

Measuring Psychological Effects and Internet Addiction towards Academic Performance of Tertiary Students in Malaysia

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Abstract- Excessive use of internet leads to internet addiction, which has numerous negative consequences. The purpose of this study is to investigate the impact of internet addiction on academic performance and identify the level of internet usage among tertiary students in Malaysia. Approximately 300 survey questionnaires were distributed to get 220 respondents from five different public universities in Malaysia. Based on the literature review, seven hypotheses were derived and tested using Structural Equation Modeling (SEM). The key findings of this study show that 6.3% male and 3.2% female students are excessive internet users. The model shows that two factors, such as psychological effects, and observable impacts have positive and significant influence on internet addiction. The result also revealed that social comforts and attitudes toward using internet do not have significant influence on internet addiction. However, social comforts and observable impacts have significantly influence on psychological effects. The findings also reveal that internet addiction has a negative and significant influence on academic performance of tertiary students in Malaysia.

Keywords- Internet Addiction, Psychological Effects, Observable Impacts, Academic Performance, Malaysia

1. INTRODUCTION

There is little questioning the prominence of internet in human life in the 21st century. The internet is an outstanding social and communications tool that has altered human life. Due to technological advances and the growing available access to the internet, people are logging on to the net for every possible reason. However, the excess use of internet may lead to internet addiction. For instance, problematic internet users find themselves logged on during meals, during lessons, at work, home, during outings and they remain logged on even while they sleep.

Internet addiction is defined as, “excessive or poorly controlled preoccupations, urges or behaviours regarding computer use and internet access that lead to impairment or distress” (Shaw & Black, 2008, p.1)[52]. Numerous internet researchers have assumed that students might be at higher risk due to excessive use of internet (Nalwa et al., 2003)[44]. This is because many universities and colleges all over the world offer high speed, free, and all time internet access to their students. From an analysis of internet user behaviour, it is noticeable that many students are addicted to the internet (Chou & Hsiao, 2000[12]; Frangos, Frangos, & Sotiropoulos, 2011[22]). Anderson

(2001)[3] attempted to distinguish between excessive users and normal users based on their sleeping and eating patterns. Unnecessary internet usage has significant social effects. For instance, numerous researches have observed that persons who use internet excessively tend to sleep less, underperform socially, show poor interpersonal skills (Anderson, 2001[3]; Nalwa et al., 2003[44]; Kraut et al., 1998[37]; Lin and Tsai, 2002[42]; Young, 1998[61]), and use the internet to manage anxiety and misery (Chou, 2001[13]).

Internet usage is aggressively growing in developing countries and Malaysia is no exception to this. The World Bank (2013) reported that as of 2011, 61% of Malaysians have access to the internet, which is an increase of 12.67% compared to 2005. According to the Nielsen Company's Mobile Insights Survey, the highest usage was recorded among people aged between 20 to 24 years. Almost six in ten (57%) people regularly use the internet and spend an average of 22.3 hours online per week. Kapahi et al. (2013) found that the likelihood of becoming an internet addict is high among Malaysian youth. University or college students aged between 18 and 25 were found to be susceptible to internet addiction (Kapahi et al., 2013)[33].

The author(s) also posit that internet addiction might have significant negative impact on Malaysian youths. To address this problem, the main objective of this study is to investigate the impact of internet addiction and the level of internet users among tertiary students in Malaysia. The findings could be useful for Malaysian policy makers particularly the Ministry of Higher Education (MOHE) to take necessary steps for minimizing the negative impact of internet addiction among tertiary students in Malaysia.

2. LITERATURE REVIEW

Internet is the most recognized and popular channel for communication, information exchange, academic research, entertainment, commerce and social media. Although internet has many positive aspects for users, there is a growing amount of literature on the negative aspects of its excessive and pathological use (e.g. unpleasant social life), otherwise referred to as internet addiction (Douglas et al., 2008[16]; Byun et al., 2009[8]; Frangos & Frangos, 2009[20]). It is greatly acknowledged that internet has a profound impact on our daily lives. For the most part, this is due to the wealth of information available online. Doubtless, the internet has contributed tremendously to the technological advances of this world as well as smooth functioning of our daily lives (Frangos, Frangos, & Kiohos, 2010)[21]. In contrast, excessive internet use can cause trouble to human life. For example, top technology producers like Korea and Japan are particularly vulnerable to internet addiction (Kim, 2006)[34]. Chou & Hsiao (2000)[12] conducted a survey among 910 students from 12 universities and colleges around Taiwan. They found that 5.9% of students can be categorized as internet addicts. In another study of 2,203 adolescents from Taiwan, Ng et al., (2003) found that 10.7% of the

respondents could be considered potentially at risk of internet addiction, while 3.5% could be identified as seriously at risk of internet addiction. Sato et al. (2006)[51] identified that some Japanese students dropped out from school due to internet addiction. In a study of 293 respondents from China, Lin and Yan (2001)[43] revealed that 9.6% of the respondents could be considered addicted to the internet. Mythily (2008) found that 17.1% of adolescents are excessive internet users in Singapore while in Thailand it was 3.7% (n = 35) (Wanajak, 2011).

The time university students devote to the internet is increasing (Odaci, 2013[49]; Odaci, 2011[48]; Griffiths, 2000[25]). For instance, Griffiths (2000) described the case of a Greek university student in the UK whose studies noticeably suffered because he spent too much time on the internet, which left him little time to get on with his degree. Many researchers are convinced that students are at risk of becoming internet addicts, which can cause poor academic performance (Yang et al., 2005)[56]. For example, Kubey et al. (2001)[38] assessed internet addiction in a sample of 542 university students and found that 9% of the respondents categorized themselves as being emotionally dependent on the internet and having trouble with homework, absent from class, and having a sense of guilt and lack of control over their internet use. Apart from that, Odaci (2013) found a significant negative correlation between problematic internet use and academic self-efficacy. In contrast, Jones (2008)[31] found that university students and teachers consider the internet as a convenient and useful tool for educational activities. Kubey, Lavin, & Barrows (2001)[38]) showed that 68% of parents and 69% of teachers said that there is a positive relationship between internet use and academic performance.

Usually students use internet more for fun at the expense of productivity, even though it is used as an ideal research tool (Odaci, 2011)[48]. In addition, Anderson (2001)[3], Bloch (2002)[6], Brenner (1997)[7] and Caplan, (2002)[10] found that internet addicted university students underperform socially and show a poor mentality compared to non-addicts. On the other hand, the use of internet for social media is associated to attitudes and behaviours which enrich individuals' social capital (Valenzuela, Park & Kee, 2009)[53]. They found positive relationships between internet use and students' life satisfaction, interpersonal trust, community involvement, and political engagement. Overall, internet usage became one of the important way for social comforts (Aydin, 2007[5]; D'Esposito & Gardner, 1999[15]). Social comforts as predictors of social safeness offer a safe and secure environment for those involved with social networks, even though it is a virtual network (Anderson, 2001[3]; Niemz et al., 2005[46]; Cardak, 2013).

The psychological effect refers to influence on the mind, especially as a function of awareness, feeling, or motivation (Sato, 2006[51]; Amichai et al., 2003[2]). This effect could be negative or positive. For instance, Amichai et al., (2003) pointed out that students who are extremely

dependent on the internet suffer from negative psychological effects such as loneliness and mental disorder. Fung (2002)[24], Grifits (2003)[25], Jones & Madden (2002)[30], and Kraut et al., (1998)[37] found that internet addiction among students causes relationship degradation with family, friends and other social relations. Due to internet addiction, people begin to neglect friends and family. This might lead to lower productivity and dishonesty with themselves and others. For instance, Young (1998)[59] found serious relationship problems that were reported by 53% of internet addicts surveyed resulting in divorce. Increased use of the internet often causes neglect of other responsibilities due to time mismanagement (Young, 1998)[59]. Under such circumstances, what a husband or wife does is not motivated to contribute to other household responsibilities. As a new form of addiction, internet addiction has attracted the attention of psychologists, psychiatrists, and sociologists among others. Internet addiction is a problem that can be seen in different societies and cultures. The spread of this problem has led researchers and experts to identify its reasons, consequences and side effects (Yen et al., 2007)[58]. It has also been observed that uncontrollable game playing or programming, and computer addiction are loosely used terms for the excessive use of computers to the degree that it affects daily activities (Cover, 2006)[14]. According to Reuters, American college students are overly attached to their cell-phones, social media and the internet with symptoms similar to drug and alcohol addictions (Jeong & Titov, 2010)[28]. Internet obsession such as gambling, gaming, chatting, cybersex etc. can disturb daily life to the point

that an individual disregards other productive and creative activities (Fisoun et al., 2012)[19]. In such a state of addiction, addicts constantly think of internet browsing. Whenever they are not online they feel that their life is boring, empty and joyless.

Cao et al., 2007[9], Kim, et al., 2006[34], and Yen et al., 2007[58] compared the psychological, personal and social characteristics of students who excessively use the internet with other students. This excessive use of the internet has an observable impact on our daily lives. Observable impact refers to negative influence of internet usage on the personal life of the users (Ko et al., 2007). The results indicated that depression, stress, suicide intentions, hyper-activity, fear, social fear, aggression, violence and anti-social behaviours occur more in addicted students. In addition, cybersex addiction among couples lead to serious interpersonal problems and on many occasions it leads to divorce (Hertlein & Piercy, 2006)[27]. Research shows that due to advancements in internet usage, there has been a global increase in unethical behaviour such as cheating, stalking, and pornography, which eventually leads to poor academic performance among students (Yang et al., 2004)[56]. Currently, college and university students are regarded as highly vulnerable to internet addiction (Kandell, 1998[32]; Young & Rogers, 1998[59]; Nalwa & Anand, 2003[44]; Niemz et al., 2005[46]). This is due to several reasons such as free and unlimited access, lack of parental control, and lack of ethical behaviour among others. To understand this issue, especially among university students, Young (2004)[60] argued that students are the utmost susceptible population to internet addiction due to the widespread availability of internet access.

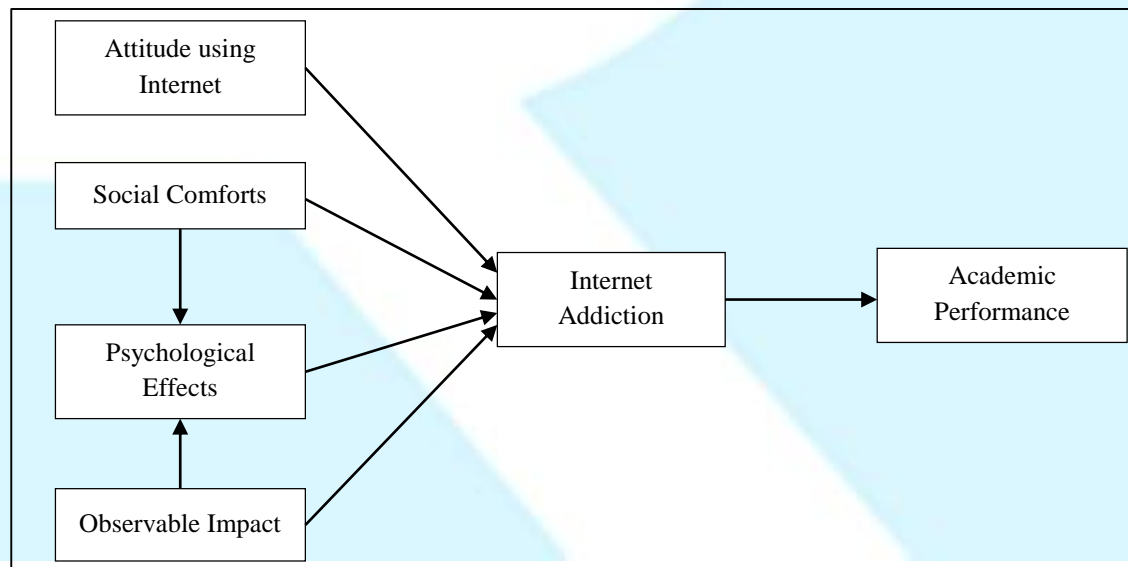


Figure 1: Proposed Research Hypotheses

Based on the above literature, the following research model was developed with seven hypotheses:
H1: Students' attitudes toward internet use have a positive impact on Internet Addiction (IA).

H2: Social Comfort (SC) has a positive influence on IA
H3: SC has a positive influence on Psychological Effects (PE)
H4: PE has a positive impact on IA.

H5: Observable Impact (OI) has a positive impact on IA.
H6: OI has a positive impact on PE.
H7: IA has a negative impact on students' Academic Performance (AP).

3. RESEARCH METHODOLOGY

3.1 Sampling

The target sample of this study comprised of students from IIUM, UM, UKM, UPM and USM. A total of 300 students from five public universities (USM, IIUM, UKM, UPM and UM) were randomly selected using quota sampling. The sample consisted of 50% males and 50% females. The research selected an equal number of males and females to identify which group users the internet more. Questionnaires were distributed among the sampled students of IIUM, UPM, UM, UKM and USM. The questionnaires were distributed via face to face interaction. This approach offers a higher chance of the researcher obtaining straightforward and honest answers from respondents to accurately measure the level of internet addiction among students from the five sampled public universities in Malaysia

3.2 Distribution and Data Collection

Both undergraduate and postgraduate students were selected as respondents. Data was collected through a survey questionnaire using quota sampling. The distribution ratio across the sampled universities was USM (20%), UM (20%), UKM (20%), IIUM (20%), and UPM (20%). The quota sampling procedure is illustrated in Figure 2.

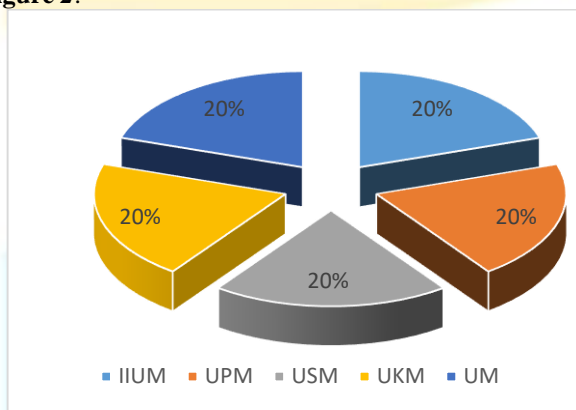


Figure 2: Study Sample according to University

3.3 Research Instruments

Currently there are several scales to measure internet addiction such as Chen Internet Addiction Scale, Young's Internet Addiction Questionnaires, and Ko's Internet Addiction Scale (Aboujaoude, 2010[1]; Frangos, Frangos, & Sotiropoulos, 2012[23]). The IAT has been used by many researchers to measure internet addiction (Egger & Rauterberg, 1996[17]; Johansson & Götestam, 2004[29]; Widyanto & McMurran, 2004[54]; Yang et al., 2005[56]). To date, Young's Internet addiction test (YIAT20) is the most frequently used scale to measure internet addiction (Frangos, Frangos, & Sotiropoulos, 2012). In addition, the

author(s) suggested that based on the mean differences among the three scales mentioned earlier, YIAT20 is more reliable in college students and probably in Asia. Thus, this study adapted Young's Internet Addiction Test (IAT) questionnaires to assess the participants' level of internet addiction. The questionnaires were divided into seven sections, namely A, B, C, D, E, F, and G. Section A consisted of the demographic information of the respondents which included their gender, age, nationality, number of years studying at the university, level of study, and faculty. Section B consisted of 20 items designed to measure the degree of internet addiction e.g. minimal, moderate and excessive users among IIUM, UM, UPM, UKM and USM students. This was calculated using Microsoft Excel based on a 5-point scale with 1 being "not at all" and 5 being "always." As suggested by Young, cut-off scores for the IAT were used to classify internet users based on the severity of their addictive behaviour (Young, 1998). The first 20 questions required the participants to rate the characteristics of their internet habits. The following five sections consisted of a 5-point Likert-type agreement scale with 1 being "Strongly disagree" and 5 being "strongly agree". The next 8 questions addressed the observable impact on the participants' daily tasks. The subsequent 5 questions addressed the respondents' social comforts. The next 5 questions addressed the respondents' internet obsession. The next 8 questions addressed the respondents' most characteristics of their situations and the last part of the questionnaire inquired as to the respondent's activities for which they frequently use the internet.

4. RESULTS AND DISCUSSION

4.1 Demographic Information

300 questionnaires were successfully distributed among the target population. A total of 220 completed questionnaires out of the 300 distributed were usable. This indicates a response rate of 74%. An equal selection of male (50%) and female (50%) respondents was decided upon in order to measure the degree of internet addiction among each group. This study was conducted among Malayu (50%), Chines Malaysian (24%), Indian Malaysian (15%) and international (11%) students.

4.2 Internet Addiction Group

Respondents were divided into three groups based on 20 items from Young's IAT. The minimum score was 20 while the maximum was 100. The higher the score, the greater the level of internet addiction is. As suggested by Young, cut-off scores for the IAT were used to classify internet users based on the severity of their addictive behaviour (Young, 1998). The same cut-off scores were used in the present study:

- Minimal users (scores 20 to 39) – average online users who have complete control over their internet usage;

- Moderate users (scores 40 to 69) – those experiencing occasional or frequent problems due to internet usage
- Excessive users (scores 70 to 100) – those having significant problems caused by internet usage.

Figure 3 shows the level of internet usage among the surveyed respondents. Of the total respondents, 10.5% were considered minimal users, 80% moderate and 9.5% excessive users. The three levels of addiction are shown in **Figure 3**.

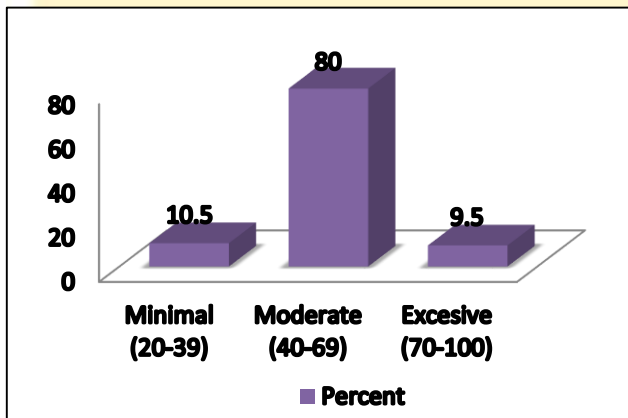


Figure 3: Internet Addiction Group

A comparison of gender representation shows that there were more male excessive users than female. **Table 1** below indicates that 6.3% of male students are excessive users, which is 3.2% higher than their female counterpart.

Table 1: Gender and IAT Group Cross tabulation

Gender	Minimal	Moderate	Excessive	Total
Male	12	93	14	110
Female	10	84	7	101
Total	22	177	21	220

Table 2: Internet Activity Engaged and IAT Group Cross Tabulation

Internet Activity Engaged	Minimal	Moderate	Excessive	Total
Chat room, E-mail, Instant messaging, newsgroup	11	63	2	78
Cyber relationship	1	9	1	11
Cybersex	0	0	1	2
Gaming, Interactive gaming	2	13	2	17
Shopping	0	6	1	9
Research	1	34	7	44
Simply Web surfing	5	17	0	25
Research	1	15	3	25
Others	0	3	2	9
Total	21	160	19	220

The above result supports the previous study conducted among university students in China and United states by Norvilitis et al., (2008)[47]. The study concluded that the internet addiction rate was much higher among males than females. Similar findings were reported by Yen et al., (2007)[58] suggesting more attention should be paid to male adolescents with high hostility towards intervention of internet addiction. Men were more likely to be addicted to the internet than women, and internet addicted students were associated with poorer academic performance. In Greece, two studies of high school pupils similarly mentioned that boys used computers more than girls (Papastergiou & Solomonidou, 2005[50]; Aslanidou & Menexes, 2008[4]). Interestingly, Papastergiou & Solomonidou (2005)[50] mentioned that boys had more opportunities to access the internet and use the internet for entertainment and Web page creation than girls, with no other differences in other activities.

4.3 Internet Activities Engaged

The internet is a tremendous significant social and communications tool, which has altered human life. The numbers of internet addiction cases are increasing among tertiary students owing to the usage of cell phones, iPads, computers, e-mail, Facebook, Twitter, chatting, cybersex, online gaming, and online gambling. The findings of the study indicate that the internet is mainly used for interactive communication such as chatting, e-mail, instant messaging, news groups, research, surfing, and gaming. Preferences differed among the three IAT groups. 11% of minimal users, 63% of moderate users, and 2% of excessive used the internet for chatting, e-mail, instant messaging, and news. 1% minimal, 9% moderate and 11% of excessive users used it for cyber relationships. Internet used for research comprised for 1% minimal, 34% moderate and 7% excessive users as shown **Table 2**.

4.4 Tests for confirmatory factor analysis (CFA)

According to Kline (2015), the purpose of a measurement model is to constitute an appropriate measurement instrument of the observed indicators representing a latent variable. This is echoed by Hair et al. (2010), who observed that in measurement theory, the purpose is to estimate the relationship between the observed and the underlying latent variables. The adequacy of a measurement model is performed by CFA. In doing so, four fit indices are checked to ascertain the fit of the model with the data: chi-square statistic, normed chi-square, root mean square approximation (RMSEA) and comparative fit index (CFI). For an adequate model fit, general guidelines suggest cut-off values for such indices: Normed Chi-Square and RMSEA are to be less than 5 and 0.088 respectively, while CFI values are to be above 0.9 (Hair et al., 2010[26]; Byrne, 2010).

Prior to testing the structural equation model, CFA was simultaneously performed on the entire set of measurement items. The process of evaluating the measurement model resulted in deleting terms based on the factor loadings of less than 0.40 (Field, 2009)[18]. Based on the CFA tests, all seven dimensions had adequate model-to-data fit: normed chi square value below 2.41; CFI value above 0.95; and RMSEA value less than 0.080. This test also evaluated the reliability and construct validity. Cronbach's Alpha measures the reliability coefficient, which indicates the consistency of the entire scale (Hair, et al., 2010), or

the overall reliability of the questionnaire (Field, 2009). The results from this study showed that the overall α is 0.840, which indicated that the questionnaire was reliable and consistent (Hair, et al; Field, 2009). All six dimensions of the research variables had Cronbach's $\alpha > 0.7$, which exceeds the minimum 0.30 value for inter-item correlations, suggesting high correlations among items (Hair, et al., 2010)[26].

The construct validity evaluates "the extent to which a set of measured items actually reflects the theoretical latent construct those items are designed to measure" (Hair et al., 2010)[26]. This study has considered construct validity by using convergent validity. For convergent validity, this study assesses factor loadings, average variance extracted (AVE), and composite reliability (CR). A standardised factor loading of 0.50 or higher, ideally 0.70 or higher, provides strong evidence of convergent validity (Hair et al., 2010)[26]. In the measurement model, all the items had significant factor loadings, most of them greater than 0.60, suggesting adequate convergent validity. From the CFA, the AVE, which is the mean variance extracted for the items loading on a construct is calculated. The measurement model showed AVE values of greater than 0.5 for each construct, suggesting an adequate convergence (Hair et al., 2010)[26]. The composite reliability of this study indicates adequate convergence with values $\geq .7$, thus indicating good reliability (see [Table 3](#)).

Table 3: Construct Validity of Confirmatory Factory Analysis

Items	Stand. Loadings	Composite AVE Reliability
Attitudes of Using Internet (Normed $\chi^2 = 2.30$, CFI = 0.943, RMSEA = 0.067)		
Given the resources, opportunities and knowledge it takes to use the internet	0.53	0.54 0.816
Using the internet is a good idea.	0.63	
The actual process of using the internet is pleasant.	0.76	
Working with the internet is fun.	0.79	
Overall, I like using the internet.	0.73	
Psychological effects (Normed $\chi^2 = 1.56$, CFI = 0.995, RMSEA = 0.051)		
When not on-line, I spend a lot of time doing other things related to the internet	0.57	0.53 0.70
I have frequent dreams about the internet	0.78	
When I'm not on-line internet comes to my mind	0.79	
I have received phone bills that I couldn't afford because of using internet	0.66	
Internet Addiction (Normed $\chi^2 = 1.46$, CFI = 0.984, RMSEA = 0.046)		
Others complain about spending time on line	0.63	0.56 0.86

Items	Stand. Loadings	Composite AVE Reliability	
Attitudes of Using Internet (Normed $\chi^2 = 2.30$, CFI = 0.943, RMSEA = 0.067)			
I act annoyed if someone bothers me while I'm on-line	0.64	0.54	0.70
Lose sleep due to late-night log-ins	0.62		
Feel preoccupied with the internet when off-line, or fantasize about being on-line	0.80		
Find yourself saying “just a few more minutes” when on-line	0.50		
Try to hide how long you’ve been on-line	0.63		
Choose to spend more time on-line oven going out with others	0.69		
Feel depressed, moody or nervous when is off-line	0.73		
Social Comforts (Normed $\chi^2 = 1.19$, CFI = 0.999, RMSEA = 0.030)			
I would rather use internet than deal with other pressing issues	0.55	0.52	0.78
I am the kind of person who feels more comfortable with objects than people	0.81		
I have given up my social and leisure time so I can spend more time on the internet	0.59		
I’m often late for appointments because I’m on-line when I shouldn’t be	0.63		
Observable Impacts (Normed $\chi^2 = 2.41$, CFI = 0.956, RMSEA = 0.080)			
My productivity at university has decreased because of internet use	0.58	0.57	0.75
My friends and family complain about my use of the internet	0.62		
I get irritated when somebody disturbs me when I am on the internet.	0.64		
I feel down and nervous when I am not on the internet.	0.68		
I lie to others or conceal the extent of involvement with the internet	0.67		
Every day I use the internet for a minimum of 8 hours	0.55		
Academic Performance (Normed $\chi^2 = 1.42$, CFI = 0.993, RMSEA = 0.044)			
CGPA less than 2.5	0.66	0.71	
CGPA 2.5 – 3.00	0.58		
CGPA 3.01 - 3.50	0.66		
CGPA 3.51 - 4.00	0.71		
Others	0.75		

4.5 Test for Structural Equation Modeling (SEM)

Structural equation modeling (SEM) is used to test the causal effect among the main constructs of a hypothesized model (Kline, 2015)[35]. In this study, a structural model was tested to examine the relationship among academic performance, internet addiction, attitudes towards internet

use, social comforts, internet obsession, and observable impacts (see [Figure 4](#) below). The model had an adequate fit to the data: chi square per degree of freedom (13.83/5) = 2.767, less than 3; CFI = 0.989, greater than 0.90; p = 0.017, less than p ≥ 0.005; and RMSEA = 0.066, less than 0.088 (Hair et al., 2010)[26].

As shown in **Figure 4**, the R square for the three dependent (endogenous) variables were academic performance = 0.83, internet addiction = 0.48 and internet obsession = 0.50, which indicated that a large percentage

of the variance in the dependent factors was explained by the independent (exogenous) factors. All hypotheses were supported in the SEM based on the significant level ($p = <0.001$) except hypothesis 1 and 2.

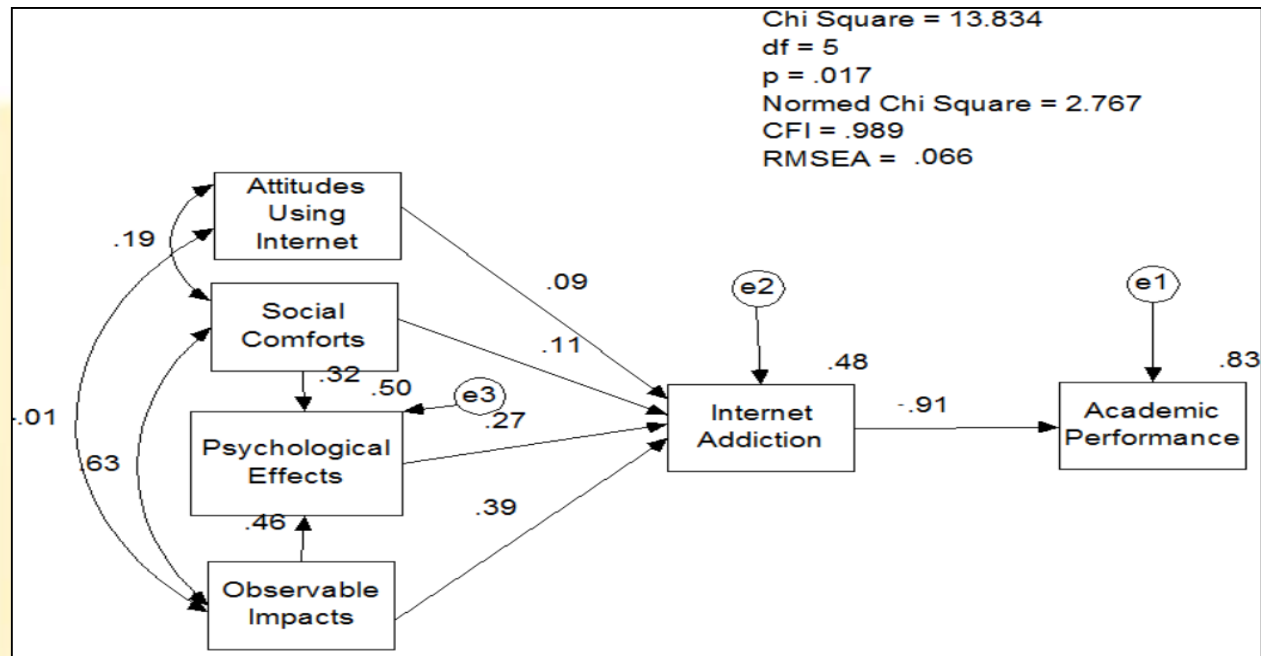


Figure 4: Structural equation modeling of internet addiction and academic performance

The SEM model shows that two factors, namely psychological effects ($\beta = 0.264$), observable impacts ($\beta = 0.404$), have positive and significant influence on internet addiction. The factor of observable impact includes the level of productivity at university, lateness for appointments, complaints from friends and family, difficulty in abstaining from internet use, and lying to others etc. These negative behaviours led users to internet obsession. Amichai et al. (2003)[2] observed that students excessively dependent on the internet feel alone from the perspective of mental health. Fung, 2002[24], Griffiths, 2003[25], Jones and Madden, 2002[30], and Krat et al.,1998[37] argued that internet addiction in students causes indifference in interpersonal, family, friendship and social relations.

Social effects include neglecting friends and family, lowered productivity, being dishonest with himself/herself and others. According to Ko et al., (2007)[36], the development of addiction to internet is harmful. Preoccupation with internet such as an addiction to online gambling can disturb daily life to the point that an individual disregards other productive and creative activities. It should be noted however, that attitudes toward internet use and social comforts do not directly influence internet addiction. However, social comforts significantly influence internet obsession ($\beta = 0.373$) and observable impacts have similar influence on internet obsession ($\beta = 0.493$).

Table 4: Hypothesised Path Coefficients

Hypothesized paths	Coefficient (β)	P-value (sig.)	Remarks
H1 Attitudes Using Internet → Internet Addiction	0.108	0.073	Unsupported
H2 Social Comforts → Internet Addiction	0.123	0.108	Unsupported
H3 Psychological effects → Internet Addiction	0.264	0.000	Supported
H4 Observable Impacts → Internet Addiction	0.404	0.000	Supported
H5 Social Comforts → Psychological Effects	0.373	0.000	Supported
H6 Observable Impacts → Psychological Effects	0.493	0.000	Supported
H7 Internet Addiction → Academic Performance	-0.924	0.000	Supported

The SEM results also show that internet addiction has a negative and significant influence on academic performance ($\beta = -0.924$). This finding is supported by the study of Griffiths (2000) and Yang et al. (2005). The SEM test results also show that social comforts have strong correlations with observable impacts ($r = 0.63$) and attitudes towards internet use ($r = 0.19$), whereas observable impacts has a weak and negative correlations with attitudes towards internet use ($r = -0.01$).

5. DISCUSSION AND CONCLUSION

Internet addiction may lead to serious negative consequences particularly among youths (Young, 1996[59]; Yellowlees & Marks, 2005[57]; Nalwa & Anand, 2003[44]). The principle goal of this research is to investigate the impact of internet addiction and the level of internet usage among tertiary students in Malaysia. The findings show that 10.5% of the students are minimal users, 80% are moderate users, while 9.5% are excessive internet users. As suggested by Young, cut-off scores for the IAT were used to classify internet users based on the severity of their addictive behaviour (Young, 1998)[59]. The paper also noticed that males tend to use the internet more than females. This is in line with the findings of Papastergiou and Solomonidou (2005)[50] and Aslanidou and Menexes (2008)[4]. Papastergiou and Solomonidou (2005)[50] mentioned that boys have more opportunities to access internet and use internet for entertainment and Web page creation more so than girls, with no other differences in other activities.

This study found an insignificant relationship between students' attitudes towards internet use and internet addiction. This is perhaps because this factor depends on positive or negative attitudes towards use of the internet. If students use the internet to support his/her studies it does not necessarily mean that they are addicted to the internet. On the other hand, some students use internet for chatting, facebook, cybersex, gambling etc. which may lead to internet addiction. Therefore, it can be concluded that the issue depends on the user attitudes towards the internet.

The findings also showed that the observable impact influences internet addiction because it is obvious that this factor may affect the productivity of users, lateness for appointments, lying to others, feelings of anxiety when away from the internet etc. Prior studies have shown that internet can distract students from their work (Chang & Man, 2008[11]; Nalwa & Anand, 2003[44]; Young, 1996[61]). A significant relationship was observed between internet obsession and internet addiction. This is often due to the lack of social skills with real human beings. The social support and the anonymity offered by social networking can lead to severe addictive behaviour (Caplan, 2002)[10].

The SEM test results also showed that social comforts have strong correlations with observable impacts ($r = 0.63$) and attitudes toward internet use ($r = 0.19$), whereas observable impacts has a weak and negative correlation

with attitudes toward internet use ($r = -0.01$). In addition, internet addiction had a negative and significant influence on academic performance ($\beta = -0.924$). This means when internet addiction increases, academic performance decreases. This is because users are engaged with chatting, Facebook, gambling, pornography, cybersex etc.

The negative impact of the internet on the youths is partly due to their ignorance of its negativities and their destructive consequences. In this regard, university authorities may introduce a counselling service to reduce their internet addiction. This might assist in improving academic performance. Top management could organize educational programs concerning the negative consequences of excessive use of the internet. Parents are of particular importance in changing the internet behaviour of their children. The government could provide the necessary assistance that enables local authorities to offer rehabilitation and educational programs. However, currently the Malaysian government is promoting internet use via broadband connection which may further lead to excessive internet use. This study has demonstrated that in the respondents, if self-report is to be trusted, some students cannot control their internet usage. It is also documented that it is not only students who are in danger of internet addiction but also the young administrative staff within tertiary institutions.

It is noteworthy that there are some limitations of this study. First, generalization of the findings should be addressed with care as a convenient sampling technique was used in this study. Second, the self-reported data can have the positivity bias problem. Third, there is a methodological deficiency as this study is only carried out using a quantitative method. Despite these limitations, this study provides some original findings on internet addiction among tertiary students in Malaysia.

6. COMPLIANCE WITH ETHICAL STANDARDS

6.1 Conflict of Interest

The authors have no conflict of interest in the execution or outcomes of this study.

6.2 Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

6.3 Informed Consent

Informed consent was obtained from all individual participants included in the study.

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