A STUDY OF INTERNET ADDICTION AMONG STUDENTS OF SEKOLAH MENENGAH JENIS KEBANGSAAN PEI YUAN, KAMPAR

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Approval Form

This research paper attached hereto, entitle "**A Study of Internet Addiction among Students of Sekolah Menengah Jenis Kebangsaan Pei Yuan, Kampar**" prepared and submitted by "Yong Shu Qin" in partial fulfillment of the requirement for the Bachelor of Social Science (Hons) Psychology is hereby accepted.

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ABSTRACT

There are many studies about internet use and internet addiction and it is one of the things that influence our daily life. This study examines the internet addiction in secondary school. The sample consisted of 120 students in Sekolah Menengah Kebangsaan Jenis Pei Yuan Kampar, Perak. The study utilized an instrumental to measure the internet addiction; namely Internet Addiction Test (IAT). Demographic factors (age, gender and grade of level) were examined too. Data analysis included descriptive and inferential statistic (Chi-square and T-test). The result suggests that the level of internet addiction among SMJK Pei Yuan is moderate and tends to minimal. Moreover, there is a significant of gender difference in internet addiction, t (118) = 2.380, p = 0.019. However, there is no significant association between internet addiction among the lower and upper secondary students of SMJK Pei Yuan, Kampar, x^2 (1, n = 120) = 0.306. It is recommended that problem of internet addiction should be aware to prevent growing of internet addiction.

DECLARATION

I declare that the material contain in this paper is the end result of my own work and that due acknowledgement has been given in the bibliography and references to ALL sources be they printed, electronic or personal.

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CHAPTHER I

INTRODUCTION

Background of Study

Internet is being integrated as part of our everyday's life because the usage of internet has been growing explosively worldwide. Homes, schools, colleges, libraries and internet cafes are the places which are more accessible to internet nowadays. Completing schoolwork, playing online games, reading and writing emails and engaging in real time chatting are the common online activities. According to the National Center of Education Statistic preliminary studies had shown that a large number of American children and adolescents with age around 5 to 17 years old have access to the internet and are exposed to the internet at a very early age (Mythily, Qiu and Winslow, 2008).

Young (2006) stated that internet is one of the things that influence our daily life because internet users more likely to spend their leisure time in the cyber community. According to the Ministry of Information and Communication (2005), around 94.8% of teenagers are using the internet and this propensity suggests that teenagers may consider the cyber space as a real rather than virtual space (as cited in Young, 2006). Again according to Young 2006, "the internet has Janus face". It means that internets provide facility for people while on the other hand people might abuse the internet usage also. Based on Ko et al. (2006) studies that internet and computer usage have become popular worldwide but also have negative impact on some individuals and on society at large.

According to Young (1996), addiction to the internet is the same as addiction to gambling, drugs, and alcohol. Widyanto & McMurran (2004) have explain that concept of addiction is quite hard to define because it depends on a substance or activity. The characteristic of dependence are overindulgence, tolerance, withdrawal, craving, and loss of control. The behavioral addiction has been grown and related to the use of machines such as playing video games, using computer, and playing amusement machines. Behavioral addictions do not rely heavily on physiological mechanisms but most important the psychological explanations of addiction fore.

Internet addiction has received increased attention due to the controversial nature and the possibility that a new kind of compulsive activity is on the rise (Mythily, Qiu & Winslow, 2008). According to Chebbi, Koong & Liu (n.d.), Internet addiction is a contemporary problem brought by easy access to computer and online information. On the other hand, internet addiction can be defined as an impulse disorder. Furthermore, some of the characteristic of this problem are similar to those of pathological gambling. Orzack (1999) have conducted a study and found that people who are easily bored, lonely, shy, depressed and suffering from other addiction are people who are susceptible to internet addiction (as cited in Chebbi, Koong & Liu, n.d.).

Chebbi, Koong & Liu (n.d.) have stated that, people who are addicted to internet can develop many types of disorder and one of the disorders that are common for the modern day is Internet Addiction Disorder (IDA). Individuals who are suffering from IDA can exhibit symptoms such as drawbacks and face consequences that are similar to individual who are addicted to alcohol, gambling, shopping or other compulsive behaviors. The two major treatments available to help people in this disorder are: Cognitive Behavioral Therapy (CBT) and Motivational Enhancement

Therapy (MET).Young (1998), had identified seven reasons for the IDA such as marital discontent, work related stress, financial problems, insecurity, anxiety, struggle in life, and limited social life (as cited as Chebbi, Koong & Liu, n.d.).

There are many studies about internet usage and internet addiction. Two researchers, Egger and Rautenberg have worked out a questionnaire to assess usage, feeling and experiences of internet use. When this questionnaire was posted, it and attracted 454 responses and 10% of them were identified as addicted. While the other survey: Internet Usage Survey with 32-item true-false questionnaire had been posted by Brenner and received 563 responses. Besides that, Petrie and Gunn had conducted another online study with 27 questions about the participants' internet use, attitudes, and beliefs and yielded 455 valid responses. The result has shown that 46.1% of them classifying themselves as addicted to the internet. Another two assessments are also completed by respondents which are Beck's Depression Inventory and Eysenck's Introversion/ Extroversion Scale. In these both assessment, it is found that the high internet usage and both depression and introversion indicating that those who consider themselves addicted to the internet were more likely to be depressed and introverted. Internet Addiction Test (IAT) was posted by Young with 20-item. This is the latest version for Young and more systematically (Widyanto & McMurran, 2004).

According to American Psychiatric Association (1995), the term "addiction" does not appear in the most recent version of the (Diagnostic and Statistical Manual-Fourth Edition) DSM – IV (as cited as Chebbi, Koong & Liu, n.d.). In additional, another study has mentioned that internet addiction is not a DSM-IV diagnosis yet (Mythily, Qiu and Winslow, 2008). However in 1998, Young have proposed a set of criteria for diagnosing internet addiction based on the DSM-IV criteria for

pathological gambling. Young have selected eight out of ten criteria that she felt that can applied most readily to internet use:

1. Preoccupation of the internet.
2. A need for increase time spent online to achieve the same amount of satisfaction.
3. Repeated efforts to curtail internet use.
4. Feel irritability, depression, or mood liability when internet use is limited.
5. Staying online longer than anticipated.
6. Putting job or relationship in jeopardy to use internet.
7. Lying to others about how much time is spent online.
8. Using the internet as a means of regulating mood.

Individuals fulfill five of the eight criteria would be considered as internet dependence (as cited in Yellowless & Marks, 2005).

According to Salman & Hasim (2009), Internet usage in Malaysian began around 1992 and they started with simple browsing and e-mail experience and now turned into mechanism to creatively propagate information. Radio and television has overtaken by internet as a source of information and par with newspaper. In Malaysia, in order to break through the barrier of gender discrimination, disability, and find job, the women internet users have used information and communications technology (ICT) to allow them to work from home. Sanders (2005) stated that, the number of Malaysian Internet user has increased over the years reaching 51.4% making Malaysia women a force to reckon with far as internet use is concern. Based on Hoffman et al. (2004), internet has exceeded the adoption rate that of earlier mass communication technologies by several magnitudes (as cited in Salman & Hasim, 2009).

However, according to Wong (2010), internet addiction is already a crisis in many developed countries. He believed this plague has infected youngsters in Malaysia and situation will be worsening by the day. Wong has stated that, it is time for Health Ministry in Malaysia is to work with psychologists in considering an internet rehabilitation program because it's help to bring addicts back into the real world.

Statement of Problem

As the usage of the internet is growing rapidly each year and internet addiction is becoming a problem among some users. Addicted persons may come from all walks of life and as a result there are suffering in the main aspect of everyday life in the situation such as school, family, work and relationship (Chebbi, Koong & Liu, n.d.). In 2007 it was declared that there were 6.6 billion people in the world but 20% of them use internet, the increased rate has increased 265.6% (Canbaz, Sunter, Peksen & Canbaz, 2009). However, 11.67 – 19.8% of adolescents have developed an addiction to internet use. Indirectly, it impairs the individuals' psychological well-being, peer and family interaction and of course academic performance (Ko at al., 2005).

According to Mythily, Qiu and Winslow (2008), Singapore is a multicultural city-state with a total resident population of just over 3.5 million people, the literacy rate of Singaporeans is 95.4%. Result show that 84% of the resident with age 10 to 14 years age have started to use the internet, while the internet use for the age of 15 to 59 is 64%. Besides that, 21% of Singaporean with 60 years and older age group has used

the internet. Furthermore, 78% of household in Singapore have at least one computer no matter is desktop or laptop at home and the 71% of household have access to the internet at home. The most important thing is 61% of the individuals are using the internet for leisure activities including playing/downloading games, listening to music or watching films.

According to Canbaz, Sunter & Canbaz (2009), among the 70.6 billion populations in Turkey, 22.5% of them use internet in 2007 and usage rate increased to 700% between the year of 2000 and 2007. However another study have showed that approximately 20 million internet users at the end of 2007 and the amount have increased to 26 million by September, 2008 in Turkey (Kabakci, Odabasi & Coklar, 2008). Based on Ju et al. (2008), Taiwan has established that 19.8% of adolescents have internet addiction and they usually have problems with their daily routines, school performance, family relationship and mood.

As a conclusion, the studies of internet addiction have been found in many different countries such as western country, Turkey, Taiwan, Hong Kong, Korea, Singapore, and etc. However, this study in Malaysia is very limited and the levels of internet addiction among adolescent still in a question mark.

Significant of Study.

This study is very important to investigate the seriousness of internet addiction in the society nowadays especially for adolescent in secondary school. Internet is very useful for user to find information for their current work. However presently internet is not only use for seeking information but being use to fills leisure

time as well. If this phenomenon continues without any solution then internet addiction will become very serious and serious. So to investigate the seriousness of the internet addiction is the main thing to start so that this problem can be solve. Hence this study seeks to find out how serious internet addiction among school student is.

This study also will explain the negative consequences of internet addiction. Besides that these studies also important to let the people who are involve to take care of it such as parents and teacher. Through this study, they may start to aware of this problem so that can try to control their children or student.

This study can provide much information about internet addiction. This study can provide information on the symptoms of the internet addiction, the impact of internet addiction and also the effect of internet addiction. The important effect that needs to be investigating in this study is whether the internet addiction will affect the academic performance of student in secondary school. However, According to Joeng (2005), internet addiction is significantly and negatively related to students' academic performance (as cited as Young, 2006). Besides that, academic performance of the students is impaired by the addiction to the use of the internet.

Objectives of Study

There are four objectives in this study. Firstly, the objective for this study is to find out the seriousness of the internet addiction among students from secondary school. SMJK Pei Yuan Kampar's students will be this study's population. The second purpose for this study is to investigate what is the level of internet addiction

among them. Besides that this study also wants to investigate whether there is gender difference in internet addiction. The fourth objective in this study is to investigate where the in a difference on internet addiction between lower and upper secondary school students in SMJK Pei Yuan Kampar.

Research Questions

1. What is the level of internet addiction among students of SMJK Pei Yuan, Kampar?
2. Is there any difference between gender and internet addiction among students of SMJK Pei Yuan, Kampar?
3. Is there any significant association between internet addiction and level of study lower and upper secondary school students among students of SMJK Pei Yuan, Kampar?

Hypothesis

1. The level of internet addiction among students of SMJK Pei Yuan, Kampar is high.
2. There is a difference between gender and internet addiction among students of SMJK Pei Yuan, Kampar.
3. There is no significant association between internet addiction and level of study lower and upper secondary school students among students of SMJK Pei Yuan, Kampar.

Definition of Concept

Addiction. Soule, Shel, & Kleen (2003) concluded that:

> Mosby's Medical, Nursing & Allied Health Dictionary defines addiction as "compulsive, uncontrollable dependence on a substance, habit, or practice to such a degree that cessation causes severe emotional, mental, or physiologic reactions." According to Gale Encyclopedia of Medicine, "Addiction is a dependence, on a behavior or substance that a person is powerless to stop." Merriam-Webster's Collegiate Dictionary defines *compulsion* as "an irresistible impulse to perform an irrational act" and *addiction* as a "compulsive need for and use of a habit-forming substance." The term *addiction* has been to some extent replaced by the word *dependence* for substance abuse (p. 64).

Internet addiction. Based on Center for Internet Addiction Recovery, internet addiction is when an individual is having a compulsive behavior involving the internet interferes with normal functioning, and causes stress on the addicts, as well as their family, friends, and loved ones (Padwa & Cunningham, 2010). According to Wolfe (2000), internet addiction is a creation of the media. While, Bidgoli (2004) stated that, internet addiction is a dysfunctional internet use pattern. This phenomenon occurs when people spend much time online to the detriment of their social and financial well-being.

Lower secondary school. Lower secondary school is a compulsory education for children between the age of 12 and 15. Most of the lower secondary schools are public schools, which are established by municipalities and operated by

local boards of education under national guidelines and legislation (Smith, 1999). The first is ideology, it is actually classical, subject-centred and vocational. The curriculum design is subject-centred too. However, for the preferred pedagogy it is subject-focused with much use of textbooks and teacher-prepared worksheets, fewer opportunities for fieldwork. The teachers' characteristics are specialist, trained principally (Tibury & Williams, 1997).

Upper secondary school. According to Lee (2002), Upper secondary education is start from Secondary Year Four and Secondary Year Five and is the democratization of education or the universalization of education in Malaysia. This democratization of secondary education has brought about the transformation from an elitist to a universal or mass secondary education. Furthermore, it is the contention of this paper that the widening of formal access to education may not lead to real access to education if effective measures are not put in place. In addition, access to education must lead to better equality and quality of education (as cited in Tan, 2010).

CHAPTHER II

LITERATURE REVIEW

Level of Internet Addiction in Adolescent

According to Pallanti, Bernardi and Quercioli (2006), Internet addiction can be found at any age and in any social condition, but most of the research major attention has been focuses on adolescent because adolescent seem to be a critical period of addiction vulnerability. The research of Van Rooij and Van den Eijinden (2007) had reported that, using internet has become one of the most popular leisure-time

activities among adolescent in Western societies. Adolescents in Netherlands of ages between 11 to 15 use the internet for leisure activities and for adolescents aged 14 and older regard internet usage as an important leisure-time activity than watching TV (as cited as Van den Eijinden, Spijkerman, Vermulst, Van Rooij and Engels, 2009). According to Lin, Lin and Wu (2009), older adolescents appear to be more dependent on the internet than younger adolescent.

Recent studies have found that 19.8% of adolescent in the world have internet addiction and furthermore, it is associated with hostility (Ko, Yen, Liu, Huang, and Yen, 2009). The first widely "wired" generation now a day are preteens and teens and according to eMarketer (2004), the number of preteens and teens online in United State grew steadily from 26.6 million in 2000 to 34.3 million in 2003 and nearly one-half of all youngsters were online (as cited in Lin & Yu, 2008). However a recent survey from Forrester Research (2005) had revealed that consumer between the age of 12 and 17 in North America were often online daily and average almost 11 hours per week. On the other hand, a survey by Taiwan Network Information Center (2008), should that the internet population in Taiwan has reached 15 million. Among them, internet user of the age under 20 accounted for about 2.86 million. Furthermore, the two groups with the highest rates of internet usage were 12 to 15 years old which is 98% and 16 to 20 years old that is 95.6% (as cited in Lin & Yu, 2008).

Based on Pallanti, Bernardi and Quercioli (2006) research, 5.4% of the sample was internet addiction and the sample included 275 students with the average of 16.67 ± 1.85 years and consisted of 52.4% males and 47.6% females. This research also shown that in Italy, internet usage had a slower diffusion than in other countries. However, in another research from China Internet Network Information Center (2006) had shown that 123 million people had gone online, of which 14.9% were teenagers

below 18 years old and it has concluded that internet addiction is currently becoming a serious mental health problem among Chinese adolescents. Chou and Hsiao reported that the incidence rate of Internet addiction among Taiwan college students was 5.9%. Wu and Zhu indentified 10.6% of Chinese college students as addicted to Internet (as cited in Cao, Su, Liu and Gao, 2007). Based on Chen et al. (2005), the majority of online gaming crime in Taiwan is theft (73.7%) and fraud (20.2) and their research found that the age of offenders is low with is 3.3% between ages 15 to 20 years of age, 8.3% are under 15 years old (as cited in Wan & Chiou, 2007).

According to Park, Kim and Cho (2008), there are more adolescent using the internet than any other age group in South Korea. Based on their research 97.3% of South Korean adolescents between the age of 6 and 19 years used the internet in 2005. Moreover, a study have investigated the prevalence of Internet addiction among South Korean adolescents been made. In this study 903 adolescents participated and 10.7% of them scored high on the Internet Addiction Scale and these youths were considered at high risk for Internet addiction. This phenomenon occurs because South Korea is an internet-based society that provides numerous middle and high school adolescents with easy internet access and Internet addiction among South Korean is serious.

Gender Differences in Internet Addiction

One of the studies of Hamade (n.d.) showed the distribution of students among three levels of internet addiction. It showed that 75.6% of female no sign of addiction compared to only 46.6% of males. Besides that, less than 25% of females are addicted to the internet and more than 50% of male students are addicted. Moreover, about 18% of males are highly addicted to the internet but females only 6% are highly addicted. In other words, male students are more addicted to the internet than female students

and the reason could be that male students enjoy more freedom than female students such as spend time outside the house and with friends, and visit internet cafes, game networks and other places. This freedom will make them more time surfing the internet and consequently become more vulnerable to internet addiction.

Wartella, Lee & Caplovitz (2002) stated that numerous studies have shown on gender differences in the use of digital media and the type of service girls and boys prefer are different. Besides that, based on (Subrahmanyam et al. (2001); Bickham, Vandewater, Huston, Lee, Caplovitz, & Wright (2003), in early teens, girls use the computer longer than boys, but for the late –teens this trends is reversed (as cited in Park 2009). Gender differences in internet addiction can be explained by the types of content that interest men and women. Interactive online games characterized by power, dominance, control, and violence attract more men than women. As an example, Young (1998) observed that men tend to seek out dominant activities. Women, on the other hand, seek out close friendships and prefer anonymous communication in which they can hide their identity. Van Schie & Wiegman (1997) have another study which showed that boys enjoy online games more than girls. This preference makes boys heavy users of the internet (as cited in Park 2009).

However, according to Azim, Zam, & Rahman (n.d.) stated that, gender differences and trends in age groups are often observed in many study. One of the studies by Young (1996) showed that middle- aged women were more prone to internet addiction than men and other age groups. While based on Davis, Smith, Rodrigue and Pulvers (1999) have compared gender differences in internet use. They found that male students spend more time online than female in the public university. However, in private university there was no significant gender differences in tern of the time spent online (as cited in Azim, Zam, & Rahman, n.d). One of the studies by

Kubey, Lavin and Barroes (2001) showed that, male students were more internet dependent than women. Dependents were four times more likely than non-dependents to report academic impairment due to their internet use (as cited in Azim, Zam, & Rahman, n.d).

Park, Kim and Cho (2008) concluded that:

> However, previous studies reported that 4.6% of girls and 4.7% of boy among 12-18 years olds Finnish youth (Kaltiala-Heino, Lintonen, & Rimpela, 2004) and a total of 1.98% (2.42% for boys and 1.51% for girls) among Norwegain youth (12-18 years) met criteria of internet addiction (Johansson & Gotestam, 2004) (pg.904).

According to Hunley et al. (2005) had a report about the amount of time spent on the computer was similar across gender. Tsai and Lin (2004) study, found that there was no significant gender difference in adolescents' Internet self-efficacy, and they suggesting that both genders were competently mastering it. In another word, both genders appear now to have equivalent resources and experience in accessing the internet. Although based on this study, gender differences in computer use are narrow but there is gender gap in online activities and in the content that is accessed (as cited in Lin & Yu, 2008). Mediamark Research (2005) had reported that, boys (28.9%) were more likely to play games than were girls (11.1%). Besides that Griffiths, Davies, and Chappell (2004) also support that boy tended to play games more often than did girls (as cited in Lin & Yu, 2008). Tsai and Lin (2004) had also stated that, males tended to consider the Internet more as a "toy", but females tended to view it as a tool or as technology with which to accomplish task (as cited in Lin & Yu, 2008). As

previously stated, researchers have found that male and female use internet differently, and according to The Pew Internet and American Life (2005), man are more likely than women to use the internet more for information gathering while women more to use in communication (as cited in McMahan 2005).

The study of Rees and Noyes (2007) found that there are significant gender differences that were reported for computer and internet use, internet attitudes, and computer anxiety. Although males and females were generally used this technologies, but females are less frequent user of technology as compared to males and that females have less positive attitude and greater aniety toward technology (as cited in Azim, Zam, & Rahman, n.d). However, a study by Ferraro, Caci, D'Amico and Di Blasi (2007) used Italian version of Young's Internet Addiction Test (IAT). Result revealed that no significant differences were found between male and female (as cited in Azim, Zam, & Rahman, n.d)

According to Hiroshi and Zavodny (2005) internet use in different location or countries have different result in gender differences. In the United State Internet use at various locations increased over time among women relative to men. In 1997 and 1998 were less likely to use internet anywhere or at home but they were more likely to do so by 2001. Nevertheless, women in Japan are much less likely to use the internet than men regardless of location, and this difference has not narrowed significant over time. In general, this research had find that gender inequality in labor markets and human capital development carries over to gender difference in IT use. In contrasting patterns of IT access and use in United State and Japan reflected differences in the structure of social organization and labor market institution in two cultures.

A study was examined the internet addiction between male undergraduate Human Sciences students of International Islam University Malaysia (IIUM). This study showed that there were no significant differences in internet addiction between male and female in Human Sciences students (Azim, Zam, & Rahman, n.d).

Theoretical Framework of Internet Addiction

According to Douglas, Mills, Niang, Stepchenkova, Byun, & Ruffini et. al (2008), conceptual model of internet addiction is proposed. It is concluding that overuse of internet is generally defined by the inner need and motivations of an individual or so call push factor. This model state that, the perceived attractive features of the medium or pull factor moderate the relationship between push factors and the severity of negative effects of internet overuse. Negative effects of Internet addiction disorder can include not only academic, social, financial, occupational, and physical impact, but extend to various deviant behaviors. Nevertheless, realization of the Internet addiction disorder problem by the individual may make possible consumption of control strategies in order to curb the addiction a link between the deviant behaviors and control strategies constructs is also proposed, since the reviewed studies provide evidence that subjects struggle with the compulsion to online in criminal activities online. It is also proposed that some individuals are more likely to adopt deviant online behaviors than others; therefore, a direct link is proposed between the antecedents and deviant behaviors constructs.

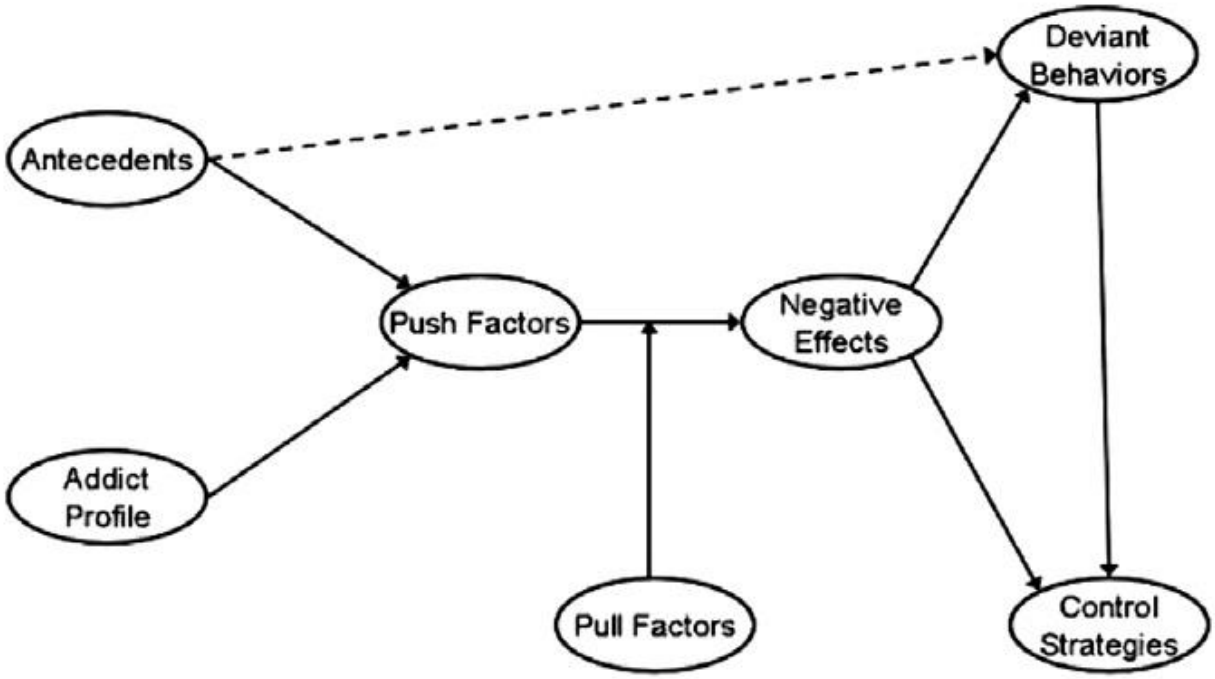

Figure 2.1: *Conceptual Model of internet addiction. "Douglas, Mills, Niang, Stepchenkova, Byun & Ruffini et. al. (2008) (p.3041)"*

Based on Preece (2000); Wellman & Gulia (1999), socialization is one of the magnet behind the addictive power of the internet. Grohol (2005) have stated that, sociability of the internet is responsible for the excessive amount of time individuals spend having real-time interaction through e-mail, discussion forums, chat, online games, etc (as cited in Douglas et. al 2008).

According to Davis (2001), another theoretical framework about internet addiction is Pathological Internet Use (PIU) and its result from problematic cognitions coupled with behaviors that either intensity or maintain the maladaptive response. The most prominent symptoms of PIU had mainly been considered to be the effective or behavioral symptoms. However the cognition symptoms may often precede and cause the affective or behavioral symptoms rather than vice versa. Pratarelli, Brawne, and Johnson (1999) described a four-factor model of PIU psychopathology:

I. Focus on the dysfunctional behaviors associated with overuse of the Internet – problematic behavioral styles.

II. The functional used of the Internet – using internet in a meaningful and productive way.

III. Internet for sexual gratification and/or social gains – shy or introverted use who relies on the internet express hi/her fantasies.

IV. Individual who are either disinterested in the Internet or mildly averted to technology – demonstrate little or no dependence on the internet.

This model is helpful in describing the prevalence and incidence of internet usage (as cited in Davis 2001).

According to Freeman (1992), in the past cognitive theory is seldom employed but more focus on three models: the disease model, the adaptive model, and the way of life model. These three models focused on pathology, adaptive, or behavioral type. However this research is first examine internet addiction from the cognitive perspective of human motivation and aimed at exploring the differential motivations between the addicts and non-addicts. Based on Lepper, Greene, & Nisbett (1973), from cognitive perspective, psychologists frequently describe motivation as being either intrinsic or extrinsic. Intrinsic motivators comes from within ourselves, which we are doing something because we enjoy doing it. While extrinsic motivators come from outside, which is people doing something can obtain extrinsic motivators such as praise from others (as cited in Wan & Chiou, 2007).

According to Davis (2001), Cognitive –Behavioral Model has the explanations of other psychological difficulties such as depression and anxiety. Davis' model stated

that it is an individual's problematic thought patterns that are the source of pathological behavior. There are differentiating between specific and generalized internet addiction in Davis' theory, which related to the type of online activities pursued by the individual. However, generalized internet addiction tended to be related to more interactive or social functions and lead to greater severity of problematic internet behavior (as cited in AIM conference center, 2008).

Symptom of Internet Addiction

Some reports demonstrated that teenagers or adolescent with the problem of internet addiction will have several psychiatric symptoms. As a result, internet addiction has been reported to be associated with depression and attention-deficit-hyperactivity disorder. Besides that, in the Symptoms Checklist 90 Revised, it check the severe psychopathology for the heavy internet user. The study proved that adolescents with internet addiction had poor outcome for mental health (Ju et al., 2008).

Causes of Internet Addiction

According to Korean scientists, a habitual base is not the main cause for individuals addictive to internet, but the demographic and socioeconomic can also be the causes. The correlation between computer, internet usage and family structure was on an average level. So, pupils without siblings or from incomplete family are in more danger to addiction (Zboralski, 2009). Familial problem will occur if individuals are addicted to internet. According to the research, marriages are seriously affected. The activities such as caring for children will be ignored. For example, one mother

became so absorbed in her internet and forgets to pick up her children after school and to make them dinner and put them to bed. Furthermore, argument between couples will occur. Addictive users are also quick to get angry and resentful outbursts (Young, 1999). School was the most common place for children to access the internet because they are using computer in school nowadays. However the addiction of internet does not stop at the secondary school level. Some study have believe that overuse on internet will lose the savvy, skills and patience to conduct social relations in the corporeal world (Kumar, 2004).

CHAPTER III

METHODOLOGY

Research Design.

In this study, data will collect by using survey method. This study will use the cross-sectional design whereby all variables will collect at the same point of time. One set of the questionnaire which is Internet Addiction Test (IAT) is use for this study. This is a non-experimental study that has demographic variables, that is gender.

Subject.

This study will use an uncontrolled quota sampling method to recruit 60 male and 60 female at SMJK Pei Yuan, Kampar. Those respondents include students from Form 1 to Form 6. The investigation will be separated into two groups which are the lower secondary and upper secondary. The lower secondary category consists of from Form 1 to Form 3 students while the upper secondary category from comprises of 4 to Form 6 students. All the 120 questionnaires will distribute to the respondents. In term of ethnicity, the respondents consist of Chinese, Malay and Indian. The respondents' age ranged from 13 to 18 years old.

Instrument.

Internet Addiction Test (IAT). The IAT was develop by Dr. Kimberly Young, 1998 and it consist of 20 questions was adopted to evaluate the respondents' level of internet addiction. Each item is scored using a five-point likert scale, a graded

response can be selected (1 = “rare” to 5 = “always”). It covers the degree to which internet use affect daily routine, social life, productivity, sleeping pattern, and feeling. The minimum score is 20 while the maximum is 100 and the higher the score the greater the level of internet addiction. Three types of Internet-user groups were identified in accordance with the original scheme of Young and the scores ranging from 20 to 49 indicate minimal users while scores from 50 to 79 indicate moderate users and the scores from 80 to 100 indicate excessive users. The instrument has exhibited good psychometric properties in previous researches. The reliability for this questionnaire is 0.899 in Cronbach’s Alpha (Sally, 2006).

Research Procedure

In order to conduct this, the questionnaires were distributed personally and to the participants. A consent form was attached to the questionnaire whereby the nature of the study was explained to participants. The questionnaires were then collected there and then. The completed questionnaires were later analyzed.

Since this survey is conduct in SMJK Pei Yuan, Kampar so I have to obtain permission from the principal of the school. After having obtained the approval appointment were made to meet with the despondences was out in three days. The actual survey was conducted during the respondent break time in order not to disturb their studies. After having calculated the questionnaires, the data was analyzed.

Data Analysis

The data collected were analyzed using the statistical methods. Level of internet addiction among students of SMJK Pei Yuan, Kampar was analyzed using percentage. T-test was used to conduct the differences between male and female in internet addiction. Chi-square was used to conduct the significant association between internet addiction and the level of study lower and upper secondary school among the students of SMJK Pei Yuan, Kampar.

CHAPTER IV

FINDING AND ANALYSIS

This chapter describes the analysis and finding of data. Firstly, this study will analyze the level of internet addiction among students. Secondly, will find out is there any significant association between gender and internet addiction among students and lastly to find out whether there any significant association between internet addiction and the lower and upper secondary school students.

Hypothesis 1: Level of Internet Addiction

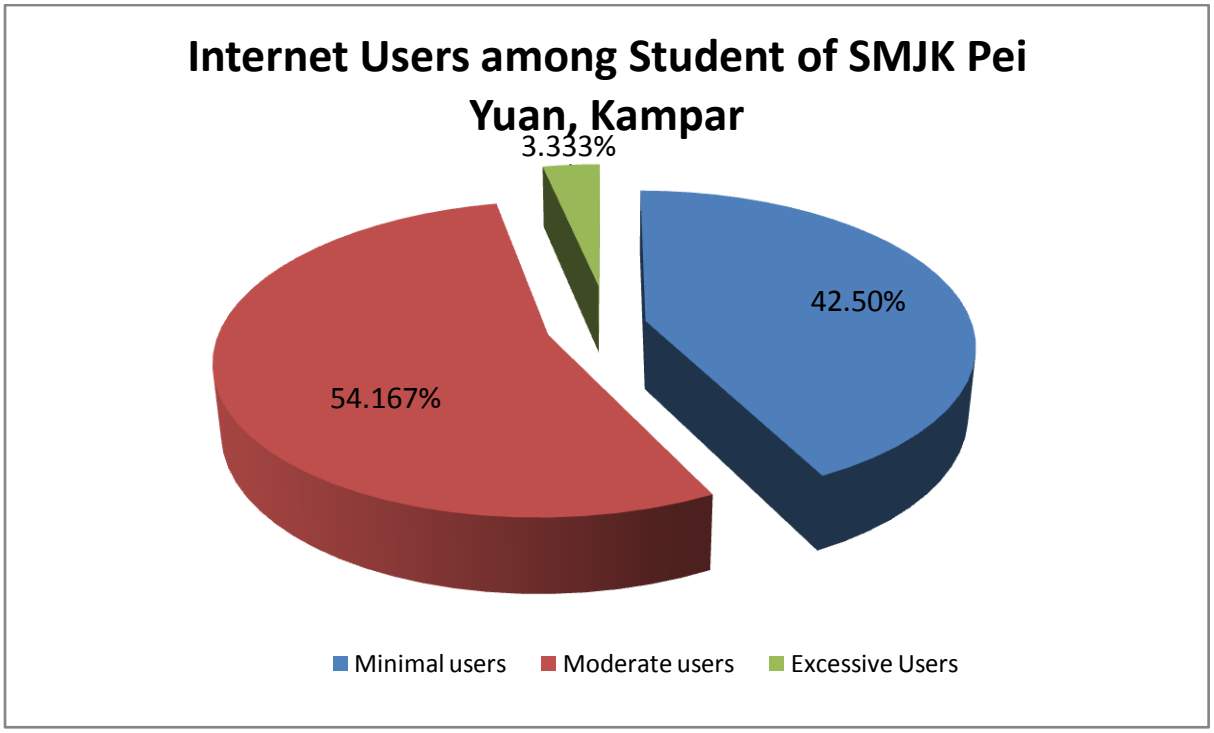

Figure 4.1: *Level of Internet Addiction among Students of SMJK Pei Yuan, Kampar*

Percentage is used to calculate the level of internet addiction among students. This is to make sure which level among students in Pei Yuan is. The results

categorized in three categories that is: Minimal users, Moderate users and Excessive users on internet addiction. So, the result will be analyzed base on these three categories.

Based on the figure 4.1, 54.167% (n = 65) of the students are moderate users of internet and this is followed by 42.50% (n = 51) minimal users. Only 3.333% (n = 4) are classified excessive user. As a conclusion, the level of internet addiction among SMJK Pei Yuan student is moderate and tends to minimal (Appendix C).

Hypothesis 2: Gender Differences between Internet Addictions

In this finding, data were analyzed using Statistical Package for Social Science (SPSS). P value below 0.05 was considered as statistically significant.

Research Hypothesis (H_1): There is a significant difference between gender and internet addiction among students of SMJK Pei Yuan, Kampar.

Null Hypothesis (H_0): There is no significant difference between gender and internet addiction among students of SMJK Pei Yuan, Kampar.

Descriptive Statistic. From the table, the internet addiction mean for male is 55.20 and the standard deviation is 16.389. However, the internet addiction mean for female is 48.48 and standard deviation is 14.470.

The mean for male is 55.20 while for female is 48.48. Therefore, the mean of male is higher than female. So, there is difference between male and female.

Table 4.1: *Descriptive statistic for Internet Addiction among Gender*

Gender	N	Mean	Std. Deviation	Std. Error Mean
Male	60	55.20	16.389	2.116
Female	60	48.48	14.470	1.86

(Appendix D)

T-test. From the table, the significant value in Levene's Test for Equality of variances' column was .330. It is more than .05 therefore need to refer to the "Equal Variances Assumed" column to determine either there are significant differences between internet addiction and gender. The results for *Independent Sample T-test* show that there is a significant difference between internet addiction and gender among students of SMJK Pei Yuan, Kampar, t (118) = 2.380, p = 0.019. That is the average internet addiction of male (M = 55.20, SD = 16.389) was significantly different from that of female (M = 48.48, SD = 14.470). So, the null hypothesis is rejected

Table 4.2: *Independent Sample Test for Internet Addiction among Gender*

		Levene's Test for Equality of Variance		T-test for Equality of Mean				
		F	Sig	t	df	Sig. (2-tailed)	Mean difference	Std. error Difference
Internet addiction	Equal Variance Assumed	.957	.330	2.380	118	.019	6.717	2.822
	Equal Variance Not Assumed			2.308	116.215	.019	6.717	2.882

(Appendix D)

Hypothesis 3: Significant Association between Internet Addiction and the Lower and Upper Secondary School Students.

In this finding, data were analyzed manually by using method of Chi-square.

Research Hypothesis (H_1): There is a significant association between internet addiction among the lower and upper secondary school students of SMJK Pei Yuan, Kampar.

Null Hypothesis (H_0): There is no significant association between internet addiction among the lower and upper secondary school students of SMJK Pei Yuan, Kampar.

Table 4.3: *Chi-square for Internet Addiction between Lower and Upper Secondary Students*

X^2	*CV*
1.560	5.991 (*df* = 2)

(Appendix E)

The result of *Chi-square test for independent* show that there is no significant association between Internet addiction among the lower and upper secondary students of SMJK Pei Yuan, Kampar, x^2 (1, n = 120) = 1.560, n.s.. Hence the null hypothesis is accepted.

Data re-categorized:

Research Hypothesis (H_1): There is a significant association between internet addiction among the lower and upper secondary school students of SMJK Pei Yuan, Kampar.

Null Hypothesis (H_o): There is no significant association between internet addiction among the lower and upper secondary school students of SMJK Pei Yuan, Kampar.

Table 4.4: *Chi-square for Internet Addiction between Lower and Upper Secondary Students*

X^2	*CV*
0.306	3.841 (*df* = 1)

(Appendix E)

The result of *Chi-square test for independent* show that there is no significant association between Internet addiction among the lower and upper secondary students of SMJK Pei Yuan, Kampar, x^2 (1, n = 120) = 0.306, n.s.. Hence the null hypothesis is accepted.

CHAPTER V

DISCUSSION AND CONCLUSION

This chapter involves discussion on result and research finding in previous chapter. Moreover, recommendation will be given in this chapter to establish a greater study in further research or investigation and lastly conclusion about the study of internet addiction among students in SMJK Pei Yuan, Kampar.

Discussion

The result of this study showed that, there is no significant between Internet addiction among the lower and upper secondary students of SMJK Pei Yuan, Kampar, x^2 (1, n = 120) = 0.306. Basically, students who are in lower and upper secondary school are between age of 13 years old to 19 years old and it is considered as adolescent. However based on this study, lower secondary school students' age range is 13 years old to 15 years old while upper secondary students' age range is 16 years old to 19 years old.

The findings of this study are supported by some research such as Van den Eijinden, Spikerman, Vermulst, Van Rooil and Engels (2009), no matter in lower or upper secondary students, adolescent of ages between 11 to 15 years old often use internet. Forrester research (2005), where adolescents between the ages 12 years old to 17 years old were often online daily with an average of almost 11 hours per week. Based on Pallanti, Bernardi and Quercioli (2006) supported that, the age average for students who are internet addiction is 16.67 ± 1.85. It means that, adolescent who are addicted to internet normally in the age range of 14 years old to 18 years old which

matches the age range in lower and upper secondary school students in SMJK Pei Yuan, Kampar. In other words, adolescents who are potential internet addicts are between ages of 14 years old to 18 years old.

This is because using internet has become one of the most popular leisure time activities among adolescents. Parents are sometime confronting with the fact that their children have become so attached to the internet that they are no longer capable of controlling their online activity. Moreover, adolescent may be particularly exposed to the development of compulsive internet use. Recent study has show that immediate online communication application such as instant messaging and chatting bear a higher addictive potential than other internet application (Van den Eijinden, Spijkerman, Vermulst, Van Rooij and Engels, 2009).

Besides that, Ferguson and Perse (2000) has also found that, entertainment was the most salient motive for internet use, followed by passing time, acquiring social information and relaxation. However, Papacharissi and Rubin (2000) stated that, information seeking and entertainment were equally important motives for using the internet (as cited in Lin & Yu, 2008). Furthermore, the immaturity of frontal cortical and subcortical momoaminergic brain system is hypothesized to underlie adolescent impulsivity as a transitional trait behavior (Casey et al. 2008). In additional Chambers et al. (2003), the neurodevelopment process seems to be functional by enhancing the learning drive, on the other hand these process may lead to an increased vulnerability to addictive behaviors in adolescent (as cited as Van den Eijinden, Spijkerman, Vermulst, Van Rooij and Engels, 2009).

According to the result had found the level of Internet addiction among students in SMJK Pei Yuan, Kampar is classified in the moderate level (54.167%)

because the percentage is highest among those levels. In different country or even in different state have different percentage in internet addiction but the result or the level is almost the same. Based on previous research before, the percentage of Internet addiction in excessive level is not over than 20% and the highest percentage is 19.8% of adolescent in the world have Internet addiction. However, only 5.4% of adolescent has a low level of internet addiction.

Internet activities do not mean only playing online game but searching homework information and other information about almost anything in mere moments. Besides Internet activities, adolescents also involve in other activities such as leisure activities, family activities, social activities, school activities, outdoor activities and etc. So, most of the adolescents' internet level still is consider in moderate level because students have to focus on their to prepare their exam such as Penilaian Menengah Rendah (PMR) for lower secondary school students, Sijil Pelajaran Malaysia (SPM) and Sijil Tinggi Persekolahan Malaysia (STPM) for Upper secondary school students. Nevertheless, when adolescents are bored or dissatisfied with their leisure time in other activities, they may be motivated to seek excitement and pleasure from cyberspace and therefore raise their level of Internet addiction will occur for further investigation.

Although this finding showed that, most of the students in SMJK Pei Yuan, Kampar are moderate internet users but we should be aware of them and cannot underestimate this problem. It is because most of the students who are compulsive use of Internet are often associated with increased social isolation, increased clinical depression, familial discord, divorce, academic failure and etc. if this problems become chronic it may lead to psychological problem.

Besides that, the result have showed that, there is a significant difference between gender and internet addiction among students of SMJK Pei Yuan, Kampar, t (118) = 2.380, p = 0.019. In other words, gender is related to internet addiction. Most of the studies have mentioned that male or female are addicted to internet but level of addiction varies however they have the differences also. According to the finding of this study, male are more likely to go online compare to female. Moreover male will spend longer hours on the computer compare to female so they have tendency to addict to internet through this opportunity.

According to Tan, Abdullah & Saw (2009) have shown a research in Malaysia, the percentage of boys spending three hours or more online is about 6% more than that of girls. However when mentioned about not going online, the percentage of girls is about twice that of boys. Overall, the boys in this study spent more time on the internet compare to the girls. Based on Aslanbay, Aslanbay & Cobanoglu (2009) stated that, there are significant gender differences were discovered. The result showed that, 1% of women and 9% of men were reported as addicts. Men were found that to be able spend more time in internet than women. Another study of Riitakerttu et al. (2004), a sample of 12-18 year old, 59% used the internet and the addicts spent 2.7 hours in the internet daily (as cited in Aslanbay, Aslanbay & Cobanoglu, 2009).

Tsai and Lin (2004) found that, male tended to consider the internet more as a "toy" while female tended to view it as a tool or as technology with which to accomplish a task. In addition, female tend to hold a more pragmatic view of the Internet, while male tend to focus on enjoyment. Girls view close relationships and more important so for female adolescents expressed greater confidence in using the internet for general or communication purpose. Female more likely to use the internet for mailing while male were likely to download software, online games may be

behind this behavior. Male adolescent tend to spend more time playing online games and girls more frequently surf for information about idols. Besides that, girls tend to go online mostly at home and school so they have the capability to control the impulsive use of internet while boys visit internet coffee shops. Moreover, girls often used the computer for homework and boys were more likely to play games (as cited in Lin & Yu, 2008).

Internet may be consider as masculine domain because the ability to master internet. It is undeniable that males had more opportunities to use technology products. Besides that the contents of the internet more suitable males and was not targeted at females. So, male have used internet more often and longer time than have females (Lin & Yu, 2008). However some researchers such as Schumacher & Morahan-Martin (2001) have argued that the gap has been narrowed now. There are more content related to women's interest has become available and females have acquired more experience now a days. Empirical studies have supported this view and Hunley et al. (2005) have stated that the amount of time spent on internet was similar across genders (as cited in Lin & Yu, 2008). Tsai and Lin (2004) stated that, gender are no any differences in internet addiction although they are related to each other but they have different application on internet between male and female and they were completely mastering it. Education polices might play an important role in bridging the remaining gap. For example computer and internet classes starting so that boys and girls at school have had equal opportunities to access the internet and the gender gap should have narrowed (as cited in Lin & Yu, 2008).

Limitations of Study

One of the limitations of this study is the small sample size of each level of students although the sample in this study (N=120) is quite big amount for the study but when divided to each level, one level only have twenty samples chosen for the survey. As for each level have six or seven classes and each class have average 35 students. So twenty samples been chosen to do the survey. Hence the results cannot be used as a generalization.

Another limitation of this study is the language in which questionnaire was administered in. The questionnaire was administered in English and no translation was provided. As SMJK Pei Yuan, Malay language is used as their main language for teaching so there is a probability of those students may have the difficulty for students to understand the language. In another words, the finding of this study was affected by this limitation as those who do not fully understand the meaning of some of the items in the questionnaire might have just completed the questionnaire for the sake of it without giving any consideration.

Also, this study just focuses on Internet addiction with gender, age and level, limited demographic variable taken into consideration in order to determine the level of internet addiction. Moreover result finding only used quantitative method to analyze and it will limit the collection of information. However, there is limited information about internet addiction in Malaysia. The information in this study mostly from other countries cannot be generalized in Malaysia's society.

Recommendation for Future Study

Sample of correspondences can be vastness and the result can be use as a generalization. Besides that, Malaysia is a multicultural country and most of the school will consist of different race of students. So the questionnaire can be edit in multi language let correspondences more understand what the actual question asking. When they are understood questions then will not simply answer and the result will more accurate.

For the further research, it is recommended that by study internet addiction with more detail in psychology pathology. It is because this problem seems like quite severe in now a day especially people who are internet addiction may have depression also. This is also the way to let society realize the severity of social disease as well as psychology disorder.

In addition, it is also recommended that more variable can be taken into consideration in order to determine the level of internet addiction. This studies is conduct in secondary school so races, academic achievement and etc can be use to determine the level of internet addiction will be affect by those variable or not. Moreover, this study is using quantitative method to find out the result, it is recommended that using the both quantitative and qualitative method to collect data and find out the result because using qualitative way can find out the actual thinking and actual experience of sample so researcher can have In-depth investigation. Moreover, the similar and related topic of research is recommended to do more in the future as it is an important issue in the society.

Conclusion

Over the year, Internet used is increasing rapidly because of the technology development today. So have unwittingly, internet addiction may increase also. Hence, this study is to examine the level of internet addiction for secondary students to examine the seriousness of internet addiction in adolescent now a day. Fortunately, the result showed that level of excessive users among the adolescent are still in moderate level.

Data was collected using an uncontrolled quota sampling of 120 secondary students in SMJK Pei Yuan, Kampar. The instrument used for data collection was Internet Addiction Test (IAT). The participants' demographic information was collected too. The questionnaire was collected and data were analyzed by using percentage, independent sample T- test and Chi-square.

The result shows that students of SMJK Pei Yuan are moderate internet user. Although their just moderate internet user, this problem cannot be ignored and proper observation or treatment must be prepared for those adolescents. Adolescent plays an important role in society because they may be the backbone of country so that society has the responsible to protect them. Besides society, parents and teachers also play an important role to monitor the children use of internet.

Finally, there are some limitations that encountered in this research such as small sample size of each level of students, the language in which questionnaire was administered in, limited demographic variable and the only quantitative method been used. To overcome these limitations, some recommendations are suggested, for instance use both qualitative and quantitative method for this research. Also, the

similar and related topic of research is recommended to do more in the future as it is an important issue in the society.

As a conclusion, problem of internet addiction although not that serious but this should be aware to prevent the growing of internet addiction.

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APPENDIX A

QUESTIONNAIRE

Internet Addiction Test (IAT)

I'm an undergraduate student from UTAR, Kampar and study in Psychology course of Year 3 Semester 2, currently conducting a research for my Final Year Project and the topic is regarding to internet addiction.

The main objective of this questionnaire is to discover the level of addiction internet among students of SMJK Pei Yuan, Kampar.

I ensure that all the information will be kept private and confidential and only I will be acknowledged about it.

Your cooperation and patience will be greatly appreciated. Thanks.

Age:

Gender: Male / Female

Grade Level: □ Form 1

□ *Form II*

□ *Form III*

□ *Form IV*

□ *Form V*

Please circle your preferences accordingly. Most of the questions directly relate to internet addiction. Please answer each question as precisely as possible. Thank you. All of the results will be strictly confidential.

1= Rarely

2 = Occasionally

3 = frequently

4 = Often

5= Always

1. How often do you find that you stay online longer than you intended?	1	2	3	4	5
2. How often do you neglect household chores to spend more time online?	1	2	3	4	5
3. How often do you prefer the excitement of the internet to intimacy with your partner?	1	2	3	4	5
4. How often do you form new relationships with fellow online users?	1	2	3	4	5
5. How often do others in your life complain to you about the amount of time you spend online?	1	2	3	4	5
6. How often do your grades or school works suffer because of the amount of time you spend online?	1	2	3	4	5

7. How often do you check your email before something else that you need to do?	1	2	3	4	5
8. How often does your job performance or productivity suffer because of the internet?	1	2	3	4	5
9. How often do you become defensive or secretive when anyone asks you what you do online?	1	2	3	4	5
10. How often do you block out disturbing thoughts about your life with soothing thoughts of the internet?	1	2	3	4	5
11. How often do you find yourself anticipating when you will go online again?	1	2	3	4	5
12. How often do you fear that life without the internet would be boring, empty, and joyless?	1	2	3	4	5
13. How often do you snap, yell, or act annoyed if someone bothers you while you are online?	1	2	3	4	5
14. How often do you lose sleep due to late-night log-ins?	1	2	3	4	5
15. How often do you feel preoccupied with the Internet when offline, or fantasize about being online?	1	2	3	4	5
16. How often do you find yourself saying "just a few more minutes" when online?	1	2	3	4	5
17. How often do you try to cut down the amount of time you spend online and fail?	1	2	3	4	5
18. How often do you try to hide how long you've been online?	1	2	3	4	5
19. How often do you choose to spend more time online over going out with others?	1	2	3	4	5
20. How often do you feel depressed, moody, or nervous when you are offline, which goes away once you are back online?	1	2	3	4	5

APPENDIX B

JOURNAL SUPPORT FOR QUESTIONNAIRE

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The Psychometric Properties of the Internet Addiction Test

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ABSTRACT

There is growing concern about excessive Internet use and whether this can amount to an addiction. In researching this topic, a valid and reliable assessment instrument is essential. In her survey of Internet addiction, Young[1,2] designed the Internet Addiction Test (IAT), which provides a basis for developments. The IAT has high face validity, but it has not been subjected to systematic psychometric testing. This study sought to replicate and expand Young's[1] survey, and to examine the IAT more systematically. A questionnaire that existed as a Web page was devised, consisting of the IAT and 15 other questions regarding the respondents' demographic information and Internet usage. Participants were recruited through the Internet, yielding 86 valid responses (29 males and 57 females). Factor analysis of the IAT revealed six factors—salience, excessive use, neglecting work, anticipation, lack of control, and neglecting social life. These factors showed good internal consistency and concurrent validity, with salience being the most reliable. Younger and more recent users reported more problems, mainly concerning the neglect of work and social life. We expected interactive Internet functions to be more addictive; however, this was not found to be so. Overall, the IAT is a valid and reliable instrument that may be used in further research on Internet addiction.

INTRODUCTION

In recent years, the prevalence of Internet use worldwide has increased markedly, with the current estimated number of users exceeding 500 million.[3] Along with all the benefits the Internet brings, problems of excessive use are also becoming apparent. Neglect of academic, work, and domestic responsibilities, disruption of relationships, social isolation, and financial problems have all been identified as consequences of heavy Internet usage.[1,4,5] That people should use the Internet to the extent that they experience such problems gives rise to the question of whether or not the Internet may be addictive.

The concept of addiction is not easy to define, but central to it is dependence on a substance or activity. Dependence is characterized by overindulgence, tolerance, withdrawal, craving, and loss of control.[6] Although originally linked only with substance use, there is growing recognition of behavioral addictions such as gambling,[7] overeating,[8] and exercise.[9] Included within behavioral addictions are behaviors that relate to the use of machines, such as playing video games,[10] using computers,[11] and playing amusement machines.[12] Behavioral addictions require explanations that do not rely too heavily on physiological mechanisms, and psychological explanations of addiction have come to the fore.[13]

There have been several studies of Internet use and Internet addiction. Egger and Rautenberg[4] devised a questionnaire to assess usage, feelings, and experiences of Internet use. Posting this questionnaire on the Internet attracted 454 responses, of whom 10% identified themselves as addicted. These self-styled addicts spent significantly more time on the Internet, and their usage was increasing. They felt more strongly driven to use the Internet, felt more anxious if use was restricted, and felt more guilty or depressed when they spent a long time on the Internet.

Brenner[14] received 563 complete responses to the Internet Usage Survey that he posted on the Internet. This survey instrument is a 32-item true-false questionnaire assessing respondents' experiences similar to those associated with substance abuse in DSM-IV. The mean number of items that respondents answered yes to was 11 out of the possible 32, with the most common problems relating to time management. He also found that older users experienced fewer problems, despite spending as much time online as younger users.

Petrie and Gunn[15] conducted another online study that yielded 455 valid responses. They asked 27 questions about the participants' Internet use, attitudes, and beliefs. Included was the key question of whether or not they defined themselves as Internet "addicts," with 46.1% of the respondents classifying themselves as addicted to the Internet, and these were equally likely to be female as male. Respondents also completed Beck's Depression Inventory and Eysenck's Introversion/Extroversion Scale, and a significant relationship was found between high Internet usage and both depression and introversion, indicating that those who consider themselves addicted to the Internet were more likely to be depressed and introverted.

Young[1] likened excessive Internet use most closely to pathological gambling, a disorder of impulse control in DSM-IV, and adapted the DSM-IV criteria to relate to Internet use in her Internet Addiction Test. She recruited 396 participants through announcements in newspapers, posters distributed at colleges, electronic postings on Forums geared toward Internet addiction, and search engines on the Web. Participants were interviewed either by phone or online. Consistent with the cut-off point for pathological gambling, respondents who answered "yes" to five or more of the diagnostic questions were classified as Internet dependents. In her sample, 60% were identified as dependent on the Internet.

Compared to non-dependent users, dependent users reported more negative consequences of Internet use. They mostly used the more interactive functions, such as chat rooms, Multi User Dungeons (MUDs), and news groups, whereas nondependent users mostly use the noninteractive functions, namely E-mails, the World Wide Web (WWW), and information protocols. Interestingly, dependent users had had Internet access for a shorter period of time than nondependent users.

Later, Young[2] wrote a self-help book aimed at individuals who fear that they, or someone they know, might be addicted to the Internet. In this book, she included an expanded version of the Internet Addiction Test (IAT). The IAT uses simplified terminology and includes Young's original eight items on DSM criteria, along with 12 new items. It was designed to assess which areas of an individual's life might be affected by their excessive Internet use. The IAT has high face validity, but it has not been subjected to rigorous psychometric investigation.

One major shortcoming of previous research is the absence of a psychometrically developed assessment instrument. We sought to replicate and extend Young's findings, and to examine the properties of the 20-items IAT more systematically. There are also a number of issues raised in earlier studies that we explored further. First is the temporal dimension of addiction. Young's results showed that the majority of those addicted to the Internet were relatively new users, in contrast to non-dependents who had been using the Internet for more than 12 months. Young chose to construe this as addiction occurring quickly from the point that users were introduced to the Internet, but an alternative is to construe it as a "newbie symptom," with "newbie" being the Internet term for new users. In other words, being addicted is a temporary phenomenon for some individuals, probably relating to the initial novelty value and wearing off with increased familiarity. Data collected using the IAT will allow exploration of whether new users are more addicted to the Internet than more experienced users, and if there are any specific functions of the Internet that they use more than others. Second, it appears that specific applications are more addictive—namely, those that are more interactive. The ability to communicate with other people in real time, present oneself as desired, and develop a degree of intimacy may be "addictive" to some people, whereas simply gathering information and sending an E-mail may not.

Thus, in this study we expect to find that:

1. The higher the amount of time spent online, the greater the extent of problems as measured by the IAT.
2. More recent users spend more time online compared to longer-term users, and their extent of problems is greater.
3. The interactive functions of the Internet are more addictive and cause more problems.

MATERIALS AND METHODS

Sample

Participants for this study were recruited through the Internet. Volunteers were sought from (a) elec-

tronic postings on popular chat programs (AOL Instant Messenger, ICQ, and MSN Messenger), (b) postings on different Google psychology Newsgroups (sci.psychology.misc. and sci.psychology.announce), (c) postings on Internet related Google Newsgroup (soc.net-people and comp.internet.net-happenings), (d) posting on a major auction site (www.ebay.com), (e) posting on a big MUD (www.anguish.org), (f) individuals who searched for the keywords "Internet Addiction" and "Internet Usage Survey" on popular search engines (Google, AOL, Yahoo, and Altavista), and (g) poster advertising the site in a Cyber Café. Participants were also recruited by personal contact. The site of the online questionnaire could also be accessed through a link from the researcher's university homepage.

Materials

A 35-item questionnaire was used in this study.

Demographic information. Questions 1–4 asked about the respondent's age, sex, occupation and e-mail address (optional).

Internet use. Questions 5–15 asked about the respondent's Internet use, including estimated time per week spent online and for what purpose (business or pleasure). They were asked if their Internet use had changed over the past year, which function of the Internet they use mostly during their time online, and how much time they spend on the chosen function.

Internet Addiction Test (IAT²). This is a 20-item questionnaire on which respondents are asked to rate items on a five-point Likert scale, covering the degree to which their Internet use affects their daily routine, social life, productivity, sleeping pattern, and feelings. The minimum score is 20, and the maximum is 100; the higher the score, the greater the problems Internet use causes. Young suggests that a score of 20–39 points is an average online user who has complete control over his/her usage; a score of 40–69 signifies frequent problems due to Internet usage; and a score of 70–100 means that the Internet is causing significant problems.

Procedure

The questionnaire existed as a Web page implemented in a UNIX-based server that captured the responses into a text file and sent it to the researcher's electronic mailbox for analysis. The Web site of the questionnaire was then submitted to several popular search engines as well as Newsgroups. On each electronic posting, a link to the site of the questionnaire was provided, along with a brief explanation of the study. Once a participant was transferred to the site of the questionnaire, she/he was able to read the instructions and complete the survey in his/her own time. Data were collected over a 7-week period. All responses were entered into a standard statistical database for analysis. Scores for each variable were checked to ensure that there were no errors made when transferring survey responses into the database.

RESULTS

Participants

Over a 7-week period, 92 responses were collected. Due to incomplete questionnaires, only 86 of the responses were used in analysis. The sample was made up of 29 (33.7%) males and 57 (66.3%) females. The mean age was 25.45 for males (SD = 8.91) and 31.44 for females (SD = 10.34). Female participants are found to be significantly older than the male participants ($t(84) = -2.66$, $p < 0.01$). The ages of the participants ranged between 13 and 67 years old. Of all respondents, 51 (59.3%) stated that their professions required them to use the Internet. Interestingly, 82 (95.3%) participants have Internet access from home. Out of the 86 responses, 48 (55.8%) supplied their e-mail address for the researcher to be able to contact them for further studies.

General Internet use and the IAT

The duration of Internet use among the respondents ranged from 2 to 125 months (10 years and 5 months), with a mean of 47.76 months (SD = 34.81). An average of how many hours they stay on the Internet per week in general, for professional use only and for personal use only, is shown in Table 1.

Factor-analysis of the 20-item IAT

First of all, measures of sampling adequacy was carried out on the 20-items IAT to see whether it was suitable for factor-analysis. Bartlett's test of sphericity indicated a chi square value of 746.34, $p < 0.0001$; while Kaiser-Meyer-Olkin measure of sampling adequacy indicates a value of 0.83. When a basic scree-test and eigenvalue at >1.0 criteria were used, six factors were generated from the IAT. These six factors, which were rotated to position of maximum orthogonality in nine iterations, explain

TABLE 1. MEAN HOURS/WEEK OF INTERNET USE

Hours/Week	*Male (n = 29)*	*Female (n = 57)*	*Total (n = 86)*
Overall Internet use	31.62 (24.57)	26.61 (20.39)	28.03 (21.88)
Professional use	8.83 (11.89)	6.79 (11.03)	7.48 (11.30)
Personal use	21.93 (20.63)	19.82 (19.17)	20.53 (19.58)

Standard deviations are given within parentheses.

68.16% of the variance (Table 2). Factor 1 (five items) accounts for 35.80% of the variance and measures salience (e.g., "How often do you choose to spend more time online over going out with others?", "How often do you snap, yell, or act annoyed if someone bothers you while you are online?"). Factor 2 (five items) accounts for 9.02% of the variance and measures excessive use (e.g., "How often do you find that you stay online longer than you intended?", "How often do you try to hide how long you've been online?"). Factor 3 (three items) accounts for 6.51% of the variance and measures neglect of work (e.g. "How often does your job performance or productivity suffer because of the Internet?", "How often do you become defensive or secretive when anyone asks you what you do online?"). Factor 4 (two items) accounts for 6.02% of the variance and measures anticipation (e.g., "How often do you find yourself anticipating when you will go online again?"). Factor 5 (three items) accounts for 5.55% of the variance and describes lack of control (e.g., "How often do you try to cut down the amount of time you spend online and fail?"). Factor 6 (two items) accounts for 5.21% of the variance and measures neglect of social life (e.g., "How often do you prefer the excitement of the Internet to intimacy with your partner?"). In order to measure internal consistency within the items in each factor, Cronbach's alphas were calculated and all were highly to moderately reliable.

Correlations between the six IAT factors, age, and Internet use

Correlations (Pearson's r) between the six factors extracted from the 20 item IAT and age, duration of Internet use, average, professional and personal use are presented in Table 3. Factor 1, salience, was found to be positively correlated with average Internet use ($r = 0.26$, $p < 0.05$, two-tailed) and personal Internet use ($r = 0.32$, $p < 0.01$, two-tailed). Factor 2, excess use, was also found to correlate positively with average use ($r = 0.27$, $p < 0.05$, two-tailed) and personal use ($r = 0.34$, $p < 0.01$, two-tailed). A negative correlation was found between Factor 3, neglecting work, and age ($r = -0.27$, $p < 0.05$, two-tailed). Factor 4, anticipation, did not correlate with age or Internet use. Factor 5, lack of self control, was found to correlate positively with personal internet use ($r = 0.22$, $p < 0.05$, two-tailed). Factor 6, neglecting social life, was found to correlate negatively with duration of use ($r = -0.26$, $p < 0.05$, two-tailed) and positively with personal use ($r = 0.22$, $p < 0.05$, two-tailed). No significant correlations were found between the factors and gender and different types of applications use.

Correlations were calculated between the total IAT scores, duration of Internet use, average length of overall, professional and personal Internet use. As expected, a small but significant, negative ($r = -0.18$, $p < 0.05$, one-tailed) was found between duration of use and total IAT scores indicating that newer users experience more problems. Internet usage was measured in three categories; overall, professional, and personal use. Positive correlations were found between overall Internet use and total IAT score ($r = 0.22$, $p < 0.05$, one-tailed) and between Personal Internet use and total IAT score ($r = 0.3$, $p < 0.01$, one-tailed); no significant correlation was found between Professional Internet use and total IAT score. However, this is not true for professional use. A negative correlation between participants' duration of use and how much time they spend online was also found ($r = -0.18$, $p < 0.05$, one-tailed) as expected.

Correlations between the six IAT factors

The six IAT factors all significantly correlated (Pearson's r) with each other, with the correlations ranging from $r = 0.62$ to $r = 0.226$ (Table 4). The strongest correlation was found between F1 (salience) and F2 (Excessive Use) and the weakest between F3 (Neglecting Work) and F6 (Neglecting Social Life).

Specific functions of the Internet

Participants were asked about which specific function of the Internet they use mostly during their time online. For analysis, the various functions of the In-

TABLE 2. ROTATED COMPONENT MATRIX

Question	*How often . . .*	*1*	*2*	*3*	*4*	*5*	*6*
Q19	Do you choose to spend more time online over going out with others?	0.71					
Q13	Do you snap, yell, or act annoyed if someone bothers you while you are online?	0.62					
Q12	Do you fear that life without the Internet would be boring, empty and joyless?	0.60					
Q15	Do you feel preoccupied with the Internet when off-line or fantasise about being online?	0.56					
Q10	Do you block disturbing thoughts about your life with soothing thoughts of the Internet?	0.55					
Q2	Do you neglect household chores to spend more time online?		0.78				
Q14	Do you lose sleep due to late night log-ins?		0.65				
Q20	Do you feel depressed, moody, or nervous when you are offline, which goes away once you are back online?		0.63				
Q1	Do you find that you stay online longer than you intended?		0.60				
Q18	Do you try to hide how long you've been online?		0.40				
Q6	Does your work suffer (e.g., postponing things, not meeting deadlines, etc.) because of the amount of time you spend online?			0.85			
Q8	Does your job performance or productivity suffer because of the Internet?			0.83			
Q9	Do you become defensive or secretive when anyone asks you what you do online?			0.64			
Q11	Do you find yourself anticipating when you go online again?				0.74		
Q7	Do you check your E-mail before something else that you need to do?				0.71		
Q17	Do you try to cut down the amount of time you spend online and fail?					0.87	
Q5	Do others in your life complain to you about the amount of time you spend online?					0.67	
Q16	Do you find yourself saying "Just a few more minutes" when online?					0.61	
Q4	Do you form new relationships with fellow online users?						0.81
Q3	Do you prefer excitement of the Internet to intimacy with your partner?						0.65
Cronbach's standardized alpha		0.82	0.77	0.75	0.61	0.76	0.54
Eigenvalue		7.17	1.8	1.3	1.2	1.11	1.04
Percentage of variance explained		35.8	9.02	6.51	6.02	5.55	5.21

Extraction method: principal component analysis.
Rotation method: varimax with Kaiser normalization:
a. Rotation converged in nine iterations
F1—Salience
F2—Excessive use
F3—Neglect work
F4—Anticipation
F5—Lack of control
F6—Neglect social life

TABLE 3. CORRELATIONS BETWEEN IAT FACTORS AND INTERNET USE

	Age	*Duration of use (months)*	*Average use (h/wk)*	*Personal use (h/wk)*
Factor 1: Salience	−0.20	−0.16	0.263[a]	0.321[b]
Factor 2: Excess use	−0.63	−0.075	0.274[a]	0.344[b]
Factor 3: Neglect work	−0.272*	−0.142	0.022	0.004
Factor 4: Anticipation	−0.082	−0.099	−0.007	0.063
Factor 5: Self-control	−0.184	−0.12	0.107	0.223[a]
Factor 6: Neglect social life	−0.048	−0.261[a]	0.159	0.216[a]
Total IAT Score	−0.192	−0.18	0.217[a]	0.299[b]

[a]Correlation is significant at the 0.05 level (two-tailed).
[b]Correlation is significant at the 0.01 level (two-tailed).

ternet were divided into four categories. The first category, Non-Interactive, included information search, surfing the Web, downloading programs, playing computer games and MUD games. Of all the participants, 29 (33.7%) were included in this category. The second is Asynchronous Interactive, which included functions whereby users were able to interact with other users although they did not get an immediate reply. This category includes e-mails, auctions, and discussion forums. There were 41 (47.7%) participants in this category. The third category is Synchronous Interactive, which included chat rooms and MUD chat. The functions listed in this category allowed user to interact with other users in real time. There were 12 (14%) participants in this category. The final category was labelled Non-Specified for the participants who chose not to specify which function they use the most during their online time. Only 4 (4.7%) of the participants were included in this group. Anova was used to examine the different categories against duration of use, personal, professional and overall Internet use, the six IAT factors and the total IAT score. No significant differences were found.

DISCUSSION

This study sought to explore the psychometric properties of the IAT. Six factors were extracted from the 20 items questionnaire. Factor 1 (five items) measures salience, Factor 2 (five items) measures excessive use, Factor 3 (three items) measures neglect of work, Factor 4 (two items) measures anticipation, Factor 5 (three items) describes lack of control, and Factor 6 (two items) measures neglect of social life. These scales show good to moderate internal consistency (alpha coefficients (0.54–0.82). Factor 1, salience, explained most of the variance. It was also found to be the most reliable as indicated by its highest Cronbach's Alpha. This factor was validated by its positive correlations with average general and personal Internet usage.

The factors themselves were found to be positively correlated with each other. The strongest relationship was found between salience (F1) and excessive use (F2). There were also strong correlations between salience (F1) and lack of control (F5), as well as excess use (F2) and lack of control (F5).

TABLE 4. CORRELATIONS BETWEEN THE 6 IAT FACTORS

	Salience	*Excess use*	*Neglecting work*	*Anticipation*	*Lack of self-control*	*Neglecting social life*
Salience	1					
Excess Use	0.62[b]	1				
Neglecting work	0.422[b]	0.401[b]	1			
Anticipation	0.552[b]	0.447[b]	0.337[b]	1		
Lack of self-control	0.584[b]	0.559[b]	0.334[b]	0.431[b]	1	
Neglecting social life	0.461[b]	0.439[b]	0.226[a]	0.323[b]	0.435[b]	1

[a]$p < 0.05$ (two-tailed).
[b]$p < 0.01$ (two-tailed).

Salience and excess use were both associated with higher weekly general and personal Internet use of the participants. Neglect of work has only been found to be associated with one factor, which is age. The negative correlation would suggest that younger participants were experiencing more problems related to work neglect. Besides being consistent with Brenner's[14] previous finding whereby younger users were found to be having more problems, the result of this study suggests that neglecting work might be the one area that younger users are having difficulties with. Lack of control and neglect of social life are found to be associated with higher personal Internet use. The latter is also found to have a negative association with how long participants have been using the Internet (duration of use), which indicates that users who had only started using the Internet were neglecting their social lives more compared to longer term users.

Total IAT scores were used to measure the extent of problems participants were having due to their Internet use. In keeping with findings of previous studies,[1] a negative correlation was found to exist between duration of use and the total IAT score, indicating that newer users experience more problems. Of the three different categories of Internet use (overall, professional and personal use), higher general and personal use were associated with more problems. However, there is no association between professional use and reported problems. A negative correlation between participants' duration of use and how much time they spend online was also expected, but no significant correlation was found. This suggests that more recent users do not necessarily spend more time on the Internet compared to the longer duration users.

Another hypothesis that was tested in the current study was whether interactive Internet functions were more addictive. Young[1] found that the more interactive an Internet function was, the more addictive it would be to the users. However, no correlation was found between the type of functions and participants' total IAT scores in the current investigation. It should be taken into account that the function each participant chose to nominate as his/her most utilized could be a reflection of the way that the participants were recruited. In other words, the larger percentages of users seem to mirror the applications in which the site of this survey was announced (i.e., search engines, Auction site, Forums, and Chat rooms). As it was announced in a limited number of Internet functions, only individuals who used those specific functions regularly would see these announcements. Only 12 participants (14%) were users of the Synchronous Interactive functions as it was more difficult to recruit participants through these types of functions. An additional question asking how the participants reached the questionnaire site would have indicated whether or not this was true.

One major drawback of this study was found is sampling of participants. First of all, as Azar [16] pointed out, individuals who volunteered to take part in an on-line experiment are self-selected. They are not random samples of population in general. This study suffered from inherent methodology biases of using a convenient and self-selected group of Internet users. Moreover, the result should be interpreted with caution due to the relatively small number of participants.

The IAT seem to be measuring some key factors in addiction. Its reliability and validity need to be further tested using a larger sample. Once a valid and reliable measure has been devised, more can then be researched about the nature of Internet addiction. Despite the methodological limitations of the study, the IAT shows potential to be a good basis for developing a valid instrument.

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APPENDIX C

OVERALL DATA COLLECTION

Age	Form	Gender	Score	Upper/ Lower Secondary School Students
13	One	Male	31	Lower
13	One	Male	65	Lower
13	one	Male	67	Lower
13	One	Male	67	Lower
13	One	Male	55	Lower
13	One	Male	23	Lower
13	One	Male	24	Lower
13	One	Male	54	Lower
13	One	Male	30	Lower
13	One	Male	76	Lower
13	One	Female	36	Lower
13	One	Female	75	Lower
13	One	Female	53	Lower
13	One	Female	41	Lower
13	One	Female	34	Lower
13	One	Female	64	Lower
13	One	Female	60	Lower
13	One	Female	22	Lower
13	One	Female	39	Lower
13	One	Female	30	Lower
14	Two	Male	51	Lower
14	Two	Male	58	Lower
14	Two	Male	66	Lower
14	Two	Male	63	Lower
14	Two	Male	67	Lower
14	Two	Male	63	Lower
15	two	Male	70	Lower
14	Two	Male	55	Lower
14	Two	Male	80	Lower
14	Two	Male	29	Lower
14	Two	Female	77	Lower
14	Two	Female	43	Lower
14	Two	Female	47	Lower
14	Two	Female	52	Lower
14	Two	Female	33	Lower
14	Two	Female	31	Lower
14	Two	Female	32	Lower

15	Two	Female	64	Lower
14	Two	Female	61	Lower
14	Two	Female	64	Lower
15	Three	Male	71	Lower
15	Three	Male	81	Lower
15	Three	Male	44	Lower
15	Three	Male	74	Lower
15	Three	Male	37	Lower
15	Three	Male	75	Lower
15	Three	Male	79	Lower
15	Three	Male	51	Lower
15	Three	Male	36	Lower
15	Three	Male	48	Lower
15	Three	Female	71	Lower
15	Three	Female	48	Lower
15	Three	Female	39	Lower
15	Three	Female	37	Lower
15	Three	Female	62	Lower
15	Three	Female	59	Lower
15	Three	Female	33	Lower
15	Three	Female	43	Lower
15	Three	Female	20	Lower
15	Three	Female	48	Lower
16	Four	Male	23	Upper
16	Four	Male	39	Upper
16	Four	Male	52	Upper
16	Four	Male	65	Upper
16	Four	Male	50	Upper
16	Four	Male	52	Upper
16	Four	Male	64	Upper
16	Four	Male	61	Upper
16	Four	Male	52	Upper
16	Four	Male	81	Upper
16	Four	Female	48	Upper
16	Four	Female	53	Upper
16	Four	Female	52	Upper
16	Four	Female	58	Upper
16	Four	Female	55	Upper
16	Four	Female	41	Upper
16	Four	Female	26	Upper
16	Four	Female	37	Upper
16	Four	Female	60	Upper
16	Four	Female	62	Upper

17	Five	Male	67	Upper
17	Five	Male	54	Upper
17	Five	Male	41	Upper
17	Five	Male	63	Upper
17	Five	Male	71	Upper
17	Five	Male	69	Upper
17	Five	Male	26	Upper
17	Five	Male	60	Upper
17	Five	Male	60	Upper
17	Five	Male	67	Upper
17	Five	Female	48	Upper
17	Five	Female	47	Upper
17	Five	Female	67	Upper
17	Five	Female	28	Upper
17	Five	Female	25	Upper
17	Five	Female	39	Upper
17	Five	Female	67	Upper
17	Five	Female	30	Upper
17	Five	Female	41	Upper
17	Five	Female	26	Upper
18	Six	Male	45	Upper
18	Six	Male	36	Upper
18	Six	Male	78	Upper
18	Six	Male	35	Upper
18	Six	Male	40	Upper
19	Six	Male	80	Upper
19	Six	Male	47	Upper
19	Six	Male	43	Upper
19	Six	Male	42	Upper
19	Six	Male	59	Upper
18	Six	Female	69	Upper
18	Six	Female	69	Upper
18	Six	Female	54	Upper
18	Six	Female	59	Upper
18	Six	Female	52	Upper
19	Six	Female	44	Upper
19	Six	Female	56	Upper
19	Six	Female	60	Upper
19	Six	Female	63	Upper
19	Six	Female	55	Upper

APPENDIX D

RESULT 1: LEVEL OF INTERNET ADDICTION

I. Minimal users: (Total respondents in minimal users/ total of respondents) x 100%

= (51/120) x 100%

= 42.50%

II. Moderate users: (Total respondents in moderate users/ total of respondents) x 100%

= (65/120) x 100%

= 54.167%

III. Excessive users: (Total respondents in excessive users/ total of respondents) x 100%

= (4/120) x 100%

= 3.333%

APPENDIX E

RESULT 2: GENDER DIFFERENCE IN INTERNET ADDICTION

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Internet Addiction	Male	60	55.20	16.389	2.116
	Female	60	48.48	14.470	1.868

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Internet Addiction	Equal variances assumed	.957	.330	2.380	118	.019	6.717	2.822	1.127	12.306
	Equal variances not assumed			2.380	116.215	.019	6.717	2.822	1.127	12.307

APPENDIX F

RESULT 3: CALCULATION FOR LOWER AND UPPER SECONDARY SCHOOL STUDENTS AND THE INTERNET ADDICTION

Expected frequencies = $(R_{row}/N_{total}) \times C_{column}$

1. (60/120) × 51 = 25.5
2. (60/120) × 65 = 32.5
3. (60/120) × 4 = 2
4. (60/120) × 51 = 25.5
5. (60/120) × 65 = 32.5
6. (60/120) × 4 = 2

Percentage of each value = $(N_{observed}/ R_{row}) \times 100\%$

1. (27 /51) × 100% = 52.941%
2. (31/65) × 100% = 47.692%
3. (2/4) × 100% = 50%
4. (24/51) × 100% = 47.059%
5. (34/65) × 100% = 52.308%
6. (2/4) × 100% = 50%

	Minimal Users	Moderate Users	Excessive Users	Total
Lower Secondary Students	O: 27 E: 25.5 (52.941%)	O: 31 E: 32.5 (47.692%)	O: 2 E: 2 (50%)	60
Upper Secondary Students	O: 24 E: 25.5 (47.059%)	O: 34 E: 32.5 (52.308%)	O: 2 E: 2 (50%)	60
Total	51	65	4	120

Degree of freedom (*df*) = $(N_{column} - 1) \times (N_{rows} - 1)$

= (2-1) × (3-1) = 2

Critical Value (CV) = 5.991

$$x^2 = \frac{(\text{Observed frequencies} - \text{expected frequencies})^2}{\text{expected frequencies}}$$

$$= \frac{(O - E)^2}{E}$$

$$= \frac{(27-25.5)^2}{25.5} + \frac{(31-32.5)^2}{32.5} + \frac{(24-25.5)^2}{25.5} + \frac{(34-32.5)^2}{32.5} + \frac{(2-2)^2}{2} + \frac{(2-2)^2}{2}$$

= 0.088 + 0.069 + 0.088 + 0.069 + 0 + 0

= 1.56

When x^2 = 1.56 < CV = 5.991 then reject research hypothesis, accept null hypothesis.

Based on the Table above, the frequency of expectation in Excessive users is less than 5 so the Moderate users and Excessive users will be combined and the result is as shown below:

Data re-categorized:

Expected frequencies = (R_{row}/N_{total}) × C_{column}

1. (60/120) × 51 = 25.5
2. (60/120) × 69 = 34.5
3. (60/120) × 51 = 25.5
4. (60/120) × 69 = 34.5

Percentage of each value = ($N_{observed}/ R_{row}$) × 100%

1. (27 /51) × 100% = 52.941%
2. (33/69) × 100% = 47.826%
3. (24/51) × 100% = 47.059%
4. (36/69) × 100% = 52.174%

	Minimal Users	Moderate Users and Excessive Users	Total
Lower Secondary Students	O: 27 E: 25.5 (52.941%)	O: 33 E: 34.5 (47.826%)	60
Upper Secondary Students	O: 24 E: 25.5 (47.059%)	O: 36 E: 34.5 (52.174%)	60
Total	51	69	120

Degree of freedom (*df*) = (N_{column} - 1) × (N_{rows} – 1)

= (2-1) × (2-1) = 1

Critical Value (CV) = 3.841

$$x^2 = \frac{(\text{Observed frequencies} - \text{expected frequencies})^2}{\text{expected frequencies}}$$

$$= \frac{(O-E)^2}{E}$$

$$= \frac{(27-25.5)^2}{25.5} + \frac{(33-34.5)^2}{34.5} + \frac{(24-25.5)^2}{25.5} + \frac{(36-34.5)^2}{34.5}$$

= 0.088 + 0.065 + 0.088 + 0.065

= 0.306

When x^2 = 0.306 < CV = 3.841 then reject research hypothesis, accept null hypothesis.