indicate that there is a strong relationship between the variables being correlated. In the other hand, the values closer to 0 indicate that there is little or no linear relationship.

Table 8: Correlation analysis by using Spearman's rho

Hypothesis	Characteristics of smartphone use	Correlation (r)	Significant (p)
H1	Tolerance	0.653	0.000
H2	Withdrawal	0.691	0.000
H3	Positive Expectancy	0.647	0.000
H4	Interference with daily routine	0.669	0.000

4.5.1 Result

H1: *There is a relationship between tolerance and smartphone addiction*.

Refer to table 8 above; tolerance was positively and significantly correlated with smartphone addiction, r (0.653), p (0.000). Hence, H1 is accepted.

H2: *There is a relationship between withdrawal and smartphone addiction*.

Based on table 8 above, withdrawal was positively and significantly correlated with smartphone addiction, r (0.691), p (0.000). Hence, H2 is accepted.

H3: *There is a relationship between positive expectancy and smartphone addiction*.

Refer to table 8 above, positive expectancy was positively and significantly correlated with smartphone addiction, r (0.647), p (0.000). Hence, H3 is accepted.

H4: *There is a relationship between interference with daily routine and smartphone addiction*.

Based on table 8 above, interference with daily routine was positively and significantly correlated with smartphone addiction, r (0.669), p (0.000). Hence, H4 is accepted.

5. Discussion and Conclusion

This chapter is a discussion based on the data analysed in the chapter before, hence follow up by the summary of findings of the research and present the methods for other researchers as a suggestion to improve in future research. This chapter also includes the limitations of the study, as a reference and recommendations for further research to prevent it happen again. The conclusion will be stated in the last part of the study.

5.1 Discussions on the Main Findings

The purpose of this research is to study the relationship between smartphone addiction and characteristics of smartphone use among UTHM students. Characteristics of smartphone use separated into four instruments which are tolerance, withdrawal, positive expectancy, and interference with daily routine. The explanations of the research that will be based on the objective which to determine the relationship between tolerance and smartphone addiction; to determine the relationship between withdrawal and smartphone addiction; to determine the relationship between positive expectancy and smartphone addiction; to determine the relationship between interference with daily routine and smartphone addiction. All the objectives analysed by using correlation analysis which is Spearman's rho test. The result indicated a positive and strong relationship between all the characteristics of smartphone use and smartphone addiction.

5.2 Implications of Theoretical and Practical

Tolerance and withdrawal could only be controlled by self-control. Smartphone is a gadget full of applications including entertainment, social media, health care system, etc. However, the "smartness" of the smartphone is yet to be fully exploited by consumers. Most of the usages are entertainments, instant messaging, Internet browsing, and email. Other functions of smartphones, such as GPS, document editing, and business-related functions, are not commonly utilised (Osman *et al*., 2012). Individual without self-control might face the increased of smartphone addiction level once consumers have explored these functions.

Apart from the self-control, interference with daily routine could be controlled by policies and rules in the workplace or study place. According to the previous study, students who showed greater addictive behaviours disagreed with establishing policies to guide the use of smartphones in the lecture setting. There are no universally accepted guidelines or standards for the use of smartphone in the lecture setting (Cho & Lee, 2015). Indeed, the smartphone could improve communication and easy access to look for the knowledge that not included in the slide show. However, the smartphone also leads to distractions or interruptions during the lecture, especially when lecturer spreading important message or information.

5.3 Limitations

There are some limitations in this study, firstly regarding the respondents. As mentioned in this study, respondents are targeted to students in UTHM. The expectation of the data received is 375 respondents, but the researcher only received 283 respondents. The reason why the researcher only received 75.5% of respondents is that it is difficult to reach to all students in UTHM. However, the questionnaires were distributed through online as UTHM separated into two campuses (Parit Raja and Pagoh) which consists of different faculties.

Second, the researcher faced the challenge after received the data from online questionnaires answered by students UTHM. Some of the respondents answering the questions distributed without faithful and truthful. It might consist of some reason, such as they have not enough time to answer their

questionnaire. Otherwise, they might not understand some words or phrases in the questionnaire. Hence, results attained after analysing the data might be different from previous studies.

Lastly, the online questionnaire limited communication between research and respondents. Communication happened when research started to conduct a pilot test with only involved the first 30 respondents. Communication required to explain the objectives and words or phrases as a knowledge for respondents regarding the current study. It might not affect the result if communication was successfully between the researcher and respondents.

5.4 Directions for Future Research

Some directions and recommendations were drawn to become a reference for future research. The research scope considered to enlarge into the whole community in UTHM, such as increase the respondent, including students and staffs in UTHM.

A future study could consider researching by distributing the questionnaire face-to-face with respondents instead of using an online questionnaire. This can overcome the communication problem.

The researcher should prepare enough time or begin earlier for collecting data to increase the efficiency of the data collection process. Different methodologies could be considered, such as interview and survey. Different methods used for collecting data will indicate a different result, and the result might more accurate than current research.

Characteristics of smartphone use are encouraged to increase in future research, which means not only using the four dimensions (tolerance, withdrawal, positive expectancy, and interference with daily routine). Increasing in the dimension enrich the coverage of characteristics of smartphone use and indicate a better result for the research.

5.5 Conclusion

This study has been conducted for the quarter of the year, and it has successfully answered all study objectives, as well as providing empirical evidence of the relationship between characteristics of smartphone use and smartphone addiction among students in UTHM. All the implications, limitations, and recommendations for future studies of the current study have been discussed.

The researcher hopes that the findings could be one of the starting points for other research on smartphone addiction to control the trend and decrease smartphone addiction level among students. Further studies are encouraged to be undertaken to enhance and enrich the knowledge of smartphone addiction and market trends in Malaysia.

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