

# The Influence of Internet Addiction and Time Spent on the Internet Towards Social Isolation Among University Students in Malaysia

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## Abstract

Recent research has shown that there is a connection between Internet addiction and time spent on the Internet with social isolation of the users. Therefore, the aim of this study is to examine the influence of Internet addiction and time spent on the Internet towards social isolation among university students in Malaysia. A total of 110 respondents who were undergraduate and postgraduate students from four universities participated in the survey. The collected sample through purposive sampling technique was 110 responses which exceeded the minimum sample size. The research instruments for Internet addiction were adopted from Young Internet Addiction Scale Test which consist of 20 items whereas social isolation was measured using the UCLA Loneliness Scale consisting also of 20 items. Time spent on the Internet was measured based on the number of hours the students spent on social media platforms such as Facebook, WhatsApp, Twitter, and Instagram. The questionnaire was distributed via online channels due to the physical constraints of the Covid-19 pandemic. Data were analysed using IBM SPSS Statistics version 22 and Smart PLS-SEM Version 3.2.8. The measurement assessment showed that the data had fulfilled the composite reliability and convergent and discriminant validities requirements. The findings revealed that the level of Internet addiction, time spent on the Internet and social isolation were moderate. The findings also demonstrated that Internet addiction and time spent on the Internet influenced social isolation among university students.

**Keywords:** Internet addiction, Time spent on Internet, Social isolation, Loneliness

## 1. Introduction

Being born and bred in the era of cyberspace, today's young generation are immersed in the Internet and all its uses. Information seeking, daily decision making and to a certain extent, the execution of simple daily tasks depend very heavily on the Internet. With the advancement of technology, entertainment and socializing have also claimed their space on the Internet. Socializing, which previously comprised people mingling and communicating in person has fast switched its form into behind the screen interactions, where communication and social engagements are done virtually. Lives that revolve around the use of the Internet has introduced a challenge from many perspectives, among the prominent ones is the issue of Internet addiction among the young. It has been established that excessive use of the Internet has resulted in social and mental health issues such as mental exhaustion, cyberbullying, social isolation, depression, and others.

Living and breathing the Internet among the cyberspace society has created a disorder known as Internet addiction (IA). Similar to any other addiction the victim is commonly found to be suffering from social isolation. Social isolation is a lack of mutual interactions with other people in society as well as with families and friends. In Malaysia, the study of Internet addiction has been aplenty; however, the ones that reflect on the relationship between Internet addiction and social isolation can be extended further especially among the younger generation. Internet addiction has been recognized to be more prominent among the younger generation as they were born into the Internet era.

Findings have shown that Internet addiction triggers social isolation, people who are addicted to Internet use tend to spend more time online and have limited face-to-face exchange with other people (Moradi et al., 2019). Due

to this circumstance, Internet users are experiencing problems of loneliness, low self-esteem, unrealistic fantasies, and an increase in antisocial behaviour. (Lam, 2014). Medical research has also established that social isolation leads to serious health risks such as substance abuse, obesity, depression and can lead to premature mortality (Novotney, 2019). While there has been indication that Internet addiction has resulted in social isolation, empirical studies that support this relationship in the context of Malaysian young adults have been limited.

From the literature, several studies have shown that Internet addiction has the tendency to prevent interpersonal communication and leads people to experience social isolation which if experienced by the young will lead them to face issues in their personal development and social health (Moradi et al., 2019; Tateno et al., 2019; Zorbaz et al., 2020). Most studies indicate that the majority of Internet users are teenagers and young people (Moradi et al., 2019; Tateno et al., 2019; Zorbaz et al., 2020), which is a concern as the new generation will become more and more detached from healthy social interactions and more prone to the threat of psychological health issues from spending most of their time in a virtual world. This study is looking to validate that Internet addiction is indeed resulting in social isolation in the context of Malaysian youth. Various studies have suggested that excessive amount of time being spent online by individuals has resulted in inclination towards self-isolation and excessive amount of time spent on the Internet has been established as one of the main indicators of Internet addiction. Hence, this study was conducted on the younger generation from public and private universities in Malaysia.

The purpose of this study was to inspect the influence of time spent on the Internet and Internet addiction on social isolation among Malaysia' youth. The research objectives of this study are:

1. To determine the Internet addiction, time spent on the Internet and social isolation level among university students.
2. To examine the influence of Internet addiction on social isolation among university students.
3. To examine the influence of time spent on the Internet towards social isolation among university students.

These objectives have led to the following research questions:

1. What is the level of Internet addiction, time spent on the Internet and social isolation level among the university students?
2. Does Internet addiction influence social isolation among the university students?
3. Does time spent on the Internet influence social isolation among the university students?

### *1.1 Internet Addiction*

Internet addiction refers to excessive use of the Internet that affects the social and emotional states of an individual. The term is also referred to as severe Internet overuse (Tateno et al., 2019) or pathological Internet use behaviour which poses a threat to the wellbeing of the Internet users (Moradi et al., 2019; de Vries et al., 2018). It may lead to physical and mental problems such as restlessness, exhaustion, social isolation, depression, and many others. This modern disorder can affect society in many ways. Overuse of the Internet and electronic devices can have detrimental effects on children's and adolescents' health and development, including decreased physical fitness and obesity, musculoskeletal issues, vision issues, sleep deprivation, injury and accident, poor academic performance, worsened family relations, an increased sense of loneliness, depression, low self-esteem, and other mental health issues, according to the Centre for Health Protection of the Department of Health in Hong Kong (Shek et al., 2016).

Kumar et al. (2018) states that Internet addiction is the failure to regulate one's usage of the Internet, which when removed, results in depression, anxiety, and strange behaviour. Dr Ivan K. Goldberg defines Internet Addiction Disorder (IAD) as the symptoms of surrendering or reducing social or professional activities due to Internet use. The Young Internet Addiction Test (IAT), which includes multiple questions about Internet addiction, is one of the instruments used to gauge Internet addiction (Young, 1998).

### *1.2 Time Spent on the Internet*

Technology is widely available to students, but not all of it has a clear academic or pedagogical purpose. According to a recent study, one-quarter of American adults claim to be online practically constantly, and this percentage is higher for younger persons (18-29 years old) (Perrin & Jiang, 2018). In the study, students were asked to estimate the amount of time they spent online in a normal day. Overall, they reported spending more time online on their schoolwork and research than social networking, gaming, streaming videos, or other online activities.

The research revealed that nearly half (40%) of students said they worked online for between three and four

hours per day. According to 37% of respondents, the average student spent between one and two hours every day on social media and streaming video (36 percent of respondents). About 32 percent of students spent no more than one hour per day doing other Internet activities. Additionally, it was noted that while a majority of students did not play online video games, those who did tended to be men.

### *1.3 Social Isolation*

Based on previous studies, Internet addiction has a great impact on a person's personality and behaviour. One of the terms that seems to go hand in hand whenever the issue of Internet addiction is being discussed is social isolation. Social isolation refers to a lack of social connectedness or avoidance of social contact (Tateno et al., 2019) and unfavourable social relationship with other people (Hashempour-Sadeghian & Abbasi Shavazi, 2021). It is the lack of someone with social loneliness in which the individual can share his feelings, dreams, ideals and insights (Iskander, 2018). Social isolation has proven to be one of the effects of Internet addiction (Fallahi, 2011; Yao et al., 2014; Sharahi et al., 2014).

## **2. Literature Review**

A study by Fallahi (2011) investigated the relationship between Internet usage and social isolation among Iranian students using the UCLA Loneliness Scale (Russell, 1996) and Young Scale for Internet Addiction (Young, 1998) to gather the data. The students were divided into three groups—normal users, at risk users and addicted users. The study found that 13.2% of the respondents were addicted to the Net and 31.2% were at risk of Internet addiction. The result also showed a significant difference in social isolation among the three groups of users. This study has been verified by some other studies with similar results. Sharahi et al. (2014) examined the amount of Internet usage among high school students of Khafr County and its impact on students and found that the more students depend on the Internet, the more social isolation will occur.

Primack and his colleagues used questionnaires to collect data from 1,787 U.S. residents between the ages of 19 and 32 on their use of the 11 social media sites that were most popular at the time: Facebook, Twitter, YouTube, Google Plus, Instagram, Reddit, Snapchat, Tumblr, Pinterest, Vine, and LinkedIn. Respondents who used social media for more than two hours per day had twice the odds of feeling socially isolated compared with their friends who used it for less than half an hour per day, even after the researchers took a number of social and demographic factors into account. Additionally, those who used social media services 58 times (more than nine times per week) were around three times more likely to feel socially isolated than those who used them less frequently (Primack et al., 2017).

A study by Primack et al. (2017) evaluated the relations between social media use (SMU) and Perceived Social Isolation (PSI) among U.S. young adults. The study used Patient-Reported Outcomes Measurement Information System (PROMIS) (4-item Scale) and Social Media Use (SMU) questions to gather the data. The study found that young adults with high SMU seemed to feel more socially isolated than their counterparts with lower SMU.

Another study by Iskander (2018) investigated the relationship between Internet addiction levels and social loneliness, family emotional loneliness and lack of social self confidence levels of high school students. The test was conducted using Young Internet Addiction Scale Test (IAT) and Social and Emotional Loneliness Scale. This study found that lower social self-confidence, social loneliness, and family emotional loneliness were related positively to Internet addiction.

Tateno et al. (2019) investigated the relationship between Internet addiction and smartphone addiction with the risk of hikikomori (a severe social withdrawal) in Japanese young adults. The study used Young's Internet Addiction Test (IAT), Smartphone Addiction Scale (SAS) – Short Version (SV) and Hikikomori Questionnaire (HQ-25). The finding shows that gamers used the Internet longer and had significantly higher mean IAT and HQ-25 scores compared with other users. Yao (2014) examined the relationship between Internet addiction and other psychological problems such as loneliness and found that excessive Internet use would increase feelings of loneliness.

Teenagers today use the Internet as a valuable source of knowledge and entertainment, and it has a significant impact on how individuals live their social lives. Easy access to the Internet allows people to choose to share knowledge online. Because of how quickly humans became dependent on this technology, a new age in knowledge creation and transformation has emerged. Overuse of the Internet frequently ruins close relationships and causes social issues. Individuals who are addicted to the Internet occasionally struggle to communicate effectively with others (Gorain et al., 2018). At the present, social isolation is indeed a major problem that is largely caused by overusing the Internet. Teenagers prefer to converse online through social networking sites like Facebook rather than in person. Due to excessive Internet use and the damage it caused to interpersonal

interactions, parental bonds have weakened (Gorain et al., 2018).

Dulama et al. (2015) were interested in the length of time students spend daily on the Internet. Their study found that 34% of students spend 4–6 hours daily on the Internet, 23% spend 2–4 hours, 17% spend 6–8 hours, 13% spend 1–2 hours, while 3% spend more than 8 hours. The study concluded that the time students spent daily on the Internet correlated with other responses whether they were about communication, career, or personal life.

A study by André Hajek and König (2019) revealed that there is an association between use of online social network sites and perceived social isolation among individuals in the second half of life in Germany. Frequent users who spent a longer time on social network sites may replace real life social interactions with these sites. Moreover, the frequent use of these sites may lead users to perceive that others have more, or better quality, social relationships than themselves, due to the unrealistic portrayals of reality on social network sites (Primack et al., 2017). Younger adults in various nations have indicated that social networking site use and loneliness (the perceived gap between real and desired social ties) are positively correlated (Lemieux, Lajoie, & Trainor, 2013). All of the above previous studies discussed the variables in relation to the present research model namely time spent on the Internet, Internet use, Internet addiction and social isolation. Based on the above studies, two hypotheses have been formulated as below:

- H1 There is a significant relationship between Internet addiction and social isolation.
- H2 There is a significant relationship between time spent on the Internet and social isolation.

### 3. Research Model

Two theories, namely the theory of social information processing and the theory of equations for media, were examined to discover if exposure to Internet, Internet usage or time spent on the Internet among university students had an impact on students' social isolation behaviour. The social information processing theory developed by Joseph Walther in (1992) highlighted the information about online course. According to this hypothesis, developing an online interpersonal relationship takes longer than developing a face-to-face relationship, but once it does, it will function similarly to face-to-face communication.

In contrast, the second theory, which is the theory of equations for media, was proposed by Reeves and Nass (1996). This theory suggests that the media resembles real life, and electronic media in particular possesses human nature. This is based on the equation by Reeves and Nass (1996) which states that we respond to the communications media as though they are alive. According to the study, students' use of social media has an adverse influence on them. Facebook is a social networking site that students commonly use and prefer, and it has a negative impact on their behaviour and social skills. This is a result of students spending more time online and using social media, which makes them forget their responsibilities in real life, especially when it comes to forming social bonds with those around them.

Based on these two theories, namely social information processing theory and theory of equations media, as well as findings from previous studies (Tateno et al., 2019; Primack et al., 2017; Iskander, 2018; Fallahi, 2011; Yao et al., 2014; Sharahi et al., 2014) the research model of this study was developed as in Figure 1. The study hypothesizes that Internet addiction and time spent on the Internet have influence on university students' social isolation.

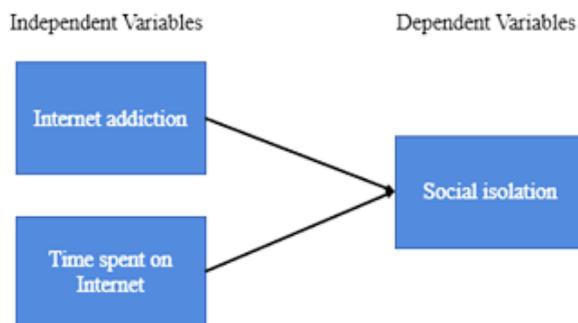


Figure 1. Research Model

## 4. Method

### 4.1 Research Design

This study used the quantitative research design via survey method. Quantitative research design enables researchers to test hypotheses using objective data to support their findings (Creswell & Plano Clark, 2011). The

use of self-administered questionnaires can help collect data from a large number of respondents economically in a short period (Sekaran & Bougie, 2018).

#### *4.2 Sampling Design*

The population of this study focused on undergraduate and postgraduate students from public and private universities in Peninsular Malaysia. Four universities were selected for the purpose of this study i.e. Universiti Teknologi Malaysia (UTM), Universiti Tenaga Nasional (UNITEN), Universiti Tun Hussein Onn Malaysia (UTHM) and Universiti Sains Malaysia (USM). The sampling size was determined based on G-Power method that yielded 74 responses as the minimum sampling size required for this study. The collected sample was 110 responses which exceeded the minimum for this study. In order to ensure fair representation from both public and private universities, at least 37 responses each had to be collected from public and private universities. The actual responses collected were 66 from public and 44 from private universities which fulfilled the minimum responses required.

#### *4.3 Research Instruments*

This study used a survey questionnaire as a means for collecting data. The questionnaire was broken down into three sections, including demographic information and the relevant study constructs of Internet addiction, social isolation, and time spent on the Internet. The Internet addiction instrument was adopted from Young's Internet Addiction Scale Test (Young, 1998) which consisted of 20 items using a 6-point Likert scale from 1 – Not applicable to 6 – Always. The social isolation instrument was adapted from the UCLA Loneliness Scale (Russell, 1996) which consisted also of 20 items using a 4-point Likert scale from 1 – Never to 6 – Always. Time spent was measured based on how much time was spent on the Internet daily by the respondents including time to do assignments, text messaging, scrolling social media, games, etc.

#### *4.4 Data Collection*

The questionnaire was distributed via online channels due to the constraints of Covid-19 which limited the physical distribution of the survey. Representatives from all selected universities were contacted and the survey link was shared to them to be distributed to the students.

#### *4.5 Data Analysis*

It is essential to choose the most appropriate method of data analysis because statistical procedures are utilized to estimate the interpretation of variables that appear to affect dependent variables and are also used as support in determining the reliability of the theoretical model (Bewick, Cheek, & Ball, 2003). In the first stage of data analysis, the Statistical Package for Social Sciences (SPSS) was utilized to analyse the demographic details of the respondents. Further analyses were also conducted to check the significant relationship and influence using Partial Least Square-Structural Equation Model (Smart PLS-SEM).

### **5. Results**

#### *5.1 Demographic*

The respondents were all students and comprised undergraduate university students from both public and private sectors ranging from diploma, bachelor's, master's and PhD candidates. Table 1 shows the overall results of the survey consisting of 60% (66 respondents) from public universities and another 40% (44 respondents) from private universities. Most of the respondents were aged between 21–23 years old or 59.1% of the respondents, followed by 23.6% between 18–20 years old. About 10.9% (12 respondents) were at the age of 24–26 years old and the rest 6.4% were more than 26 years old. The impact of Internet addiction and social isolation among university students were also viewed from the perspective of gender; whether male students are more addicted compared to female students or otherwise. The results show that 50.9% of the respondents were male (56 respondents) and 49.1% (54 respondents) were female. About 87.3% were taking first degree studies, 6.3% master's degrees, 5.5% undertaking diploma courses and 0.9% PhD studies.

The respondents were not restricted to particular field of study; thus, the more varied the field of study the more reliable the data collected, which indicates the results obtained from the survey was independent of what the students studied. The highest frequency of respondents from the same field of study was 6 (5.45%), who were students in Bachelor of Information Technology (IT) and Bachelor of Engineering (Geomatics). A smartphone is today almost compulsory to have for students to smoothen their study process in terms of managing assignments, subject registration and semester registration or even to view examination results. Everything is managed online through the Internet. Some students might even have more than one device to connect them to the Internet. From the survey, about 99.1% had their own smartphones, 91.8% owned a laptop or personal computer and 20% used

a tablet. All the respondents had more than one device.

Table 1. Demographic profile by frequency and percentage

Demographic Profile		Frequency	Percentage
Status	Student	110	100
	Not student	0	0
Type of institution	Public	66	60
	Private	44	40
Age	18–20	26	23.6
	21–23	65	59.1
	24–26	12	10.9
	> 26	7	6.4
Gender	Male	56	50.9
	Female	54	49.1
Level of study	Diploma	6	5.5
	Bachelor’s	96	87.3
	Master’s	7	6.3
	PhD	1	0.9
Own smart device	Smartphone	109	99.1
	Tablet	22	20
	Laptop/personal computer	101	91.8
Internet connection	Data card	81	73.6
	Home Wi-Fi	75	68.2
	University/campus Wi-Fi	68	61.8
	Public Wi-Fi	20	18.2
Time spent on the Internet (daily)	1–2 hours	2	1.8
	2–5 hours	22	20
	5–8 hours	36	32.7
	> 8 hours	50	45.5

5.2 Time Spent on the Internet

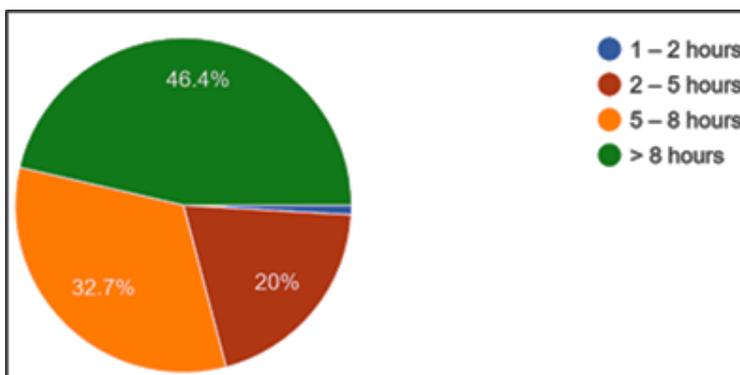


Figure 2. Time spent by the respondents on the Internet (daily)

Figure 2 shows that a majority of the respondents spent more than 8 hours daily on the Internet for the various activities stated before. Very few of them spent a minimum of 1–2 hours on the Internet daily. There are several ways to connect to the Internet. In this survey, four options were provided to the respondents. Mostly they were connected to the Internet using data cards (either prepaid or postpaid) representing 73.6% of respondents, followed by those using home Wi-Fi (68.2%). Internet addiction is closely related with how much time was spent by the respondents including time to do assignments, engaging in text messaging, scrolling social media, games, and so on. Based on the data, about 46.4% of the respondents allocated their daily time of more than 8 hours on

the Internet for multiple reasons.

5.3 Internet Addiction, Time Spent on the Internet and Social Isolation

In this study, descriptive analysis was chosen to address research question 1 that is to determine the level of each variable i.e. Internet addiction, time spent on the Internet and social isolation.

Table 2. Mean score of variables of the study

Descriptive Statistics				
	Mean	Std. Deviation	N	Mean score
Time Spent	2.8545	0.43360	110	Moderate
Internet Addiction	2.8391	0.75042	110	Moderate
Social Isolation	2.5909	0.33648	110	Moderate

Indicator of Level: 1.00–2.33 (Low), 2.34–3.67 (Moderate), 3.68–5.00 (High)

Table 2 shows that time spent on the Internet among university students falls under moderate level (Mean = 2.8545, standard deviation = 0.43360), whereas Internet addiction (Mean = 2.8391, standard deviation = 0.75042) and social isolation (Mean = 2.5909, standard deviation = 0.33648) also fall under the moderate range. This outcome indicates that use of the Internet might affect behaviour and social interaction gradually and slowly change the character of the students, immersing them in social isolation. This new character of preferring to be isolated might be permanent because they feel comfortable with their new behaviour.

5.4 PLS Path Model

PLS path model estimation was carried out to measure all the items with the corresponding constructs. PLS algorithm was used to measure PLS path model estimation. The results of the PLS algorithm are shown in Figure 3 with two independent variables namely Internet addiction and time spent on the Internet (exogenous constructs), one dependent variable that is social isolation (endogenous construct), the relationship between the variables (constructs), and all indicators of variables.

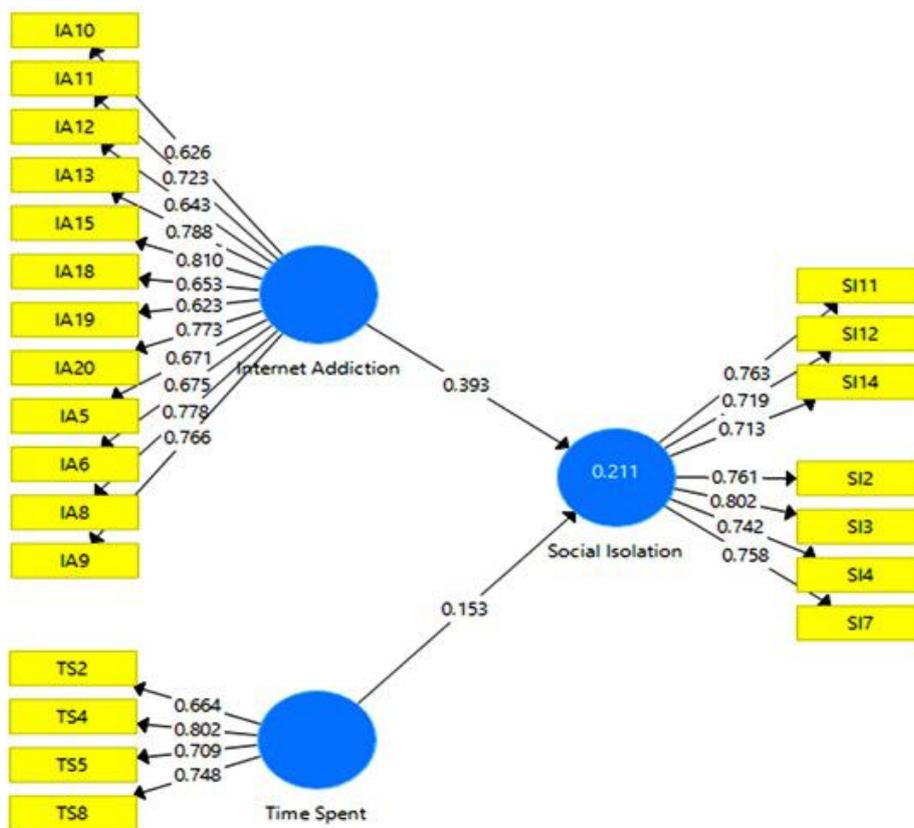


Figure 3. PLS Path Model

5.5 Reflective Measurement Model Assessment

For the purposes of determining construct reliability and validity (composite reliability and Cronbach's alpha), Hair et al. (2017) recommended using a standardized measurement technique (discriminant and convergent validities). Table 3 shows the values of Cronbach's alpha for Internet addiction (0.912), social isolation (0.871) and time spent (0.712). The results show that all values are above the 0.7 threshold value (Nunnally & Bernstein, 1994). Table 3 also presents the results for composite reliability (CR) analyses, which show values ranging from 0.822 to 0.925, all above the recommended value of 0.7 (Kline, 2015). Following these findings, the construction's dependability was confirmed, and it was discovered to be error-free. The factor loading and average variance (AVE) extracted were used to estimate the convergence validity (Hair et al., 2017). Results were higher than what the value of 0.7 suggested, according to factor loadings. In addition, in Table 3, it can be seen that AVE's values for Internet addiction (0.510), social isolation (0.565) and time spent (0.536) are all values greater than the threshold value of 0.5. Since these findings are in hand, it has been proven that all constructs have converged in their levels of validity.

Table 3. Construct Reliability and Convergent Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Internet Addiction	0.912	0.918	0.925	0.510
Social Isolation	0.871	0.872	0.901	0.565
Time Spent	0.712	0.714	0.822	0.536

Fornell-Larker criterion, cross-loadings, and the Heterotrait-Monotrait ratio (HTMT) are three potential measurement methods to use in the measurement of discriminant validity (Hair et al., 2017). AVEs have square roots greater than their correlation with other constructs, as shown in Table 4, and this criterion confirms the requirement (Fornell & Larcker, 1981). Results in Table 4 show the cross-loadings criteria have been met because each construct has a higher indicator loading than its corresponding variable.

Table 4. Discriminant Validity using Fornell-Larcker Criterion

	Internet Addiction	Social Isolation	Time Spent
Internet Addiction	0.714		
Social Isolation	0.435	0.752	
Time Spent	0.270	0.260	0.732

Result: Square root AVE higher than related constructs. Therefore, Fornell-Larcker result has fulfilled the criteria.

Table 5 shows that the indicator loading on each construct is higher than the loading of the constructs' corresponding variables, therefore the cross-loading criterion is also met.

Table 5. Cross Loading Results

	Internet Addiction	Social Isolation	Time Spent
IA10	0.626	0.226	0.105
IA11	0.723	0.249	0.147
IA12	0.643	0.141	0.158
IA13	0.788	0.322	0.213
IA15	0.810	0.338	0.219
IA18	0.653	0.352	0.251
IA19	0.623	0.244	0.168
IA20	0.773	0.349	0.369
IA5	0.671	0.397	0.128
IA6	0.675	0.321	0.207
IA8	0.778	0.334	0.175
IA9	0.766	0.288	0.107
SI11	0.342	0.763	0.135

SI12	0.379	0.719	0.148
SI14	0.273	0.713	0.260
SI2	0.353	0.761	0.207
SI3	0.324	0.802	0.127
SI4	0.341	0.742	0.216
SI7	0.255	0.758	0.279
TS2	0.179	0.161	0.664
TS4	0.187	0.175	0.802
TS5	0.188	0.217	0.709
TS8	0.232	0.197	0.748

The results produced by the Heterotrait-Monotrait (HTMT) ratio are displayed in Table 6. Following the bootstrapping process, the HTMT rate straddle at a value of 1 is absent. It follows from the three evaluations that each latent measurement was biased against the others. Internal consistency, convergent validity, and discriminant validity had each completed one of three necessary steps in the evaluation of the reflective measurement model. For the reflective measurement model, the values from composite reliability, Cronbach’s alpha, factor loadings, Average Variance Extracted, Fornell-Lacker criterion, cross-loading criterion, and HTMT inference met the advised standards or the minimal threshold value. The reflecting measurement model has a high level of internal consistency, convergent validity, and discriminant validity based on all the data. Each latent construct's indicators were reliable and appropriate. As a result, the structural model can be used to further evaluate the acquired data.

Table 6. Discriminant Validity using Heterotrait-Monotrait (HTMT)

	Internet Addiction	Social Isolation	Time Spent
Internet Addiction			
Social Isolation	0.463 CI 90(0.317,0.584)		
Time Spent	0.329 CI 90 (0.204,0.455)	0.327 CI 90(0.219,0.436)	

### 5.6 Assessment of Structural Model

#### 5.6.1 Assessment of Collinearity Issues

In an assessment of the structural model, it is very crucial to assess that there are no collinearity problems in the structural model. This problem occurs when two variables that are hypothesized to have a causal relationship tend to measure the same construct (Cheah et al., 2018). In this study, the Inner Variance inflation factor (VIF) under quality criteria was examined in Smart PLS to assess collinearity as recommended by Hair et al. (2017). As a general guideline, Ringle et al. (2015) indicated a VIF value of 5 and higher demonstrates the existence of collinearity problem while Hair et al. (2017) indicated 10 as the maximum level of VIF.

The results in Table 7 illustrate that the inner VIF values for all constructs are below 5; 1.079 (Internet Addiction) and 1.071 (Time Spent). Table 7 indicates that the VIF values for all indicators ranged between 1.202 to 3.059 which are far below 5. Following the criteria by Hair et al. (2017) of the maximum of 10, VIF values in Table 8 represent the ideal scenario of no collinearity problem in the structural model. This confirms that the results of the structural model are not negatively affected by the issue of collinearity in this study.

Table 7. Collinearity Statistics (VIF) Inner VIF Values

	Internet Addiction	Social Isolation	Time Spent
Internet Addiction		1.079	
Social Isolation			
Time Spent		1.071	

Result: < 5.0, no collinearity issue

Table 8. Collinearity Statistics (VIF) Outer VIF Values

	VIF
IA10	1.561
IA11	2.115
IA12	1.962
IA13	2.425
IA15	3.059
IA18	1.702
IA19	1.745
IA20	2.236
IA5	1.842
IA6	1.813
IA8	2.550
IA9	2.485
SI11	1.885
SI12	1.739
SI14	1.669
SI2	1.903
SI3	2.854
SI4	2.144
SI7	1.967
TS2	1.317
TS4	1.839
TS5	1.202
TS8	1.572

5.6.2 Assessment of Significance and Path Coefficients

Building a structural model comes next, after the measurement model has been validated. To precisely estimate the coefficient of determination (R<sup>2</sup>) and the route coefficients, the researcher must employ a bootstrapping procedure with 5000 re-samples (Hair et al., 2017). Table 9 includes path coefficients, t-values, and p values for each hypothesis.

The results in Table 9 show that Internet addiction (t = 5.562; p = 0.000) and time spent on the Internet (t = 2.095; p = 0.037) were found to be significantly related to social isolation at a significance level of 5% (statistically significant at .05 level). Meanwhile, from the analysis, it was found that Internet addiction ( $\beta = 0.393$ ) was the strongest predictor of social isolation, followed by time spent on the Internet ( $\beta = 0.153$ ). After conducting the assessment of significance and relevance on structural model relationships, it was found that there was a positive significant relation as illustrated in the table above among the exogenous and endogenous constructs. The finding in this second step of assessment is also strengthened by the report for confidence interval bias that revealed no indication of zero (0) value appearing. The shows that all direct relationships are significantly related. All the hypotheses (H1 and H2) are supported.

Table 9. Structural Model Estimation Results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values
Internet Addiction -> Social Isolation	0.393	0.414	0.071	5.562	0.000
Time Spent -> Social Isolation	0.153	0.179	0.073	2.095	0.037

Table 10 presents the summary report of the confidence interval bias result. After running the statistical bootstrapping procedure, the researcher needs to obtain the result of the confidence interval bias and interpret the

findings. If there is a value of 0 straddling between the upper level or lower level, it means that there is no significant result.

Table 10. Confidence Interval Bias Corrected

	Original Sample (O)	Sample Mean (M)	Bias	5.0%	95.0%
Internet Addiction -> Social Isolation	0.393	0.414	0.021	0.269	0.490
Time Spent -> Social Isolation	0.153	0.179	0.026	0.001	0.232

However, in this analysis, no value of 0 straddled between the upper level or lower level confidence interval bias for the four linkages; thus, this study concludes the existence of a significant result (Ramayah et al., 2018).

### 5.6.3 Assessment Level of R<sup>2</sup>

Based on the (R<sup>2</sup>) results in Table 11, both Internet addiction and time spent on the Internet explain 21.1% of the variance in social isolation. Conforming to the recommended values of R<sup>2</sup> (Chin, 1998), the obtained R<sup>2</sup> values are acceptable, with a low effect on social isolation.

Table 11. R Square (R<sup>2</sup>)

	R Square	R Square Adjusted	
Social Isolation	0.211	0.196	Low

### 5.6.4 Assessment of Effect Size f<sup>2</sup>

Assessment of effect size allows the researcher to observe the effect of each exogenous construct on the endogenous construct. Cohen’s (1992) guidelines for assessing f<sup>2</sup> are that values of 0.02 represent small, 0.16 medium and 0.35 large effect of the exogenous latent variable. Effect size values of less than 0.02 indicate that there is no effect. Table 12 shows Internet addiction to social isolation has a medium effect size f<sup>2</sup> whereas time spent on the Internet has a small effect size f<sup>2</sup> on social isolation.

Table 12. Effect Size f<sup>2</sup>

	Internet Addiction	Social Isolation	Time Spent
Internet Addiction		0.182 (Medium)	
Social Isolation			
Time Spent		0.028 (Small)	

### 5.7 Blindfolding and Predictive Relevance Q<sup>2</sup>

In addition to evaluating the magnitude of R<sup>2</sup> values as a criterion of predictive accuracy, researchers should also examine Stone-Geisser’s Q<sup>2</sup> value (Geisser, 1975; Stone, 1974). This measure is an indicator of the model’s predictive power or predictive relevance. The Q<sup>2</sup> value is obtained by using Blindfolding procedures for a specified omission distance D with a value between 5 and 10. A Q<sup>2</sup> value larger than 0 suggests that the model has predictive relevance for a certain endogenous construct. In contrast, values of 0 and below indicate a lack of predictive relevance. Table 13 shows that the Q<sup>2</sup> value (0.101) is larger than 0. Therefore, Internet addiction and time spent on the Internet have predictive relevance for the endogenous construct that is social isolation.

Table 13. Assessment of Q<sup>2</sup>

	SSO	SSE	Q <sup>2</sup> (=1-SSE/SSO)
Internet Addiction	1,320.000	1,320.000	
Social Isolation	770.000	692.085	0.101
Time Spent	440.000	440.000	

## 6. Discussion

One of the key findings of this study is that 46.4% of the respondents allocated their daily time of more than 8 hours on the Internet for multiple reasons. In comparison, previously it was found that only 3% of students spent more than 8 hours of their time online (Dulama et al., 2015). One of the reasons for the increase of hours on the

Internet is the Covid-19 pandemic, as most teaching and learning activities have been conducted online. Apart from that, during the pandemic, all students were staying home and would definitely have spent more time searching and browsing the Internet, either doing homework or research or other online activities such as browsing social media and streaming video. Although digital technology is the best way to access information, it is not a good method for educational purposes. There is no platform that can replace face-to-face meeting sessions and building relationships where learning and social activities can be explained and developed naturally.

The findings of the present study also reveal that both Internet addiction and time spent on the Internet explain 21.1 % of the variance in social isolation. The results of this study are supported by findings from other studies (Iskander, 2018; Tateno et al., 2019). The findings of this study also corroborate studies by Fallahi (2011), Sharahi et al. (2014) and Primack et al. (2017) who found a significant relationship between Internet use or time spent on the Internet with social isolation. The frequency of Internet overdependence among youngsters in Malaysia varies greatly. In cross-sectional surveys of young people from Malaysian public institutions, the prevalence rates of such behavioural addiction range from 7.8 to 60.7% (Harizah, 2019).

Another survey conducted in 2017 by the Malaysian Communications and Multimedia Commission (MCMC) revealed that 89% of respondents had an Internet addiction, 60% of them had high levels of anxiety, and a third had significant depression (Harizah, 2019). Teenagers' excessive Internet use may result in addiction. An over reliance on the Internet could have detrimental behavioural effects. Digital addicts frequently show signs of agitation, secrecy, and withdrawal from friends and family. There is an increase in depression and loneliness, which feeds worry and stress, making it difficult to focus, causes sleep deprivation, and makes people more self-absorbed. Each of the effects mentioned here has societal repercussions.

Everyone needs to pay more attention to it as a result. It is suggested that in addition to encouraging youths to use the Internet to better themselves, parents, teachers, and counsellors must also teach them how to manage their time, adjust their lives, and control their Internet usage in order to prevent the negative effects of Internet addiction and usage. If only it were possible to use the Internet effectively. Parents must also observe their children inconspicuously, occasionally sit alongside them as they use the Internet, and have a conversation about it. The ability of parents to prevent their kids from abusing the Internet depends in large part on how honestly they communicate with them and how well the parents get along with their children. Another important aspect preventing teenagers from choosing Internet social communication over family relationships is the social support of family members. Parents must urge their children to take this route.

Internet addiction causes students to ignore their environment, therefore their relationships with friends become weak because their relationships are limited to cyberspace. This causes the students to be isolated from their friends and their social skills could be reduced. Internet use has been found to have a strong impact on university students, and at times it affected their social life and their relationship with their family. The finding of the study implies that all social media and technology are changing the way humans interact. Now distance and place are no longer barriers to staying in touch. With just one click at the users' fingertips, virtual social interaction networks allow users to stay connected with others regardless of time. The use of the Internet also changes the youngsters' developmental environment in particular in developing their social behaviour in society.

Internet addict students experience syndromes such as being easily influenced by information accessed on the Internet, spending time on the Internet beyond necessity, Internet usage levels increasing over time, and prioritizing fun in the virtual world over socializing in the real world, which eventually leads to social isolation. All parties including parents, university management, and the mass media should always strive to educate and increase consumer awareness, especially of students in accessing the Internet by emphasizing self-control over their Internet use. A person with Internet addiction is found to fail to focus well on his or her life as normal people do. For those with this disease, their role and relationships with other individuals in their life environment are also affected.

To prevent this from happening, the following self-control strategies and measures can be studied and practiced by students, such as setting objectives and goals before browsing a website by identifying the purpose of use, set their browsing to websites that are specific and only necessary or simply meet the desired requirements without exceeding the limit and to avoid browsing unnecessary sites, limit or set the time required when using the computer and when browsing the Internet to avoid wasting time, divide the time appropriately between life in the cyber world and life in the real world so that there is a balance in everyday life, and make the Internet a source of knowledge to add skills needed in life. High Internet dependency by students has caused them to withdraw and isolate themselves from their real life activities that lead to developing social connection and relationship.

## 7. Contribution to Theory and Practice

This study makes a significant theoretical contribution. This study is important, especially in terms of how it adds to the body of knowledge. The current study specifically adds to and advances previous understanding regarding the effects of Internet addiction and time spent on people's behaviour. Social isolation behaviour among university students due to excessive use of the Internet extend the dynamics of social information processing theory (Walther, 1992) and theory of equations for media (Reeves & Nass, 1996) to explain the circumstances under which addicted Internet users may gradually be developing social isolation behaviour. They treat social media as real life and ignore their real role in society. In fact, Internet addiction is indeed contributing to social isolation among its users. This finding can be instrumental for the social and health administrative authorities to explore ways to manage the impact of Internet use especially among university students given that they are the next generation who will join the real working world and participate fully in the community.

## 8. Future Research

Although the current study's findings are statistically significant, it also indicates important limitations that should be taken into account in subsequent research. The fact that the data was gathered from four universities in Kuala Lumpur city is the primary limitation of this study. Future researchers are advised by the current study's authors to conduct similar studies in universities outside of Kuala Lumpur. Secondly, student activities such as using the Internet need to get the attention of parents, lecturers, and university administrators because they affect social interactions. Future research could explore this further to determine potential mediating as well as moderating factors or explanations. More varied samples could lead to answers to improve our understanding of the relationship. Thirdly, future research also need to examine the topic of Internet addiction caused by other factors that have not been studied in this study, such as low self-control, depression, shyness, and life satisfaction levels as well as other factors. Thus, how much of these unstudied factors influence Internet addiction can be discovered. Fourthly, future studies should also consider the qualitative research method to further understand Internet addiction behaviours and social isolation patterns among young adults as well as older adults. Lastly it is also recommended that future researchers study Internet addiction and Internet use among children, young adults, and older adults in urban and rural areas.

## 9. Conclusion

Internet addiction and increase in time spent on the Internet may cause serious effects and damage to human social relationship. Therefore, there is a need to decrease time spent on the Internet by strengthening social relationships with family and friends as well as by exchanging thoughts and ideas. Higher education institution management also need to play their role by promoting an appropriate use of the Internet among students. Success in solving this Internet addiction issue can help to reduce its negative consequences and ensure proper use of this valuable technology. Therefore, the required attention must be given to this subject especially for the benefit of younger generations.

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