

Loneliness and Social Anxiety Predicting Smartphone Addiction among Undergraduates in A Malaysian Public University

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Abstract

The youth population comprises individuals who are highly adaptable in general to the use of smartphones on a daily basis for various purposes. However, excessive use of the digital communication tool has caused physical and emotional distress in their daily habits. The main purpose of this study was to determine the relationship between loneliness and smartphone addiction among undergraduates at a Malaysian public university. A total of 318 undergraduates participated in this study, selected via random sampling. Data was collected through a set of self-administered online questionnaire: UCLA-Loneliness Scale-Version 3 was used to measure loneliness; and Smartphone Addiction Scale Short Version was used to measure smartphone addiction. Findings demonstrate a positive correlation between loneliness and smartphone addiction, suggesting that social interaction is vital in preventing problematic or addictive behaviour among undergraduates. The implications of this study for university counsellors, lecturers and management were highlighted to strategise intervention plans to avoid addictive behaviours and promote a healthy mental health state among the students. Recommendations for future research were discussed to expand its focus to various public universities in Malaysia and explore the predictive factors for undergraduates' smartphone addiction.

Keywords: Loneliness, Public University, Smartphone Addiction, Social Anxiety, Undergraduates, Youth

Introduction

Based on hand phone users survey 2018 by Malaysian Communications and Multimedia Commission, more than one out of four smartphone users checked their phone constantly (every 30 minutes or lower), even with no notification. This demonstrates that a majority are not aware of possible smartphone addiction. Aljomaa et al. (2016) reported that 48% of

undergraduate university students were smartphone addicted. The quantity of Malaysians experiencing psychological sickness, for example, despondency and uneasiness issues has ascended from 12% in 2011 to 29% in 2017. Statistics was extracted from the Patron of the Malaysian Psychiatric Association (MPA2017)'s National Health and Morbidity Survey (The Star Online, 2018). The University of Arizona conducted a research that proved that over-reliance on smartphones might increase the risk for depression and loneliness (Blue, 2019). On the other hand, according to Darcin et al. (2016), more than half the students use smartphones in bed at night. Parent & Shapka (2019) also reported that there are about 66% of individuals who reported distress after being isolated from their smartphones. Although there are several factors that could bring smartphone addiction among university students such as depression, impulsivity or distraction, loneliness and social anxiety can be concluded as a core causal factor of smartphone addiction especially among university students. On the other hand, the other factors such as impulsivity are lack of evidence-based past studies. The loneliness factor has evidence-based past studies to support the fact that it has correlation with smartphone addiction among university students. Darcin et al. (2016)'s research on smartphone addiction and its relationship with loneliness has been strongly proven. However, the research has some limitations. First, the study only has a small sample size and all the participants were private university students, meaning the study findings cannot be applied to the general population. At the same time, the researcher also did not look into gender differences. According to the researcher, future prospective, longitudinal studies will aid in the establishment of a probabilistic causal relationship. This research intends to fill the knowledge gap which was not yet fulfilled by previous researchers. Several previous studies have been carried out on the subject, but mostly only investigate the effect of smartphone addiction and not many have been done in Malaysia university students. Therefore, the aim of this research therefore is to examine loneliness and smartphone addiction among undergraduates studying in a Malaysian public university.

Literature Review

The term "smartphone addiction" describes a condition in which people become so preoccupied with their smartphones, neglecting other important aspects in their lives (Al-Barashdi et al., 2014). Several studies defined smartphone addiction as overuse and lack of usage control of such digital devices. Attempts to control are followed by withdrawal, which lead to unstoppable use of smartphones and being oblivious to the possible negative outcomes that can occur (Wu et al., 2013; Kim et al., 2014; Mok et al., 2014). Sohn et al. (2021) also showed that university students who are addicted to smartphones experience poor quality of sleep. Previous research has linked smartphone addiction to low academic performance, impaired social relationship, interaction difficulties and impaired behavioral attitude. Excessive smartphone use is also linked to higher risks of physical impairment, such as musculoskeletal pain, blurred vision, hearing impairment, and headache (Soni et al., 2017). Depression and feeling isolated are experienced when smartphone addicts are separated from their smartphone (Alhassan et al., 2018), indicating that excessive use of smartphones have negative influences on individuals' overall wellness.

Loneliness is a condition in which a person is unhappy or experiences an undesirable or lack of social relationship. It is as lack of personal sense of intimacy and social interaction with others at social events (Thomas, 2015). Peplau and Perlman (1982) describe in their study that loneliness is defined in three themes: (i) it results from deficiencies in social relationships; (ii) it is a psychological experience that is internal and subjective, and it is different with

physical isolation; and (iii) it is a negative and distressing psychological emotion that motivates people to try to overcome it (Jones et al., 1990). On the other hand, social anxiety refers to the feeling of tension or discomfort in social situation (Rapee & Heimberg, 1997). The fear or discomfort feeling from being involved in social events can influence the academic and social aspects of one's life, affecting their day-to-day tasks. Based on DSM-5, social anxiety is an avoidance of social situations that will produce anxiety, or making individual having an intense worry and nervous that seriously affect daily life (Mayo Clinic, 2017).

Several studies have shown that loneliness is a critical predictor of problematic mobile phone use (Bian & Leung, 2015; Ma et al., 2020). A survey study claims that loneliness and smartphone addiction were significantly correlated among 4509 middle school students in China (Zhen et al., 2019). Individuals who are lonely will attempt to fulfill their basic needs through social interaction via internet (Karddefelt-Winther, 2014). This is consistent with Dikec et al.'s (2017) study that reported positive correlation between the two variables among adolescents. The research utilises the Smartphone Addiction Scale- Short Version (SAS-SV) and the UCLA Loneliness Scale, in which the participants also reported a high average score on loneliness. As the authors noted, students who mainly used their smartphone for social networking purposes also tend to overuse smartphone. With the rapid technology innovations taking place nowadays, communications are possible without face-to-face interaction. Hence, individuals feeling a sense of loneliness will rely on smartphones to develop social interactions and avoid feeling left-out. However, with no moderation, reliance toward smartphones for emotional and social support can eventually lead to smartphone addiction (Sar, 2013).

With respect to the relationship linking social anxiety and smartphone addiction, Korniienko and Barchi (2020) found that the two positively correlated with each other. Findings by Boumosleh and Jaalouk (2017) support this study, reporting that mood regulation had significant and positive influence on smartphone addiction among 394 Chinese university students. As an alternative method to socialising in a physical space or setting, Reid and Reid (2007) found that individuals with social anxiety will use texting or phone calls to communicate with others. This will likely put individuals with social anxiety in a higher risk to problematic smartphone use. A study by Grieve et al. (2013) reported that Facebook use resulted in decreasing anxiety level. Immersion in smartphones and text communication is appealing to individuals when escaping uncomfortable social situations, giving them a sense of control over the communication (Pugh, 2017). As a result, they may overuse their smartphone in an attempt to avoid social situations. Pugh's (2017) study among 126 participants between the ages of 18 and 54, however, found that social anxiety is not significantly related to smartphone addiction. This may be possible due to the different sample group and instrument used to identify the associating variables.

Turgeman et al. (2020) found that loneliness and social anxiety significantly influence smartphone addiction. The findings showed that, rather than addressing their underlying issues, students who are isolated or feel socially restless can develop compulsive internet use behaviours that negatively impact their academic performance or ability to work collaboratively with others. These adverse results refrain socially anxious individuals from participating in healthy social activities, which leads to loneliness. With the development of internet and data usage today, smartphone use is associated with various type of social media such as Facebook, Instagram and WhatsApp. In fact, past studies have demonstrated that excessive smartphone use coincides with excessive social media use. O'Day and Heimberg (2021) reported that loneliness and social anxiety significantly correlate with problematic

social media use. Atroszko et al. (2018) reported similar results, indicating that psychological problems are linked to and may be a contributing factor in excessive smartphone use.

Nonetheless, despite the widespread use of smartphone among young generation, very limited studies in Malaysia have looked into particular mental structures, such as social anxiety and loneliness, in relation to smartphone addiction. Most studies thus far are carried out on a global scale, and the topic surrounding smartphone addiction will provide important information for the development of future research. Hence, given the increased integration of Internet-based communication and social media use among the Malaysian population, this study aims to learn more about the complex relationship between loneliness, social anxiety and smartphone addiction among university students. This population was selected because it comprises mostly those who are highly adaptable with the use of technology in a daily basis; thus, a study among this population will be significant for educating people in the future, especially as innovation, gadgets, and digital use are gradually becoming a significant part of the lives of the current generations (Moreno-Guerrero et al., 2020). By referring smartphone addiction to the use of smartphone either on social media or other platform, this study explores whether loneliness and social anxiety influence smartphone addiction among undergraduates in a public university in Malaysia. The research questions are as follow:

- 1) What is the level of loneliness, social anxiety and smartphone addiction among undergraduates studying in a Malaysian public university?
- 2) Is there a significant relationship between loneliness, social anxiety and smartphone addiction among undergraduates studying in a Malaysian public university?
- 3) Does loneliness and social anxiety influences smartphone addiction among undergraduates studying in a Malaysian public university?

Theoretical Framework

To test for internet addiction, Davis (2001) developed a cognitive-behavioral model. Despite the fact that smartphone and Internet addictions are not the same, they both involve many similar aspects (Wu, 2018). As shown in Figure 1, maladaptive cognition, which is found at the proximal end of the etiology chain of internet addiction, is a sufficient condition for the emergence of internet addiction, which is the central factor of this model. Individual susceptibility and life events are also thought to influence Internet addiction in this model (Wu, 2018). These two influencing factors are at the distal end of the Internet addiction etiology chain and are required for Internet addiction to occur. Susceptibility is increased when individuals have depression, social anxiety, or a material dependency. Cognitive discrepancy theory and cognitive theory are both used to explain loneliness and social anxiety. These theories guided the aim of this study, which is to examine the correlation between loneliness, social anxiety and smartphone addiction among undergraduates studying in a Malaysian public university.

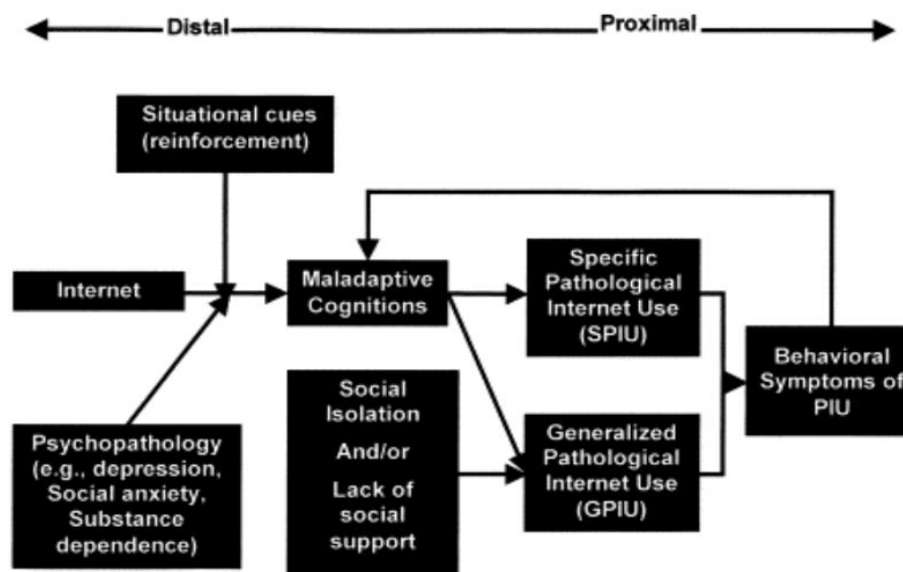


Figure 1. Cognitive-behavioral model of pathological internet use (PIU) developed by Davis (2001)

Methodology

Research Design

This study is conducted using the quantitative approach to identify the relationship between the independent variables (IV), loneliness and social anxiety, and the dependent variable (DV), smartphone addiction. Quantitative method provides the research with a wider coverage and selection of representative participants from certain population (Shaughnessy et al., 2012). Data collection was done via survey form, thus research questionnaires are the primary instrument used in this study to identify the level of loneliness, social anxiety and smartphone addiction among undergraduates at a Malaysian public university.

Population and Sample

The target population was 1292 undergraduate students of Faculty of Educational studies at Universiti Putra Malaysia (UPM). The ideal sample size of this study was selected using the Cochran's formula (1977), which is considered appropriate for large populations and for continuous data. The minimum sample size identified was 297 but adjusted by 10%, totalling to 327 target respondents. This was done to avoid unreachable participants or data imbalance; thus it was considered common that researchers add 10% to the sample size (Sharma et al., 2019).

Respondents were selected via probability sampling based on random sampling method where a total of 318 undergraduates studying in UPM at the Faculty of Educational Studies were chosen to participate and successfully completed the study. Every member is assigned a specific number and a random number generator was used to complete the sampling selection.

Instrument

UCLA-Loneliness Scale (Version 3), Social Interaction Anxiety Scale (SIAS) and Smartphone Addiction Scale-Short Version (SAS-SV) were instruments used in this study to identify loneliness, social anxiety and smartphone addiction respectively. The SAS-SV comprises of six

factors: disturbance in daily life; positive anticipation; withdrawal; cyberspace-oriented relationship; overuse; and tolerance (Kwon et al., 2013). The scale consists of ten items based on a six-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree). The internal consistency of this scale reported a Cronbach's alpha coefficient of 0.911 in Kwon, et al (2013) and 0.870 in Chern et al. (2015), indicating the reliability of the scale to measure smartphone addiction.

The UCLA-Loneliness Scale was developed by Russell et al. (1996), in which the short-form of the Revised UCLA-Loneliness Scale was utilized to assess loneliness. It is a 20-items scale to assess subjective feelings of loneliness and social isolation using a four-point Likert scale, ranging from "never" to "always" (Casey, 2012). There are eleven positive statements in this scale, with the remaining are negative statements (Tan et al., 2013). The total scores are separated into three categories: the score between 15 and 20 is considered normal or moderate level of loneliness; the score between 21 and 30 represents frequent feeling of loneliness and difficulties in having social interactions; and the score between 31 and 40 represents severe loneliness (Russell, 1996). The scale's reliability was high, reporting a Cronbach's alpha correlation coefficient of 0.903 based on a local study among university students (Chern, 2015).

The final instrument used in this study to identify the level of severity, incidence, and clinical outcome of social phobia and anxiety disorders was Mattick and Clarke's (1998) 20-item SIAS. The scale was developed such that respondents rate the level of social anxiety based on their experiences using the Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-V) criteria. The measurement was done using a five-point Likert scale ranging from 0 (not at all characteristic or true) to 4 (extremely characteristic or true). The scoring includes reverse-score items 5, 8, and 11 (Heimberg et al., 1992). The reliability of this scale is high, with Kamal's (2020) study who reported a Cronbach alpha correlation coefficient of 0.90.

Pilot Study

The pilot test was conducted among undergraduates from year 1 through year 4 pursuing a Bachelor in Economics at UPM. They were selected due to factors of convenience and easy access from the researcher, and because they represent a smaller group of the population study, which is undergraduate student in UPM. Questionnaires were distributed through an online platform and a total of 20 respondents successfully participated in the pilot study. Reliability tests showed that all three instruments are reliable during the pilot testing. The internal consistency of SAS-SV, UCLA-Loneliness scale, and SIAS was .841, .960, and .859 respectively.

Data Collection Procedure

Data collection was conducted employing online platforms. Access to the research questionnaires were given to selected respondents via Google Forms where instructions were provided to explain the study's objectives, an overview of the research, participants' criteria and ethical issues surrounding the privacy and confidentiality of the data collected. The questionnaires comprised of four parts: Part I: Demographics; Part II: Smartphone Addiction Scale-Short Version (SAS-SV); Part III: UCLA-Loneliness Scale (Version 3); lastly, Part IV: Social Interaction Anxiety Scale (SIAS). The Google Forms were distributed via a link shared in a Facebook group consisted of most UPM students and a WhatsApp group comprised of undergraduate students from the Faculty of Educational Studies at UPM. The online survey form was also shared through a personal Instagram account, a social media platform

commonly used among the younger age group for socialization, entertainment, and information-seeking purposes, to broaden its accessibility to those who fulfil the requirements of the targeted participants. Completed questionnaires were stored in the Google database for data analysis.

Data Analysis

The Statistical Package of Social Science (SPSS) 25-version was used to analyse the data collected. Respondents' total scores of UCLA-3, SIAS and SAS-SV are analysed descriptively, displaying the mean, standard deviation, and frequency for descriptive statistics. An analysis of Pearson Correlation was used to test the research hypotheses, investigating the relationship between two quantitative and continuous variables. The data is normally distributed and utilized the Likert-scale to measure the level of loneliness, social anxiety and smartphone addiction; thus, it is permissible to analyse using the parametric test (Sullivan & Artino, 2013). Finally, multiple regression analysis was used to identify whether loneliness and social anxiety influences smartphone addiction among respondents

Findings

Socio-demographics of undergraduates in Faculty of Educational Studies, UPM

Analysis of descriptive on the socio-demographics of the respondents showed that majority are female (76.7%) and only 74 are male (23.3 %). More than half of the respondents aged between 18 and 24 years old (76.7%). Malay and Chinese cover similar portions among the respondents (40.3%). The majority of the respondents have both parents (75.8%) and 56.9% reported to be in the lower social economic status. Most of the respondents are Bachelor of Counselling students (28.6%) and Bachelor of education in guidance and counselling (18.2%), which is followed by students in the other six areas of study. Year 4 students comprised the largest percent among the respondents (46.5%). Lastly, most of the respondents reported more than 5 hours in average using smartphone for social media and study purposes. The results of this descriptive analysis reporting the socio-demographics of the respondents are shown in Table 1.

Table 1

Socio-Demographics of Respondents (N=318)

Category		n	%
Age	18 – 24 year old	244	76.7
	25 – 34 year old	66	20.8
	35 – 44 year old	8	2.5
Gender	Male	74	23.3
	Female	244	76.7
Race	Malay	128	40.3
	Chinese	128	40.3
	Indian	23	7.2
	Native of Sabah	23	7.2
	Native of Sarawak	14	4.4
	Other	2	.6
Family	Parents	241	75.8
	Single parent	47	14.8
	No parent	30	9.4

Relationship status	Single	306	96.2
	Married	10	3.1
	Widowed or divorce	2	.6
Social economic status	Low	181	56.9
	Medium	93	29.2
	High	44	13.8
Programme of study	Bachelor of Education in Agricultural Science	28	8.8
	Bachelor of Education in Home Science	17	5.3
	Bachelor of Education in Physical Education	22	6.9
	Bachelor of Education in Guidance and Counselling	58	18.2
	Bachelor of Education in Teaching English as a Second Language	32	10.1
	Bachelor of Education in Malay Language	32	10.1
	Bachelor of Science Human Resources Development	38	11.9
	Bachelor of Counselling	91	28.6
Year of study	Year 1	32	10.1
	Year 2	58	18.2
	Year 3	80	25.2
	Year 4	148	46.5
Average number of hours of Smartphone usage for social media	Less than 1 hour	1	.3
	1 to 2 hours	45	14.2
	3 to 4 hours	66	20.8
	5 to 6 hours	103	32.4
	More than 6 hours	105	33.0
Average number of hours of smartphone usage for study	Less than 1 hour	10	3.1
	1 to 2 hours	71	22.3
	3 to 4 hours	74	23.3
	5 to 6 hours	87	27.4
	More than 6 hours	76	23.9

Further analysis also explore respondents' purposes of using the smartphone (Table 2). The vast majority of the respondents reported that they use smartphone for entertainment purpose (90.6%) and for social interaction (90.3%). More than half of the respondents used smartphone for work (66.7%) and study purposes (89.6%).

Table 2

Purpose of using the Smartphone

Purpose of smartphone use	n	%
Entertainment	288	90.6
Interact with others	287	90.3
Work	212	66.7
Study	285	89.6

Level of Loneliness, Social Anxiety and Smartphone Addiction

Results from an analysis of descriptive on each variables show that more than half of the respondents scored medium level of loneliness (69.8%). Only 51 (16.0%) and 45 (14.2%) respondents experienced underlying low and high levels of loneliness respectively. With respect to social anxiety levels, majority of the respondents scored medium (69.5%). This is followed by 65 (20.4%) and 32 (10.1%) respondents reporting underlying high and low levels of social anxiety respectively. Similar pattern was observed for smartphone addiction level, with most students scored medium (68.6%), which is followed by respondents scoring high (23.6%) and low (7.9%) level of social anxiety. These findings are reported in Table 3, indicating that the majority of the undergraduate students in the Faculty of Educational Studies at UPM experienced moderate levels of loneliness, social anxiety and smartphone addiction.

Table 3

Level of Loneliness, Social Anxiety And Smartphone Addiction

Level	Loneliness		Social Anxiety		Smartphone Addiction	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Low	51	16.0%	32	10.1%	25	7.9%
Med	222	69.8%	221	69.5%	218	68.6%
High	45	14.2%	65	20.4%	75	23.6%

Relationship between Loneliness, Social Anxiety and Smartphone Addiction

Results of the Pearson correlation analysis found that there is a significant but weak relationship between loneliness and smartphone addiction ($r = 0.113$, $p < 0.05$). Similar result was also found between social anxiety and smartphone addiction ($r = 0.228$, $p < 0.05$). The relationship of both independent variables with smartphone addiction was positive, indicating that higher levels of loneliness and social anxiety are associated with higher risk of smartphone addiction among undergraduates in Faculty of Educational Studies, UPM, despite weak in the correlation strength. Table 4 shows the results of the correlation analysis.

Table 4

Analysis of Correlation Between Loneliness, Social Anxiety and Smartphone Addiction

Variable	Smartphone Addiction		
	r	Sig p	Interpretation
Loneliness	.113*	.044	Significant but weak correlation
Social Anxiety	.228**	.000	Significant but weak correlation

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed)

Influence of Loneliness and Social Anxiety on Smartphone Addiction

A regression analysis of various stepwise procedures was performed to identify predictors for smartphone addiction among the respondents. The dependent variable for this study is smartphone addiction and the independent variables are loneliness and social anxiety. The results, as shown in Table 5, found that only one predictor factor appeared as factor that contribute to smartphone addiction, which social anxiety ($F(1, 316)=17.406, p=.000$). Findings reported in Table 6 indicates that social anxiety contribute 5.2% of the variance in smartphone addiction ($B=.228, t=4.172, p=.000, R^2=.052$). This means that social anxiety is a key indicator of smartphone addiction among undergraduates in Faculty of Educational Studies at UPM. Despite significant correlations found between loneliness, social anxiety and smartphone addiction, only social anxiety was found to contribute to smartphone addiction. Thus, the alternative hypothesis is rejected.

Table 5

Analysis of variance of loneliness and social anxiety towards smartphone addiction^a

	Model	Sum of Squares	F	Sig
1	Regression	9.409	17.406	.000 ^b
	Residual	170.827	316	.541
	Total	180.236	317	

a. Dependent variable: smartphone addiction

b. Predictors: (Constant), Loneliness, Social Anxiety

Table 6. The significant test of regression of social anxiety towards smartphone addiction

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	R ²	Contribution
	B	Std Error	Beta				
(Constant)	3.139	.156		20.135	.000	.052	5.2%
Social Anxiety	.287	.069	.228	4.172	.000		

Discussion

Smartphone addiction is a real risk, and the younger population is more susceptible to its dangers. The objectives of this study was to identify the relationship between loneliness, social anxiety and smartphone addiction among students in a selected faculty at UPM. The results showed that most students demonstrate medium levels of loneliness, social anxiety and smartphone addiction. Further analysis also showed that the relationship between the variables are significant; however, when tested for the predicting factors, only social anxiety reported significant contribution to smartphone addiction. Several existing studies support the current findings. Mansourian et al. (2014) and Roberts et al. (2014) reported undergraduate's level of loneliness at medium in their studies. Nonetheless, the reported levels of smartphone addiction in the previous studies vary; Jafari et al. (2019) showed that 71.3% of undergraduates had smartphone addiction in their study in Iran, while Bian and Leung's (2015) study in China reported as low as 13.5% among the respondents who were classified within the same category. The distinction in the smartphone dependence rate may

be due to the difference in the population setting and the period when the study was conducted.

Nearly one-third of the respondents reported high levels of smartphone addiction, which aligns with the current global shift in increased dependence toward technology and smartphone use. The occurrence of COVID-19 is one of the main reason that may have caused longer hours using the smartphone, especially as individuals are forced to stay at home to work or study. This supports the reported findings, which indicate that more than half of the students are using the smartphone for work and study purposes. Thus, simply associating high addiction to smartphone with higher or longer time spent on smartphone may not be appropriate and accurate.

The current findings found positive but weak correlation between loneliness and smartphone addiction, supporting several studies that reported positive correlations between loneliness and smartphone addiction (Bhardwaj & Ashok, 2015; EnezDarcin et al., 2016; Li et al., 2021; Zhen et al., 2019). The feeling of loneliness may lead individuals to turn to their smartphones in search of warmth and social interaction. While face-to-face communication might worry certain individuals, online communication is less stressful and reduces social discomfort. However, long-term smartphone use can change social interaction patterns and lifestyles, making individuals more reliant on smartphone. Coincidentally, the current study found that social anxiety correlates significantly with smartphone addiction, confirming Korniienko and Barchi's (2020) study. Turgeman et al. (2020) also suggested, in their review study, that significant degrees of social anxiety are associated with the extreme smartphone use. However, these findings disagree with a recent report by Pugh (2017) among individuals aged between 18 and 54 years old, demonstrating that social anxiety is not associated with smartphone addiction. This might be due the different sample size and instruments used to measure the two variables.

Individuals who struggle with social anxiety are more likely to use smartphone as a means of avoiding uncomfortable social situations. They could divert attention from themselves and lessen their worry about how other people would see or judge them. In such a case, individuals may become increasingly reliant on their smartphones. Evidently, the current findings showed that social anxiety significantly predicts smartphone addiction among the undergraduate students. Loneliness was not found to contribute significantly to smartphone addiction, which could be due to boredom proneness and low self-control mediating the relationship (Li et al., 2021).

Implications of the Study

The current findings have contributed some evidences to support the existing theories. The possibility of maladaptive cognition, individual susceptibility and life occasions are thought to impact internet addiction based on the cognitive behavioral model (Wu, 2018). Susceptibility is increased when individual has depression, social anxiety or a material dependency. In this case, the findings indicate that loneliness and social anxiety positively correlate with smartphone addiction. The higher the loneliness and social anxiety among undergraduates, the higher the risk of smartphone addiction. The current findings also noted that the participants consisted of undergraduates who are widowed or single and more than half of the respondents are categorised within a low social economic. This supports a mismatch in the cognitive discrepancy model that is connected with specific life occasions and circumstances, such as migration, onset disability or widowhood. This means that diverse backgrounds of the students may have a significant role in their mental health state. Hence,

it is highly likely that one experiences loneliness when their actual social relationship and desired social connection significantly differ (Burholt et al., 2017).

In addition, this study also provides evidence on the cognitive model for social anxiety that highlights several interrelated processes, such as shifting attention to internal focus and using internal information to infer one's image in the eyes of others. In this case, the current study showed that social anxiety correlated and predicted smartphone addiction among the students. This means that individual who has risk of social anxiety use smartphone to shift their attention (Doorley et al., 2020). They could avoid feeling anxious and overly focused on negative self-imagery, which is a common characteristic among individuals who suffer from social anxiety.

It is proven in the current study that the higher level of loneliness and social anxiety would increase the risk of smartphone addiction among the students. Although most of the students scored moderate levels of loneliness, social anxiety and smartphone addiction, constant monitoring, awareness and intervention are vital to maintain a healthy mental health state and lifestyle. The overwhelming number of university students who own smartphones and encounter significant psychological well-being issues further proved that smartphone use among the university students is a critical issue that needs to be focused. The findings from this study illuminate evaluation and therapeutic interventions focussed on diminishing or modifying smartphone use and further developing university students psychological wellness. By utilizing the smartphone addiction scale as an evaluating apparatus for smartphone addiction might be a judicious choice for university counselling centers (Volungis et al., 2019). Health screening for issues such as substance misuse is currently mandatory before entering a university. In this regard, it is worthwhile to also screen for smartphone use addiction, which is a common behaviour that is associated with emotional and social well-being and academic functioning (Volungis et al., 2019). Data acquired from such an evaluation might help indicate 'warning signs' to follow-up on students' mental health state and integrate them with appropriate treatment plans. For instance, psychoeducation pertaining to smartphone use can increase awareness and knowledge among the students on the danger of excessive and inappropriate smartphone use, thus assist with decreasing the possibilities of students participating in maladaptive behaviour patterns (Volungis et al., 2019). It is vital that students recognise and understood how to best regulate their daily routine that prioritise overall well-being.

Considering the networking, communication, and information-seeking benefits that the smartphone offers, it is not practical to fully eradicate the use of smartphones among the young generations. Hence, it is important that smartphone users monitor their use in moderation and seek alternative behaviours that provide similar functions to reduce their emotional and social distress and increase adaptive behaviours. It is imperative that university lecturers and counsellors play a key role in promoting students to a healthy lifestyle and mental wellness.

Conclusion

The rate at which smartphone addiction develops in young people has been explored in various ways. This study explored how loneliness and social anxiety influence smartphone addiction among undergraduate students majoring education at a Malaysian public university. Descriptive findings from the study showed that that the majority of the students had moderate levels of loneliness, social anxiety and smartphone addiction. Findings via correlational and regression analysis showed that loneliness and social anxiety correlated

positively with smartphone addiction; however, only social anxiety report significant and positive contribution towards smartphone addiction among the students. Interventions at the university level were implicated in order to reduce the danger of students engaging in maladaptive behavior patterns. The recommendations include health screening and psychoeducation programmes, which might assist in distinguishing certain areas of students' lives that require additional support.

Limitation

There are a few limitations that emerge: firstly, the majority of the participants comprised of Chinese and Malay ethnic groups compared to other races. Thus, the outcomes cannot be generalized, to sample groups of different races. The generalizability of the result was also limited to the students at the Faculty of Educational Studies at UPM who took educational courses, indicating that the findings cannot be generalized to the general population of students at the public university. The method used was also limited to correlations between the variables, naturally indicating that it is impossible to set up directionality or causality. While an experimental design may not be doable to build causality, future research could utilize a longitudinal design that has set transitory connections between specific sorts of smartphone use, addiction, and psychological outcomes. Such a design would permit more detail finding of how each variables are associated with each other.

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