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SMARTPHONE ADDICTION AND LONELINESS AMONG STUDENTS

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Abstract

Smartphones are becoming necessary in an individual's daily life, especially when everything is within the palm. Smartphone becomes problematic when there is uncontrolled usage, which could harm various aspects. Loneliness can occur when an individual is alone and even surrounded by people. In order to further explore the correlation between smartphone addiction and loneliness, this study is conducted to identify the association between smartphone addiction and loneliness among undergraduate students in Malaysia. A total of 308 undergraduate students were involved in this study. The instruments used were Smartphone Addiction Scale Short Version (SAS-SV) and UCLA Loneliness Scale (Version 3). The results indicate that 60.7% of participants reported having a moderate smartphone addiction, and 42.24% had a moderately high level of loneliness. Pearson's Correlation results show a significantly weak positive relationship between smartphone addiction and loneliness among undergraduate students. This finding can give insight into smartphone addiction and loneliness, contribute data to future studies, and recommend initiatives to improve undergraduate students' well-being.

Keywords: loneliness; smartphone addiction; university students

Abstrak

Telefon pintar sudah pasti menjadi satu keperluan dalam kehidupan seharian individu terutamanya apabila segala-galanya berada dalam genggaman tangan. Telefon pintar menjadi bermasalah apabila terdapat penggunaan yang tidak terkawal yang boleh mengakibatkan kemudaratan dalam pelbagai aspek. Kesepian boleh berlaku apabila seseorang individu itu bersendirian dan walaupun mereka dikelilingi dengan orang ramai. Oleh itu, kajian ini dijalankan untuk mengenal pasti hubungan antara ketagihan telefon pintar dan kesunyian dalam kalangan pelajar sarjana muda di Malaysia. Seramai 308 pelajar sarjana muda terlibat dalam kajian ini. Instrumen yang digunakan ialah *Smartphone Addiction Scale Short Version (SAS-SV)* dan *UCLA Loneliness Scale (Versi 3).* Keputusan menunjukkan bahawa 60.7% daripada peserta dilaporkan mempunyai tahap ketagihan telefon pintar yang sederhana dan 42.24% daripada peserta mempunyai tahap kesepian yang sederhana tinggi. Hasil daripada Korelasi Pearson menunjukkan bahawa terdapat hubungan positif yang lemah yang signifikan antara ketagihan telefon pintar dan kesunyian dalam kalangan pelajar sarjana muda. Dapatan ini dapat memberi gambaran tentang tahap ketagihan dan kesunyian telefon pintar dan menyumbang data kepada kajian masa depan dan mengesyorkan inisiatif yang perlu diambil untuk meningkatkan kesejahteraan pelajar sarjana muda.

Kata kunci: kesepian; ketagihan telefon pintar; pelajar universiti

1.0 INTRODUCTION

Smartphones are inevitably becoming a necessity in an individual's daily life, especially when everything within the palm of the hand, whether it is to connect with others, have quick access Internet and social media, catch up on the latest news, shop, online payment, or e-wallet and even entertainment. Digital 2021 Global Overview reported that there are 5.22 billion mobile phone users on January 2021 which is 66.6% of the total population in the world (Hootsuite & We Are Social, 2021a). Meanwhile, Malaysia had 39.99 million mobile connections (Hootsuite & We Are Social, 2021b). According to Malaysian Communications and Multimedia Commission (2018), the smartphone users increased by 24.6 % within 5 years from the year 2014 (53.4%) to 2018 (78.0%) and the two top age group that has the smartphones are those age 20 to 34 years old by 87% and also those below 20 years old by 86.3%.

It can be seen as a gadget or device that can help ease the task that was once seen as challenging to be done, and it consists of various applications to cater to the needs of the individuals. Smartphone addiction can be defined in terms of behavioral addiction. Griffiths (1996) stated that it is characterized as behavioral addictions (non-chemical) that require interaction between humans and machines characterized as technological addictions. Although behavioral addiction is in the latest Diagnostic and Statistical Manual of Mental Disorders (DSM-5)

by the American Psychiatric Association (2013) and consist of only gambling disorder, its criteria serve as guidance in developing items to measure smartphone addiction (Kwon et al., 2013). Smartphone becomes problematic when there is uncontrolled usage, which could harm various aspects. Due to smartphones having various purposes and conveniences, consumers tend to occupy their time with them and become too attached to them (Ting & Chen, 2020). Excessive smartphone use can lead to addiction, which can occur without the user's knowledge and is incorporated into their everyday life.

With the convenience and variety of smartphone functions, users can get overly hooked and distracted by their devices (Ting & Chen, 2020). Female students use smartphones for communication purposes, such as messaging and chatting. In contrast, male students use smartphones for entertainment, such as playing games and music. This leads them to use the smartphone for longer and is associated with increased smartphone addiction behaviors (Lee & Kim, 2018). Social media is easily accessed through smartphones, which could be associated with addiction. For example, a study by Sözbilir and Dursun (2018) shows that social media usage is positively associated with smartphone addiction. Such behaviors may provide adolescents with temporary relief and an escape from their problems, but it is not helpful in the long run because the problems are still not resolved (Ting & Chen, 2020). Other than that, 69.1% of females and 63% of males experience nomophobia, which is the fear of being disconnected from their mobile phones in a state of moderate and severe (Louragli et al., 2018). Besides, the fear of missing out contributes to smartphone addiction (Gezgin, 2018). A personality trait could also lead to smartphone addiction such a study found that higher narcissism was positively correlated with excessive use of smartphones regardless of gender (Giordano et al., 2019)

On the other hand, loneliness is a state or feeling most people do not prefer to be in and can be seen as being physically and psychologically alone. Loneliness is an uncomfortable feeling that arises when a person's relationship with others severely lacks quantity or quality (Peplau et al., 1982). Loneliness can occur when an individual is alone and even surrounded by people. Individuals who go through loneliness differ from one another and can bring different impacts when the feeling does not reside. In terms of age, younger individuals showed to experience loneliness more than older individuals aged 25 to 29 at the top (Richard et al., 2017). Females experienced more severe loneliness than males (Beutel et al., 2017; Okwaraji et al., 2018).

Studies have found that loneliness decreases mental health such as depression (Beutel et al., 2017; Stickley & Koyanagi, 2018; Wang et al., 2018) and anxiety (Beutel et al., 2017; Stickley & Koyanagi, 2018). It is also found that ideation of suicide may be linked to loneliness (Beutel et al., 2017). Also, lonely people are more likely to have multiple physical diseases (Stickley & Koyanagi, 2018). Similar to smartphone addiction, problematic Internet usage or addiction is associated with loneliness as it can be a medium that can promote loneliness or reduce it. Studies show that problematic Internet usage is significantly associated with loneliness (Costa et al., 2019; Erol & Cirak, 2019; Simcharoen et al., 2018; Zhang et al., 2018). This shows that internet usage caters to loneliness which is worrisome. In contrast, loneliness negatively affects social support (Stickley & Koyanagi, 2018; Zhang et al., 2018). Loneliness can bring various implications to an individual and is associated with factors that may not seem connected to loneliness. In the current COVID-19 pandemic, it is challenging to prevent loneliness regardless of age. This is especially true when important people are lost in an individual's life (Beam & Kim, 2020).

The association between smartphone addiction and loneliness is less studied than other variables, such as depression and psychological effects. Also, smartphones and loneliness are more studied in countries such as Iran (Jafari et al., 2019; Parashkouh et al., 2018), Turkey (Aktürk et al., 2018; Dikeç et al., 2017; Kürtüncü et al., 2020; Sönmez et al., 2021; Yalçin et al., 2020), Indonesia (Hidayati, 2019) and Korea (Kim, 2017) than in Malaysia within the past five years. The researcher's two studies research both variables in Malaysia: Wong et al. (2016) and Ujang et al. (2016). This shows a discrepancy in the number of studies related to both variables, especially in Malaysia.

The population studied for both variables is more familiar with adolescent conduct than university students. In terms of university students, previous studies study specifically in one faculty or one type of program in a university, such as nursing students (Sönmez et al., 2021), medical sciences (Jafari et al., 2019), communications (Aktaş & Yılmaz, 2017). However, the study by Hidayati (2019) was conducted on university students regardless of program or faculty in one university. Thus, this study is conducted on undergraduate students in Malaysia, whether public or private universities, regardless of program or faculty.

Lastly, this study can provide information to society on smartphone addiction and loneliness and bring awareness to reduce smartphone addiction and loneliness not only in undergraduate students but also in society. Hence, this study will examine the relationship between smartphone addiction and loneliness among undergraduate students due to the inconsistent results and various populations from the previous study.

■2.0 LITERATURE REVIEW

Smartphone Addiction

Smartphone addiction has become a problem, especially in this era where various people own a smartphone. Previous studies have investigated the prevalence of age at risk of smartphone addiction, the antecedent, and the effect of smartphone addiction on individuals. A study by Gezgin (2018) found that there is a positive association between smartphone addiction and the ages of high school students (14-19 years old) in the study. This alludes that older high school students are more addicted to smartphones than younger high school students. Also, smartphone addiction can interfere with sleep duration, as there is a negative correlation between the two variables. When smartphone addiction increases, the duration of sleep decreases. In addition, there is a significant positive relationship between smartphone addiction and students' duration of owning a smartphone, frequency of SNS checking, daily duration of SNS use, and fear of missing out (FOMO). In addition to that, FOMO was the top antecedent to smartphone addiction. It can be assumed that high school students fear missing out on what is shown on their smartphones, such as on SNS.

Smartphone addiction among university students can be seen differently in terms of the course taken. The percentage of smartphone addiction among Egyptian physical therapy students was high (62.4%), with females being more addicted (Soliman Elserty et al., 2020). In terms of nursery/midwifery students, it was reported that women were also shown to have more excellent rates of smartphone addiction than males, and there was a statistically significant difference between gender and mean scale scores (Serin et al., 2019). In a study

comparing the smartphone addiction level between nursing and medical students, nursing students scored higher on the short-version smartphone addiction scale than medical students (Celikkalp et al., 2020). This may be due to the fact that most nursing students are female.

Other than that, studies show that most of their participants are smartphone addicts. It is revealed that 48% of the participants in a study conducted by Aljomaa et al. (2016) were addicted to smartphones. Furthermore, males scored higher than females in terms of the overuse of smartphones in this study. In contrast, some studies reported that university students have a common smartphone addiction. 6.47 % of students had SAS-SV scores that were "significantly higher" than the mean SAS-SV score of the participating group. The level of smartphone addiction may differ between gender. Demirci et al. (2015) found that females scored significantly higher than males based on the Smartphone Addiction Scale (SAS) scores. While some studies regard a difference in the level of smartphone addiction between gender, other studies revealed that gender is not associated with this variable. There was no association between gender and smartphone addiction scale in the study done by Matar Boumosleh and Jaalouk (2017). Also, Hawi and Samaha (2016) revealed that both male and female university students were equally vulnerable to smartphone addiction.

Smartphone addiction can be seen in the Pathway Model of Problematic Mobile Phone Use (PMPU). Problematic Mobile Phone Use (PMPU) has been considered a behavioral addiction in past studies. However, Billieux et al. (2015) state that it does not consider the distinctiveness and discrepancy of its symptoms and correlated risk factors. The Pathway Model of Problematic Mobile Phone Use hypothesized that there are three pathways preceding PMPU, which are the excessive reassurance pathway, impulsive pathway, and extraversion pathway. The pathways are affected by the individual's psychological characteristics, which can cause a variety of uses and misuses.

Loneliness

Loneliness can be experienced by everyone regardless of age. A study by Richard et al. (2017) reported that feeling lonely was the highest in participants aged 25 to 29. Also, older participants felt less lonely than younger participants. In addition, 26% to 47% of people in all age groups felt lonely at least once, quite often, or very often. Participants who reported feeling lonely were significantly more likely to have chronic diseases, hypercholesterolemia, diabetes, distress and depression, poor self-rated health, and more visits to medical doctors than those who did not report feeling lonely. In terms of linking loneliness and lifestyle, feeling lonely was linked to smoking, lack of physical activity, and failure to follow the fruit and vegetable consumption guidelines (Richard et al., 2017). This shows that loneliness is somehow associated with lifestyle in terms of smoking, physical activities, and diet.

Hysing et al. (2020) studied loneliness among university students in Norway using the data from the Students' Health and Wellbeing Study (SHoT study). Whereby in Norway is a national student survey for higher education. The data from the years 2014 and 2018 were chosen to be used in this study. Full-time Norwegian students less than the age of 35 years old participated in the survey. The results reported that the feeling of loneliness was widespread among Norwegian full-time students in 2018. There was a curvilinear relationship between age, as the youngest and oldest students indicated the highest levels of loneliness across all loneliness indices. In terms of gender, being female contributed to loneliness, and this study further studied that those who live alone and are studying about contribute to the feeling of loneliness. Another study also used data from the international cross-national Health Behaviour in School-aged Children study (HBSC) in Denmark and compared the prevalence of loneliness in 1991, 1994, 1998, 2006, and 2014 among adolescents (Madsen et al., 2018). It was reported that 6.3% feel lonely, and the trend of loneliness increased by 2.8% from 1991 (4.4%) to 2014 (7.2%).

Other than that, a study revealed that first-year undergraduate students from a university in Pennsylvania were categorized as having a high level of loneliness. The indicator of a high level of loneliness is those who scored more than 40 on the UCLA loneliness questionnaire (Doryab et al., 2019). Results from the presurvey reported that 63.8% of participants and 58.8% of the post-survey participants from the post-survey scored above 40. This may indicate that first-year undergraduate students may have high loneliness. This is supported by Doryab et al. (2019), implying that this age group was the most lonely of the generations questioned.

The discrepancy model of loneliness developed by Perlman and Peplau (1998) shows that loneliness is present due to a significant mismatch or inconsistency between a person's current social relations and his or her needed or desired social relationships. This can mean that a person's actual or current social relation does not meet the level or threshold of the desired social relations with others.

Relationship between Smartphone Addiction and Stress

The underpinning model that can relate smartphone addiction and loneliness are "Components Model of Addiction" by Griffiths (2005). All addictions have several distinct elements in common: salience, mood modification, tolerance, withdrawal, conflict, and relapse. According to Griffiths (2005), addiction is regarded as a biopsychosocial process, and the components model aids in comprehending the processes. In this study, smartphone addiction can be related to the six components of addiction from the model. *Salience* happens when smartphone use becomes the top priority in their life, influencing their cognition, emotion, and behavior. It can be seen that smartphone addiction can affect their emotions and behavior, such as loneliness. Next, *mood modification* is a subjective experience because of excessive smartphone use. In this case, loneliness can be the product of smartphone addiction. *Tolerance* related to smartphone use is increased to reach the previous effects. It can be said that tolerance in the relationship between smartphone addiction and loneliness is not considered as it does not touch the factors leading to smartphone addiction. *Withdrawal* symptoms are when smartphone use is stopped or drastically reduced, and displeasing feelings and/or physical impacts occur. When there is a withdrawal from smartphone addiction, unwanted feelings such as loneliness can occur. Also, *conflict* refers to the interpersonal conflict between the individual with smartphone addiction and others around them or conflict within themselves on smartphone addiction. In this study, it can be assumed that loneliness is part of the conflict component because smartphone addiction can cause conflict with individuals and others due to a lack of social interaction. Lastly, *relapse* refers to the likelihood of smartphone addiction patterns recurring even after the duration of time of control. Hence, this study's component model of addiction is an underpinning model.

It can be seen from previous studies that the relationship between smartphone addiction and loneliness is in a population of university students. This can be seen in the study done by Sönmez et al. (2021), where the population is nursing students from a university in the western Black Sea region, while another study conducted by Jafari et al. (2019) consists of university students from Kermanshah University of Medical Sciences (KUMS). The difference between the two studies is that one specifies which course they are taking in the

university as their sample, which is university students; the latter study took all the students in the university. However, the results from both studies show a difference as one shows a positive correlation between smartphone addiction and loneliness (Sönmez et al., 2021) while the other shows a significant, negative correlation between mobile phone addiction and a sense of loneliness (Jafari et al., 2019). It can be seen that although the population from both studies are university students, the results can differ as there are limitations due to the different cultural norms and regions studied that cannot be generalized to all nursing students (Sönmez et al., 2021). Besides, the self-reported questionnaire can also be a limitation to the accuracy of results (Jafari et al., 2019). Thus, it is recommended that future studies have a more significant sample.

Besides that, Parashkouh et al. (2018) studied the relationship between smartphone addiction and loneliness using the Cell phone Overuse Scale and Los Angeles (UCLA) Loneliness Scale to measure the variable, respectively. On the other hand, a study by Yalçin et al. (2020) used the Turkish Smartphone Addiction Scale to measure smartphone addiction, while the UCLA Loneliness Scale short form (ULS-8) in the Turkish version was used to measure loneliness. It can be seen that UCLA has other versions in terms of length and language. Also, the respondents were chosen by cluster sampling (Parashkouh et al., 2018) and convenience sampling method (Yalçin et al., 2020). Nevertheless, the results from both studies show a significant, small, and positive relationship between the two variables.

Following the results from previous studies, studies by Dikeç et al. (2017) and Hidayati (2019) also reported that there is a positive relationship between smartphone addiction and loneliness with a correlation value of 0.202 (p= 0.00) and 0.227 (p= 0.000). To add to this, the adolescent was the population in the study, but the age of adolescents differed in both studies as the respondents were between the age of 13 to 19 years old (Dikeç et al., 2017) and 18 to 22 years old (Hidayati, 2019). This indicates that the higher the level of smartphone addiction, the higher the level of loneliness in adolescents (Hidayati, 2019). From this, the studies suggest that adolescents can utilize more time on significant activities in managing and restricting themselves from occupying their smartphones (Hidayati, 2019) and should be checked regularly to see if they show any signs of addiction (Dikeç et al., 2017).

The population studied by Yayan et al. (2019) differed from other studies as working young was their target respondents, using the snowball sampling method. The outcome shows a strong positive association between smartphone addiction and loneliness among working young people with a correlational value of 0.393, which is significant at a 0.05 level (two-tailed) and a p-value of 0.000. In other words, as smartphone addiction increases, loneliness also increases. In contrast to the study by Yayan et al. (2019), Kürtüncü et al. (2020) portrayed a negative correlation between smartphone addiction and loneliness. This indicates that when smartphone addiction increases, the sense of loneliness decreases (Kürtüncü et al., 2020). It can be assumed that the higher the phone usage, the lesser the feeling of loneliness as they are preoccupied with their phones. However, using the random sampling method was a limitation of this study as it may affect generalizing the outcome of the study.

Besides that, Wong et al. (2016) and Ujang et al. (2016) have studied the relationship between smartphone addiction and loneliness in Malaysia. The population used in both studies were university students from Universiti Tunku Abdul Rahman (UTAR) Perak campus and Universiti Teknologi Mara (UiTM) Raub, respectively. In addition to that, it is found that there is a positive relationship between smartphone addiction and loneliness among university students (Ujang et al., 2016; Wong et al., 2016). One limitation is that the respondents were from the same faculty, and there was an imbalance in the diversity of the respondents (Wong et al., 2016). Furthermore, the respondents were from five programs (Ujang et al., 2016) which could affect generalization. Future studies are recommended to identify the habits of smartphone addiction and methods to relax when loneliness occurs (Ujang et al., 2016) and to improve the reliability and validity of further studies, it is suggested to expand the population by not only a having the participants from only one university but various universities in Malaysia.Therefore, this study will test on the relationship between smartphone addiction and loneliness.

H1: The higher the smartphone addiction among university students in Malaysia, the higher their loneliness.

Figure 1 illustrates the conceptual framework of smartphone addiction and loneliness. The arrow from the independent variable, smartphone addiction, to the dependent variable, loneliness, shows the relationship between them. According to the hypothesis, it is predicted to have a significant positive correlation between the two variables.

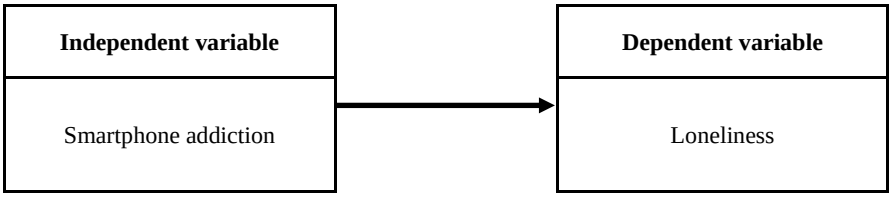

Figure 1 Conceptual Framework of the Study

3.0 METHODOLOGY

Research Design

The study applied a quantitative approach, a descriptive and correlational study, to investigate the relationship between the independent and dependent variable, the relationship between smartphone addiction and loneliness among undergraduate students in Malaysia. Also, it is a cross-sectional study which refers to a study conducted in a one-time frame that will be used to meet the objective of this study.

Sample and Procedure

The total population of undergraduate students in UTM from all faculties as of January 2021 is 15,678 (Universiti Teknologi Malaysia, 2021). The target sample size is approximately 375 undergraduate students, according to the total sample size determination by Krejcie and Morgan (1970). The samples were selected using non-random sampling. This is a cross-sectional study where quantitative methods were

used by distributing questionnaires as data collection. Convenience and snowball sampling was used in this study, where the link to the questionnaire will be distributed to undergraduate students of UTM through online platforms such as email, WhatsApp, Facebook and Instagram. In total, 303 respondents took part in the survey online.

Measures

Smartphone Addiction Scale Short Version (SAS-SV)

Smartphone Addiction Scale Short Version (SAS-SV), developed by Kwon et al. (2013), is used in this section to assess smartphone addiction in respondents. Ten items in the questionnaire measure the degree of the smartphone by using a six-point Likert scale ranging from "Strongly disagree" to "Strongly agree." An example of an item from this scale is *"Having a hard time concentrating in class while doing assignments or while working due to smartphone use."* To calculate the level of smartphone addiction, The level of smartphone addiction among undergraduate students in UTM will be identified by calculating the total mean score. Cronbach's alpha coefficient for internal consistency and concurrent validity in the original validation study was 0.91. The scale has high reliability and concurrent validity when adopted among college students in the United States, with a Cronbach alpha of 0.84 (Harris et al., 2020).

The UCLA Loneliness Scale (Version 3)

The UCLA Loneliness Scale (Version 3), developed by Russell (1996), assesses the level of loneliness and is the dependent variable of this study among undergraduate students. There are 20 items in this questionnaire, and nine of the items are reversed items which are listed in table 3.1. An example of a reversed question is question 1 *"How often do you feel that you are "in tune" with the people around you?"* A high rate for this question indicates a low score of loneliness. In addition, this questionnaire uses a four-point Likert scale to calculate the degree of loneliness from never (1) to always (4). The total score for each respondent is determined by adding all responses for a score ranging from 20 to 80. The reliability of this scale is high as it obtained an internal consistency Cronbach alpha ranging from 0.89 to 0.94. Moreover, in a study by Sönmez et al. (2021), Cronbach's Alpha coefficient was found to be high at 0.85.

Data Analysis

Descriptive analysis

The demographic data obtained from section A, such as age, gender, ethnicity, nationality, year of study, and faculty name, will be analyzed using central tendency: mean, median, minimum, frequency, percentage, and standard deviation. As for the data obtained on smartphone addiction and loneliness from section B and section C, central tendency and frequency distribution will be used to analyze the score. Furthermore, the mean score will be employed to determine smartphone addiction and loneliness among undergraduate students of UTM. The dependent and independent variables are measured by low, moderate, and high. The Smartphone Addiction Scale Short Version (SAS-SV) consisted of a 6-point Likert scale ranging from 1 (Strongly disagree) to 6 (Strongly agree). The level of smartphone addiction among undergraduate students in UTM will be identified by calculating the total mean score. The total score of the UCLA Loneliness Scale (Version 3) will indicate the degree of loneliness of UTM undergraduate students. In order to classify the level of loneliness among undergraduate students in UTM, it will be determined by incorporating the loneliness classification scheme by Perry (1990).

Inferential Analysis

To test the hypotheses in the study and the correlation between smartphone addiction and loneliness, Pearson Correlation indicates the strength of correlation or association between the two variables to be studied. This study will examine the significant relationship between smartphone addiction and loneliness among undergraduate students of UTM. The Pearson Correlation coefficient (r) shows the direction and magnitude of a correlation (Goodwin & Goodwin, 2016) where in this study, the magnitude of the relationship between smartphone addiction and loneliness.

Pilot Study

To conduct the pilot study, 20 respondents of undergraduate students from universities other than UTM were randomly selected under voluntary participation. Hertzog (2008) stated that it is occasionally sufficient with sample sizes as small as 10–15 for each group, which will determine the nature of the estimated decision. Based on this, it can be seen that 20 respondents can be seen as adequate for this pilot study. Also, the respondents are suitable to be used in the pilot study because they are also undergraduate students in Malaysia and also to avoid UTM students retaking the same questionnaire further, which could cause bias. Next, Cronbach's alpha is calculated to determine the reliability of the questionnaire used in the study. The reliability of smartphone addiction items has good internal consistency with Cronbach's alpha of 0.82, while loneliness items have high internal consistency with Cronbach's alpha of 0.92.

Ethical Consideration

Informed consent will be attached to the questionnaire, and completing it will indicate that they have given their informed consent. Besides, this study will have no misconduct, such as data fabrication. Most importantly, anonymity and confidentiality of the respondents and the data collected will be practiced. All the information gained from the study will be kept confidential and only used for the research, and the respondents' identities will not be known.

■4.0 RESULTS

Among 303 respondents, 214 (70.6%) were female, and 89 (29.4%) were male. Their age ranged from 18 to 40 years old, and the mean age was 21.47. It indicated that most respondents are between 22 to 23 years old (44.5%), followed by those aged between 20 to 21 years old (37.3%). Meanwhile, the respondents aged 19 and below were the second lowest, with 12.8%. The age of 24 and above (5.2 %) represents the minority number of ages as shown in Table 1. As for ethnicity, the respondents consisted of Malay (65%) which is followed by Indian (14.5%), Chinese (12.2%) and others (8.3%).

Table 1 Sociodemographic of the respondents

Variables	Category	Frequency (f)	Percentage (%)
Gender	Male	89	89
	Female	214	214
Age	19 and below	39	39
	20-21 years old	113	113
	22-23 years old	135	135
	24-25 years old	10	10
	26 years old and above	6	6
Ethnicity	Malay	197	197
	Chinese	37	37
	Indian	44	44
	Others	25	25

Table 2 represents the level of smartphone addiction among undergraduate students. The findings proposed that the majority of the respondent (60.7%) have a moderate level of phone addiction, with 123 respondents at this level. It is followed by 25.4% of respondents (N=77) reporting having a high level of smartphone addiction, and only 13.9% of respondents perceive a low level of smartphone addiction. The respondent's total score ranged from 10 to 60 with a mean score of 36.88 (SD= 96.32), where it can be seen that the average degree of smartphone addiction is moderate. Also, it can be seen that the total score of 31 is the score that is most obtained among the respondents

Table 2 Level of Smartphone Addiction

Total Mean Score	Frequency (f)	Percentage (%)
Low	42	13.9
Moderate	184	60.7
High	77	25.4

The respondent's total score ranged from 22 to 74 with a mean of 49.04 (SD= 9.95), where the average degree of loneliness is moderate. Also, the total score of 51 is the most obtained among the respondents. Table 3 represents the level of loneliness where the percentage of respondents reported to have a moderate and moderately high level of loneliness will be similar with 44.22% (N=134) and 42.24% (N=128) percent, respectively. Only 6.60% (N=20) of the respondents reported a high level of loneliness, the lowest number of respondents among other levels of loneliness. The number of respondents with a low level of loneliness had a difference of one respondent more than the number of respondents with a high level of loneliness at 6.93% (N=21).

Table 3 Level of Loneliness

Total Score	Frequency (f)	Percentage (%)
Low	21	6.93
Moderate	134	44.22
Moderately High	128	42.24
High	20	6.60

The result from Pearson's Correlation in Table 4 shows a relationship between smartphone addiction and loneliness among undergraduate students (r=0.254; p<0.000). Based on the Correlation Coefficient interpretation, there is a weak negative relationship between smartphone addiction and loneliness among undergraduate students, as the value is between 0.00 to 0.29. Therefore, the hypothesis is accepted since p<0.01.

Table 4 Relationship between Smartphone Addiction and Loneliness Among Undergraduate Students

Variables	Loneliness	
	r	p
Smartphone addiction	0.254**	0.000

*Note: **p < 0.01, n = 303

■5.0 DISCUSSION AND RECOMMENDATION

The study's first objective was to examine smartphone addiction among undergraduate students. The findings proposed that 60.7% (N=123) of respondents have moderate phone addiction, followed by 25.4% (N=77) of respondents who reported having high smartphone addiction. This result is contrary to the study done by Nikmat et al. (2018), where 52.2% of the participants had a chance of being addicted to smartphones. However, the respondents were also university students. Another study reported that 49% of respondents used their smartphones excessively (Matar Boumosleh & Jaalouk, 2017). The results may vary with other studies due to demographic factors such as the location of the study and the university. Mobile addiction among adolescents in higher education was also reported to have the highest percentage at a moderate level (67%) for all 30 items that measured mobile addiction (Fook et al., 2020). The moderate and high levels of smartphone addiction may be due to smartphones becoming a necessity for communication among people. A study supports this stance conducted by Lei et al. (2020), where smartphone addiction is prevalent (40.6 %) in the study due to smartphones becoming the primary mode of communication for Malaysians and others. Additionally, the COVID-19 pandemic may contribute to smartphone use more frequently than usual due to the restrictions on movement. A study conducted during the COVID-19 pandemic reported that 86.9% of Bangladeshi students were classified as problematic smartphone users (Hosen et al., 2021).

In terms of gender, the study reported that female was more likely to be addicted to smartphones, as 51 of the female respondents in the study had a high level of smartphone addiction. In contrast, only 26 male respondents had a high level of smartphone addiction. However, in terms of percentage, 29.21% of males in the study reported a higher level of smartphone addiction than females, with a percentage of 23.83%. This result can be related to the study conducted by Lei et al. (2020), where male students are more likely to be addicted to smartphones (49.2 %) than female students (36.6 %) among USM medical students. Not only that, the ratio of female and male students in this study and Lei et al. (2020) study is similar; there were 70.63% of females in this current study and 68.5% in the previous study. SAS-SV was also used, and the research also took place in Malaysia. Hence, the results are comparable, and females likely have a higher level of smartphone addiction. Other than that, the results are contrary to the previous study, where females had a higher chance of smartphone (40.47%) addiction than males (27.32%) (Kim et al., 2017).

Similarly, females were reported to have higher smartphone addiction than males (Celikkalp et al., 2020; Demirci et al., 2015; Serin et al., 2019; Soliman Elserty et al., 2020). The variation in results may be due to the imbalance of respondents between males and females in the current study, as there were 214 female and only 89 male respondents. Surprisingly, earlier studies by Matar Boumosleh and Jaalouk (2017) and Alosaimi et al. (2016) did not describe the association between gender and smartphone addiction. There were no significant differences in the prevalence of Smartphone Addiction behaviors between genders (Lee & Kim, 2018), and university students were susceptible to smartphone addiction regardless of gender (Hawi & Samaha, 2016).

The second objective is to identify the level of loneliness among undergraduate students. In the study, respondents reported having 44.22% (N=134) moderate and 42.24% (N=128) moderately high levels of loneliness, respectively. Only 6.60% (N=20) of the respondents reported having a high level of loneliness. This finding is similar to the study by Dziedzic et al. (2021), where 42.3% of respondents scored moderate, 7.7% of respondents scored severely, and 6.7 % of respondents scored very severe loneliness. Female high school students score higher De Jong Gierveld Loneliness Scale (DJGLS) for the emotional loneliness subscale. Some studies report that only a small number of participants are likely to have a high level of loneliness, such as by Parashkouh et al. (2018) found that 16.9% attain a higher score than the mean of loneliness. At the same time, other studies reported a low level of loneliness, such as by Bhardwaj and Ashok (2015) and Beutel et al. (2017), where only one in 10 participants ranging from 35 to 74 years experienced some degree of loneliness. The difference in the level of loneliness may be due to the age and cultural background of the participants, as the participants were adolescents in Iran (Parashkouh et al., 2018), adolescents in Mumbai (Bhardwaj & Ashok, 2015) and adults in Germany. Another factor that could contribute to the study result is the lockdown due to COVID-19. Levels of loneliness increased during COVID-19 in undergraduate students compared to before the pandemic (Elmer et al., 2020). Loneliness was common among college students during the mandated lockdown to prevent the spread of coronavirus, with 56.7 percent suffering moderate levels of loneliness and 23.6 percent experiencing severe loneliness (Labrague et al., 2021).

Regarding gender, the study reported that females were likelier to feel lonely, as 17 of the female respondents had a high level of loneliness. In contrast, only 3 of the male respondents had high-level loneliness. Furthermore, in terms of percentage, only 3.37% of males in the study reported having a higher level of loneliness than females, with a percentage of 7.94%, the same percentage for females who have low loneliness. This result is similar to the study by Hysing et al. (2020) and Pagan (2020), where females reported a higher level of loneliness than males. However, other studies revealed no significant difference between gender in the loneliness score (Yavuzer et al., 2019). The inconsistency in results may be due to demographic factors such as cultural background, where previous studies were conducted on students from Germany, Norway, Demark, and Turkey. Other than that, other demographic factors such as age and living status may contribute to the similarities and differences in results.

The third and last objective of the study is to examine the relationship between smartphone addiction and loneliness among undergraduate students. The findings indicate a significant relationship between smartphone addiction and loneliness among undergraduate students ($r=0.254$; $p<0.000$), which is aligned with hypothesis 1. Although there was a significant positive relationship, the significance was minor as it was also reported that there was a weak positive relationship between smartphone addiction and loneliness among undergraduate students. This finding is similar to those done by Parashkouh et al. (2018) and Yalçin et al. (2020), where the results from this study reported a small and positive significant relationship between smartphone addiction and loneliness. A similar study conducted among Indian teenagers reported a significant correlation between mobile phone addiction and loneliness among college students (Bhardwaj & Ashok, 2015).

Other than that, the finding of this study is consistent with the study conducted by Sönmez et al. (2021) but incongruent with the study by Jafari et al. (2019) whereby although the sample is similar to this study which is all the students the university, the result obtained was contrast as it was reported a significant negative relationship between mobile phone addiction and sense of loneliness. This may be due to the courses offered in the current study's university differ from those offered in the sample study done by Jafari et al. (2019), where the university chosen was Kermanshah University of Medical Sciences (KUMS) and the region studied. Also, Kürtüncü et al. (2020) study reported that as smartphone addiction increased, the sense of loneliness lessened.

The results obtained in the study can be supported by previous research done by Ujang et al. (2016) and Wong et al. (2016). These studies share the exact location that was conducted, Malaysia, and the sample, which are undergraduate university students but varies according to which university in Malaysia was chosen for their study. Considering these findings, there is a relationship between smartphone addiction and loneliness, especially among university students in Malaysia. This corresponds to the hypothesis of this study whereby the higher the smartphone addiction among university students in Malaysia, the higher the loneliness among them. An adolescent's excessive use of mobile phones can be a coping method for overcoming daily obstacles (Parashkouh et al., 2018). However, overusing smartphones and becoming addicted may be linked to increased loneliness. Hence, this issue should be observed more.

Based on the underpinning theory that can be related to smartphone addiction and loneliness, "Components Model of Addiction," it shows that the results are relatable to the theory where there is a likelihood that addiction such as smartphone addiction can be connected with components such as salience and conflict in theory. Salience can occur when smartphone use becomes a priority and necessity in a person's life, influencing cognition, emotion, and behavior, such as loneliness. In terms of conflict, smartphone addiction can cause conflict with the individual and others around them, leading to a shortage of social interaction and a sense of loneliness.

■ 6.0 LIMITATIONS AND SUGGESTIONS

There were a few inconsistencies and discrepancies identified while conducting the research, along with several recommendations that can be proposed to improve future research. Firstly, the study's sample size was small and unable to meet the targeted sample participants, and the questionnaire was distributed online due to COVID-19. Not only that, the number ratio between age, gender, ethnicity, and faculty was not balanced. Hence the findings could not be generalized to the population. It is suggested that future samples have a larger target population by conducting research that covers multiple universities and has a balanced ratio of participants in the inspected mentioned. Not only that, but this study also used non-random sampling, such as convenience and snowball sampling, so it is suggested that random sampling is to be used in the future study. Next, it is recommended to insert items regarding smartphone addiction, such as its usage purpose, to obtain more insights into it. Also, this study does not investigate the causal relationship. Thus, it is suggested that upcoming research investigate the cause and effects of smartphone addiction and loneliness.

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■7.0 CONCLUSION

In conclusion, the study has identified a weak significant positive relationship between smartphone addiction and loneliness, where most of the previous studies are aligned with this finding. Therefore, it can be understood that as smartphone addiction increased, the sense of loneliness among undergraduate students also increased. The results indicate that undergraduate students have a moderate and moderately high level of smartphone addiction where it is compared to previous studies. Besides that, there is a moderate level of loneliness felt by the respondent and a portion that had a high level of loneliness. This study provides a deeper understanding of the correlation between smartphone addiction and loneliness among smartphone addicts, which can help decrease their usage of smartphones and manage efficiently in using their smartphone, whether for leisure or educational purpose, and decrease their sense of loneliness physically and emotionally. Not only that, but it gives insights for professionals in health care, such as counselors and psychology officers in universities and other organizations such as hospitals and clinics, to come out with screening, techniques, and interventions such as counseling sessions, workshops, and programs to help reduce smartphone addiction and also a sense of loneliness among university students. Also, this study can help future researchers extensively study this related study by providing data on the variable and population used in this study where other researchers create theories and ways to expand this study, especially in Malaysia. Furthermore, this study can boost smartphone addiction intervention in terms of technological aspects such as education for university students. Lastly, smartphone addiction and loneliness in university students may correlate with students' academic performance or procrastination, which future researchers can study.

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