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INTERNET USE AND ITS IMPACT ON SECONDARY SCHOOL STUDENTS IN CHIANG MAI, THAILAND

Kesaraporn Wanajak
BNS MSc (Pharmacology)

This thesis is presented in fulfilment of the requirements for the degree of Doctor of Philosophy

Faculty of Computing, Health and Science
Edith Cowan University

June 2011

USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

ABSTRACT

Internet addiction (IA) is a relatively new field of academic inquiry. Empirical studies suggest that IA, like other well researched addictive behaviours, has an effect on many aspects of a person's life, including academic/work performance, relationships, and physical and mental health (Goldberg, 1996; Young, 1996, 1998). Evidence of IA has been suggested by the findings that some Internet users spend increasingly longer periods of time online and experience withdrawal symptoms when offline. Those preoccupied with Internet-related activities may neglect exercise, family and social activities (Kim et al., 2010; Nalwa & Anand, 2003; Seo, Kang, & Yom, 2009; S. Yang & Tung, 2007; Young, 1998, 2004).

Problems arising from excessive Internet use have been documented worldwide, including in Thailand where the use of the Internet has increased noticeably (National Statistical Office, 2008a, 2008b, 2010). It is a particularly common problem among students, as demonstrated in several international studies (Ko, Yen, Yen, Lin, & Yang, 2007; Konstantinos, Evaggelia, Dimitrios, Odysseas, & Nikiforos, 2008; Lam, Peng, Mai, & Ing 2009; Lee et al., 2007; Niemz, Griffiths, & Banyard, 2005; Thomas & Martin, 2010; Zboralski et al., 2009). However, few researchers have investigated IA and its impacts on Thai secondary school students. This thesis fills a gap in the international IA literature by developing a consensus definition and diagnostic criteria of IA, investigating the prevalence of IA among Thai secondary school students, as well as conducting an exploration of the impacts of IA on these students and their prevalence.

A mixed methods research design was employed. This study was conducted in three stages. The first stage of this study employed a modified Delphi Technique among 22 Thai addiction experts ('the Delphi panel') to develop a consensus definition of IA, to identify diagnostic criteria for classifying those affected, and to suggest potential strategies for harm-minimisation. The second stage consisted of an online survey of 952 Thai secondary school students in Chiang Mai, Thailand, conducted in order to assess the prevalence of IA among Thai secondary school students and identify its impacts from the point of view of these students. The last stage of this study employed structured in-depth interviews with 30 randomly chosen students who agreed to be

interviewed from among those who participated in the online survey, to gain a better understanding of IA.

Ten diagnostic criteria for classifying IA were identified from the Delphi panel: 1) Neglecting other activities to spend time on the Internet; 2) Having relationship problems with family members, friends, or others; 3) Having academic problems, such as school absences, poor grades, or low performance due to Internet use; 4) Being unable to control, decrease or stop use of the Internet; 5) Emerging negative behaviours, such as acting aggressively, yelling, swearing and unprovoked bad temper, isolation, sleep deprivation, skipping meals and exercise; 6) Lying about or hiding the amount of time spent on the Internet, or other online activities; 7) Exhibiting psychological symptoms, such as restlessness, anxiety, short attention span, depression, or agitation; 8) Exhibiting physical health problems, such as back pain, eye strain, hand corns, weight gain, weight loss, or dehydration; 9) Increasing the time of Internet use; and 10) Making Internet use a priority in the user's life.

Utilising an IA scale developed from the ten criteria suggested by the Delphi panel, this study found that 3.7% were classified as addictive Internet users using the scale cut off point recommended by the Delphi panel of experts. Internet addictive users spent significantly longer on the Internet than students who were classified as normal users (Mdn = 29.00 and Mdn = 16.00, respectively, $p < 0.01$). School problems, physical and mental health problems, and relationship problems were reported as being negative impacts of Internet use.

This study has contributed to the international literature on IA by generating a consensus definition and diagnostic criteria of IA, testing this definition and criteria in a sample of Thai secondary school students to identify a cohort of students fitting the criteria of IA, as well as indentifying intervention strategies recommended by the Delphi panel and students that may help minimise harm caused by IA.

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

(i) incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education;

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CHAPTER 1
INTRODUCTION

Chapter Overview

This opening chapter introduces the study by exploring the background and historical perspective of the development of the Internet and its prevalence and use worldwide and in Thailand. The emergence of the phenomenon of Internet addiction (IA) is introduced, and then brought into focus as it is beginning to affect Internet users around the world, including Thailand. Next, the aims of the study and the research questions are identified. The chapter concludes with a discussion of the significance and limitations of the study.

Background of the Study

The Internet is a global linking of computers that allows information transfer. The Internet was established in the early 1960s by the U.S. Department of Defence (Schneider, Evans, & Pinard, 2006), primarily for military purposes. Since then, the continual improvement of the Internet technology has provided an extraordinary level of public accessibility to a wide range of forms of communication**,** e.g. intra-organisational and inter-organisational email; data storage, management and transfer; social websites like Facebook; text messaging such as Twitter, and so forth.

Due to the development and spread of cheaper and more user-friendly computer technology and software (e.g., portable computers, Microsoft Word etc)**,** the use of the Internet has increased dramatically. In 2010, the world's Internet use was 28.7% of the population. While this may not seem like a very large portion of the world's population, the growth in the use of the Internet has been dramatic. For example, between 2000 and 2010, the rate of growth of Internet use was 444.8% (Internet World Stats, 2010b). Likewise in Thailand, while 26.3% of the Thai population were Internet users in 2010, the growth rate in Internet use was even larger than for the world as a whole, growing 660.3% from 2000 to 2010 (Internet World Stats, 2010a, 2010b).

There are many benefits associated with Internet use, such as access to needed information, worldwide access to news and events, and interpersonal communication through email**.** However, along with the phenomenal growth of the Internet and its use,

there has been a growing concern worldwide regarding the risks associated with Internet over-use (Buchholz, 2009; Daily News, 2008, 2009; Fackler, 2008; Janta, 2008; Khaosod, 2007; The Associated Press, 2009). It is now believed that there could be widespread 'addiction' to it, in particular amongst college and university students (Chou & Hsiao, 2000; Fortson, Scotti, Chen, Malone, & Del Ben, 2007; Kim, et al., 2010; Kubey, Lavin, & Barrows, 2001; Morahan-Martin & Schumacher, 2000; Scherer, 1997; H. Yan, Liu, Ni, & Chen, 2009; M. Yang et al., 2009).

There is an ongoing debate about the appropriateness of applying the concept of addiction to Internet use. This debate centres on disagreements about the definitions of the terms used for IA in the literature, controversy around suggested diagnostic criteria, and whether IA truly exists as a diagnosable addiction in a similar vein to other types of addictions. Indeed, most IA theorists have based their definitions of IA on established addiction conceptual frameworks, such as substance dependence (Anderson, 2001; Black & Shaw, 2008; Griffiths, 1998; Ng & Wiemer-Hastings, 2005; Scherer, 1997), pathological gambling (Greenfield, 1999; Kaltiala-Heino, Lintonen, & Rimpela, 2004; Kubey, et al., 2001; Milani, Di Blasio, & Osualdella, 2009; Niemz, et al., 2005; Thomas & Martin, 2010; Young, 1998; Zboralski, et al., 2009), and technology addiction (e.g., television addiction) (Griffiths, 1995; Schimmenti & Vincenzo, 2010). For example, some studies purporting to explain the prevalence and consequences of IA have been undertaken, most of them adopting the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) criteria for both substance dependence and pathological gambling to classify IA (American Psychiatric Association, 1994). One of the more consistent findings from the literature is that students have been identified as more likely to be the most vulnerable group for IA (Lam, et al., 2009; Milani, et al., 2009; Thomas & Martin, 2010; Zboralski, et al., 2009). However, few studies have been conducted evaluating the appropriateness and effectiveness of treatments or solutions for this phenomenon.

IA has generally been considered to be identified by the following criteria based on the criteria for both substance dependence and pathological gambling (American Psychiatric Association, 1994):

- using the Internet in a manner akin to a maladaptive preoccupation;
- using the Internet for a longer duration than intended; and

- being preoccupied with the use of the Internet, causing significant problems, including academic/professional, social and relationship problems.

To date, both the terminology and definition of this phenomenon are still ambiguous. For example, even if Internet use is harmful to an individual it is unclear whether IA can be verified as symptoms of a mental health disorder, and confusion exists within the literature as to what constitutes IA (Zboralski, et al., 2009).

Irrespective of the conceptual debate surrounding IA, many academics and researchers believe that excessive use of the Internet has the potential to become an addiction (Griffiths, 1995, 2000), and some empirical research suggests that some students have already become addicted (Kaltiala-Heino, et al., 2004; Ko, et al., 2007; Konstantinos, et al., 2008; Kraut et al., 1998; Lam, et al., 2009; Lee, et al., 2007; Milani, et al., 2009; Nalwa & Anand, 2003; Niemz, et al., 2005; Pallanti, Bernardi, & Quercioli, 2006; Thomas & Martin, 2010; Young, 1998, 2004; Zboralski, et al., 2009). For example, epidemiological studies among school students in various countries have found that the prevalence rates of IA cover a wide range, from a low of 1% in Greece (Tsitsika et al., 2009) to a high of 36.7% in Italy (Milani, et al., 2009). It should be noted that the percentage of IA identified in various studies will vary depending on the time the study was conducted, the instruments used for classifying addictive users, and the sampling strategy used in the collection of the data.

IA has also drawn attention from health professionals, educators and the public as this phenomenon has been found to result in negative consequences for IA sufferers, including academic and professional performance impairments (Kim, et al., 2010; Lin & Tsai, 1999; Nalwa & Anand, 2003; S. Yang & Tung, 2007; Young, 1998, 2004); relationship difficulties and interpersonal problems (Lin & Tsai, 1999; Nalwa & Anand, 2003; Seo, et al., 2009; S. Yang & Tung, 2007; Young, 1998, 2004); financial problems (S. Yang & Tung, 2007; Young, 1998, 2004); and physical and mental health problems (Kim, et al., 2010; S. Yang & Tung, 2007; Young, 1998, 2004). For example, the psychological literature has demonstrated that individuals who are Internet addicted often suffer from other psychiatric disorders (Yen, Yen, Ko, Wu, & Yang, 2007). On the other hand , Lin and Tsai (1999) reported IA having only a slightly negative influence on high school students in Taiwan while at the same time having a strong positive influence on peer relationships by providing opportunities to meet new online friends.

In Thailand, the number of Internet users has increased dramatically in recent years, especially among adolescents. In 2008 about 28.2% of the Thai population had access to the Internet and of those, 68.2% were young people aged 6 to 24-years-old (National Statistical Office, 2008a). By 2009, about 43.9% of Thai households were reported as having access to the Internet and over 16.99 million Thai people use the Internet as an integral part of their personal, social and occupational lives (Internet World Stats, 2009; National Electronics and Computer Technology Center, 2009). Moreover, 93.7% of Thai Educational Institutes have Internet access (National Statistical Office, 2010), thus providing students with daily access to high speed Internet.

The Thai public has been very apprehensive about the possible negative impacts of this new technology and the spread of IA, in particular among adolescents, due to recent government reports highlighting Internet and game addiction in Thai youth that have been exploited by the Thai media (CAMHRI, 2006, 2007; Kalivas & Volkow, 2005; Khaosod, 2004, 2007; Thailand life, 2006). For example, the Thai Ministry of Public Health and the Child and Adolescent Mental Health Rajanarinda Institute (CAMHRI) established an anti-IA centre to prevent IA and solve social problems associated with Internet use (CAMHRI, 2006). The Centre provides questionnaires to Internet users and parents to self-diagnose IA. Moreover, the Centre established counselling clinics for addicts and offers anti-IA camps for children and families who are at risk from Internet over-use or having difficulties caused by IA (CAMHRI, 2006). In 2007, Nakornthap and Masateianwong (2007) examined Internet use in 3,000 Thai people and found that young (6 to 24-years-old) Thai people spent one-third of their lives (or eight hours/day) using information and communication technology, such as watching television, playing on the Internet, talking on mobile phones, and sending text messages. While this study was an important initial step in documenting Internet use in Thailand, the wide age range of respondents and the combination of communications technologies that were the focus of the survey confounded the findings from this 2007 research regarding IA. That is, this study did not identify the definition of IA or any diagnostic criteria used to classify the respondents as addicted or not. This limits the applicability and generalisability of these findings to the specific topic of IA.

The Thai Health Foundation, acting on public concerns about Internet use among young people, requested that the Ministry of Culture conduct a survey focusing on the negative impacts of Internet use, particularly in relation to online gaming. The Ministry of Culture survey, which did not report any of the research design components

of the study, was conducted among Thai young people and found that a significant proportion reported having problems with their eyesight (78.3%), wasting money and time (70.8%), having no time for homework (62.4%), having insufficient rest (51.6%), and exhibiting more violent behaviours than previously (37.5%) (Nakornthap & Masateianwong, 2007). The Thai Health Foundation concluded from this study that youth who become addicted to the new technologies and who lack parental guidance are at risk for crime and immorality propagated through the Internet and mobile telephones. They recommended that parents teach their children about using these technologies appropriately (Nakornthap & Masateianwong, 2007).

As a consequence of the negative media attention directed at the use of the Internet, the Thai Webmaster Association offered practical suggestions that the Thai government should adopt to minimise the problems associated with Internet use. For example, the Association suggested that the National Legislative Assembly push through anti-cyber crime legislation and that the Ministry of Information and Communication Technology should shut down 'dangerous' Internet sites as quickly as possible. The Thai government has attempted to address some of the social problems associated with the use of these new technologies, particularly the Internet, by initiating a social marketing campaign advising parents to use computer programs that block children from viewing inappropriate websites. In addition, in 2007, anti-cyber crime legislation was passed by the National Legislative Assembly that criminalised pornography and some online 'dating' sites and allowed the government to block entry into the Thai Internet network. In addition, media campaigns were launched designed to prevent IA and related problems, such as the Child Watch and Internet Shops program, the Safe and Creative Internet Fair, and the Network on Students' Behaviours Development (Theeratith, Pruekchaikul, & Gold, 2011).

However, while the Thai government views IA as a major social problem, little rigorous, systematic research has been conducted in Thailand to accurately document the extent of IA in Thai students. Systematic research about the incidence and prevalence of IA is required in order to explore the possible positive and negative impacts of Internet use, and to identify potential intervention strategies to minimise the harm caused by IA.

Ideological Paradigms

This study reflects two ideological approaches. Both the harm minimisation approach and the action areas of the Ottawa Charter for Health Promotion (WHO, 1986) served to guide this research.

The harm minimisation approach refers to a range of pragmatic and evidence-based public health policies that aim to reduce the harmful effects associated with risk taking behaviour (International Harm Reduction Association, 2009). With respect to IA, the defining features are a focus on the prevention of harm resulting from Internet use, rather than on the control of Internet use, and a focus on people who continue to use the Internet. Harm reduction complements other approaches that also seek to reduce the potential impacts of Internet use. Harm reduction accepts that many people who use the Internet are unable or unwilling to stop using the Internet at any given time. There is a need to provide Internet users with options that help to minimise risks from over-use of the Internet that causes harm to themselves or others. It is therefore essential that harm reduction information, services and other interventions exist to provide support and assistance to those at risk of, or experiencing, Internet addiction.

Harm reduction is a targeted approach that focuses on specific risks and harms. Based on the work of the International Harm Reduction Association (International Harm Reduction Association, 2009), politicians, policymakers, communities, researchers, frontline workers and Internet users should ascertain:

- What are the specific risks and harms associated with over-use of the Internet?
- What causes those risks and harms?
- What can be done to reduce these risks and harms caused by Internet over-use?

The Ottawa Charter for Health Promotion (WHO, 1986) serves as a useful reference for structuring and informing the recommendations resulting from this study. The Ottawa Charter for Health Promotion is a global strategic policy framework established by the World Health Organization (WHO) in 1986. The Charter which aims to achieve Health for All by the year 2000 and beyond, has five action areas (WHO, 1986):

1. Build Healthy Public Policy

This action area is aimed at all public policy decision makers on the premise that health promotion extends beyond health care. The Charter suggests coordinated action across government portfolios including complementary approaches in respect to legislation, fiscal measures, taxation and organisational change, as well as intersectoral collaboration in education, housing, industry, social welfare and environment planning to achieve healthier communities.

2. Create Supportive Environments

This action area embodies the socioecological approach to health. The Charter promotes the importance of protecting the natural and built environments and the conservation of natural resources as germane to any health promotion strategy. The development of supportive psychosocial environments such as building a positive ethos within schools is relevant to this study.

3. Strengthen Community Actions

This action area sees health promotion strategies articulated through pragmatic and effective community action in setting priorities, making decisions, planning and implementing strategies to achieve better health. The Charter acknowledges information and learning opportunities as key for empowerment of communities to improve their health.

4. Develop Personal Skills

This action area focuses on the strategies that can guide and support individuals and communities achieve greater health literacy. Health promotion is applied to support personal and social development, particularly through the provision of adequate and appropriate information, education, and enhancing life skills opportunities.

5. Reorient Health Services

This action area calls for a collaborative approach to achieving health care systems that focus on health, not simply illness and disease. The Charter calls for health systems to embrace an expanded mandate; one that is sensitive and respectful of cultural needs and focuses on the individual as a whole person, and that moves increasingly in a health promotion direction and beyond models concentrated on the provision of clinical and curative services.

The Ottawa Charter for Health Promotion (1986) provided the catalyst and framework for the World Health Organization's Global School Health initiative,

launched in 1995. The Global School Health initiative " ... seeks to mobilise and strengthen health promotion activities at the local, national, regional and global levels" (WHO, n.d.-b). Correspondingly, the global school based student health survey (GSHS), a collaborative surveillance project, was designed and launched " ... to assist countries to measure and assess the behavioural risk factors and protective factors in 10 key areas among young people aged 13 to 15 years" (WHO, n.d.-a, Chronic disease and health promotion). "The GSHS is a relatively low-cost school-based survey which uses a self-administered questionnaire to obtain data on young people's health behaviour and protective factors related to the leading causes of morbidity and mortality among children and adults worldwide" (WHO, n.d.-a, Chronic disease and health promotion).

Aims of the Study

Due to the lack of a common definition of IA and universally accepted diagnostic criteria for use in determining addiction rates, more precise measurement tools for the accurate assessment of IA are needed. In addition, while there is substantial controversy surrounding the topic of IA in Thailand, there is little hard evidence of actual addiction rates and the positive or negative impacts of Internet use by Thai students. Similarly, there is no evidence-based strategy of interventions to address or minimise the negative impacts that IA may cause. This study sought to bridge these gaps by first conducting a literature review to develop a preliminary definition of IA, then performing a modified Delphi Technique data collection process to develop a consensus definition and agreed upon diagnostic criteria of IA.

This study then conducted an online survey of a sample of Thai secondary school students between the ages of 11and 19-years-old in Chiang Mai, Thailand. The survey applied the consensus definition and diagnostic criteria of IA to investigate the prevalence of Internet use and its impacts among this cohort of students. Finally, this study employed semi-structured, in-depth interviews with 30 secondary school students from the survey cohort who agreed to be interviewed to explore the information relating to survey responses. In addition, intervention strategies for the minimisation of harm from IA were sought from the Delphi panel and the secondary school respondents for use to address IA. This study differentiated between normal everyday Internet use behaviours and Internet addictive behaviours as well as exploring the impacts of those behaviours that may signify maladaptive use. Overall, the aims of this study were to:

1. Generate a consensus definition and diagnostic criteria of IA from the literature and the Delphi panel;
2. Identify the prevalence of IA among secondary school students between aged from 11 to 19-years-old in Chiang Mai, Thailand;
3. Identify significant factors that may influence Internet use among secondary school students in Chiang Mai, Thailand;
4. Explore the impacts of IA among secondary school students between aged from 11 to 19-years-old in Chiang Mai, Thailand; and
5. Identify potential intervention strategies that may help to minimise harm of IA, particularly in the Thai context.

Research Questions

This study aimed to provide an understanding of IA and its impacts, as well as to identify potential intervention strategies to ameliorate IA in secondary school students in Chiang Mai, Thailand. Therefore, the specific research questions follow directly from the previously stated aims:

1. What are the diagnostic criteria of IA to be used to measure IA in Thai secondary school students?
2. What is the current prevalence of IA among secondary school students aged from 11 to 19-years-old in Chiang Mai, Thailand?
3. What are the important factors that may influence IA among secondary school students aged from 11 to 19-years-old in Chiang Mai, Thailand?
4. What are the impacts of IA among secondary school students aged from 11 to 19-years-old in Chiang Mai, Thailand?
5. What intervention strategies are required to minimise the potentially harmful effects of IA in the Thai context?

Significance of the Study

IA and associated problems among young people have been highlighted in the Thai media (Khaosod, 2004, 2007; Thailand life, 2006; The Associated Press, 2009). The Thai government has viewed IA among young people as a significant social

problem (Kanchanachitra et al., 2007) that has required legislative as well as public health education interventions. However, the prevalence of IA in Thailand has not been accurately documented due to the confusion in the literature as to what constitutes IA and how to diagnose the problem, as well as a lack of systematic research on this issue. This study developed a consensus definition and diagnostic criteria for IA; identified its prevalence in secondary school students in one province in Thailand; and explored the physical, psychological and sociological impacts of Internet use among secondary school students. In addition, the study identified potential intervention strategies proposed by the Delphi panel and survey respondents to help minimise the potential harm caused by IA. These findings have significance for government policy makers, particularly in education, public health, law and order, and information and technology departments. The strength of this study lies in its methodology (that is, the high response rate to the student survey supporting the representativeness of the survey population from one entire provincial school district in Thailand) and the contribution to the IA field of inquiry through the construction of a consensus definition of IA along with the specification of ten diagnostic criteria that will allow for a more appropriate classification of addiction. The findings will also help inform new initiatives that the government, secondary schools, and individual families can implement to address the potential negative impacts of IA.

Limitations

This research used a mixed methods approach including consensus development using a modified Delphi Technique, an online survey of secondary school students and in-depth interviews to investigate Internet use and its impact among students in secondary schools in Chiang Mai, Thailand. There are limitations to this study that may reduce the generalisability of any conclusions reached:

1. The research examined the nature of participants in a particular area of Thailand. It might be difficult to generalise the study's findings further than the country in which the research was conducted because each society and culture has its own demographic profile and social norms that may influence student behaviour with regard to Internet use.

2. The survey format limited the researcher's ability to be certain about what may have been meant by any individual respondent when answering close-ended and semi-structured open-ended questions. However, the in-depth interviews with 30 survey

cohort students were designed to strengthen the researcher's understanding of the overall survey responses.

Summary

This chapter presented a background of the Internet and how this has expanded in use, but has led to the existence of IA. The focus of the study on secondary school students in Chiang Mai, Thailand defined the target population and location of the study. The aims of the study were delineated and operationalised as five research questions. The chapter concluded with a statement on the significance of the study and its limitations.

CHAPTER 2
LITERATURE REVIEW

Chapter Overview

This chapter discusses the literature relating to Internet use and IA. The first section introduces the background of the Internet, identifies Internet use worldwide, and identifies the prevalence of IA. The second section discusses the definitions of addiction and their relevance to IA.

Internet and Its Use

Background of the Internet.

The Internet was established in the early 1960s and subsequently became a mainstream communication vehicle (Moschovitis, Polle, Schuyler, & Senft, 1999; Schneider, et al., 2006). Since that time, there has been remarkable growth in the Internet's functionality, capacity, accessibility and convenience. These improvements have encouraged more people to use it more often, and it has become a powerful application in modern society. As of 2010, 28.7% of the world's population used Internet services (Internet World Stats, 2010b).

The Internet is a massive, computer-linked network system used globally to access and convey information, either by personal or business computer users; it is also used for communication, research, entertainment, education and business transactions (Kraut, et al., 1998; Schneider, et al., 2006). Today, the Internet can link all online computers so that people can use it to communicate throughout the world (Schneider, et al., 2006).

Nature of the Internet.

The word Internet emanates from the words "Internet Connection Network" (Greenfield, 1999), connecting computers around the world by the use of a standard protocol. It is believed that the distinctive features of the Internet, such as speed, accessibility, intensity and stimulation of its content, contribute to IA (Greenfield, 1999). In addition, Chou (2001) indicated that the most appreciated Internet features included interactivity, simplicity, availability, and abundant and updated information. In

fact, the Internet's attractiveness has increased as a result of its availability, accessibility, and affordability. The development of friendlier interfaces provides users with easier and more comfortable access. Young (1998) also concluded that the interactive features of specific Internet applications influence IA, not the Internet itself.

Nature of Internet users.

Various researchers have sought to understand the reasons some people become addicted to the Internet. For example, Suler (2000) suggests that addictive Internet users are meeting personal needs while on the Internet, including: a sense of belonging; self-actualisation achievement; and sexual images and dialogue. In a similar vein, Chou, Chou, and Tyan (1999) found that IA users experienced more personal satisfaction in escaping through online communications. Other research has documented that IA users report that the Internet is a relaxing, exciting, and enjoyable avenue for social exchange (Morahan-Martin & Schumacher, 2000). Thus, IA users have been found to express more satisfaction and pleasure in Internet interaction than 'normal' Internet users.

Internet use.

Internet use worldwide.

In recent years, the number of Internet users has increased worldwide. In 2011, 30.2% of the world's population were Internet users (2,095 million). Of those, 44% were in Asia, 22.7% were in Europe and 13% were in North America as shown in Figure 2.1 (Internet World Stats, 2011b). By comparison, from 2000-2011, population growth in Thailand declined from 0.9% in 2000 to 0.6% in 2010 (World Bank-World Development Indicators, 2011).

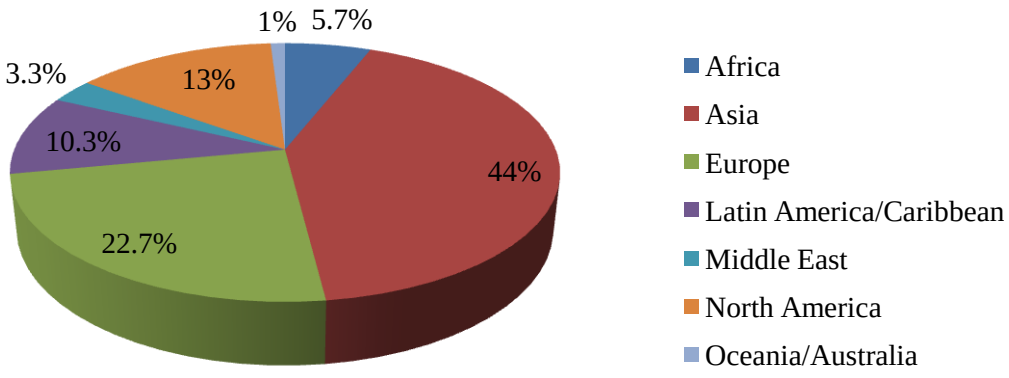

Figure 2.1. World Internet users by regions in 2011.

The growth in Internet use worldwide has increased dramatically from 2000-2011 as shown in Figure 2.2. The growth of Internet use in Asia (706.9%) was higher than that in Europe and North America (353.1% and 151.7%, respectively). In addition, the Internet use in Thailand increased significantly from 2000-2011, reaching 18.3 million users (Internet World Stats, 2011a).

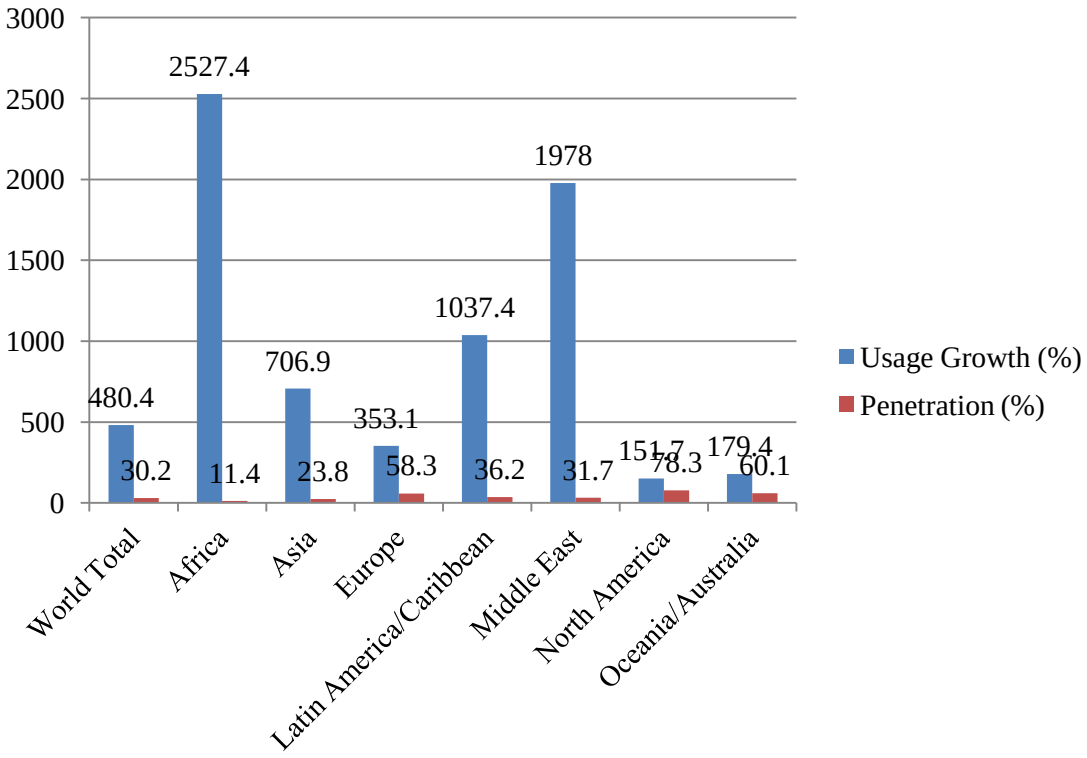

Figure 2.2. Internet use growth (%) by world regions (2000-2010).

Internet use in Thailand.

Thailand became an information technology society by setting up the Thai San computer network in 1993. The first Internet Service Provider (ISP) started to provide public access to the country in 1995. Other private ISPs subsequently emerged, thereby increasing the popularity of the Internet (Palsri, Huter, & Wenzel, 1997). Computers and the Internet play a vital role in modern living, such as for communication, information searching, and business activities (Benjadol, 2000). Consequently, there has been a well documented increase in installing Internet-ready computers in Thai homes,

offices, places of education and in specialist businesses, such as Internet cafes and computer game shops, in just the past few years (Kumruengwongse, 2001).

The penetration of the Internet increased from 5.6% of the population in 2001 to 26.3% in 2010 (Internet World Stats, 2010a; National Electronics and Computer Technology Center, 2005; National Statistical Office, 2005) as shown in Figure 2.3. Due to the popularity of the Internet and the issue of the negative impacts of Internet use, IA has received critical consideration.

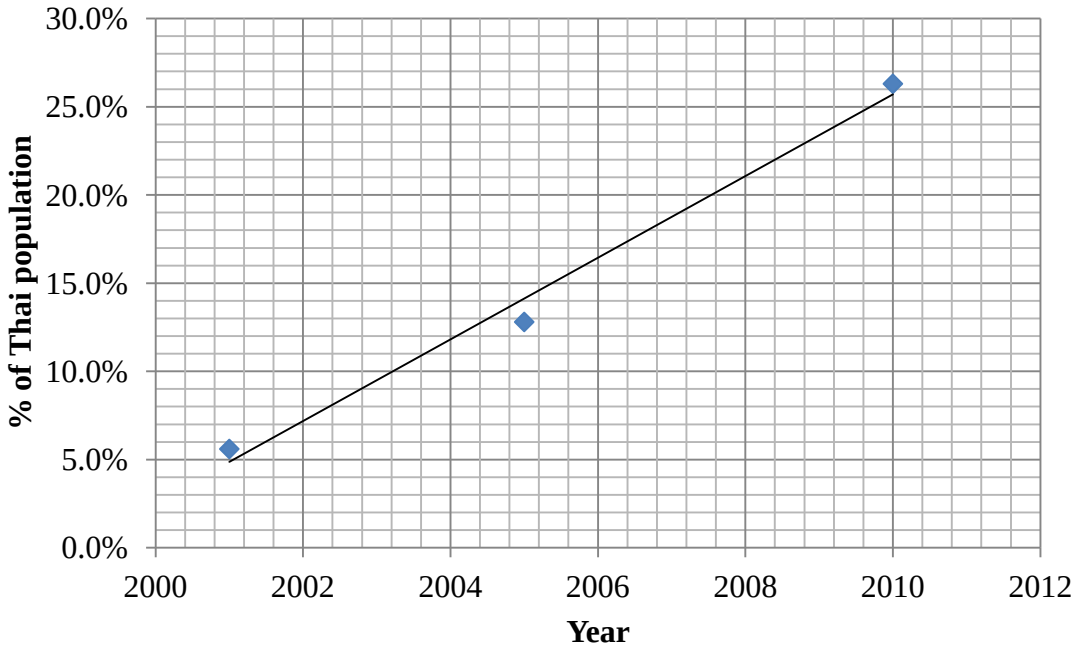

Figure 2.3. Thai Internet users (2001-2010).

Figure 2.4 shows that Thai children and youths aged from 6 to 24-years-old form the majority of Internet users (76.3%), with no significant gender difference between males (52.6%) and females (47.4%) (National Statistical Office, 2010). It has been suggested that IA is becoming a behaviour of concern among Thai adolescents given the social and emotional problems being demonstrated as a direct result of Internet over-use (Singhsawas, 2008).

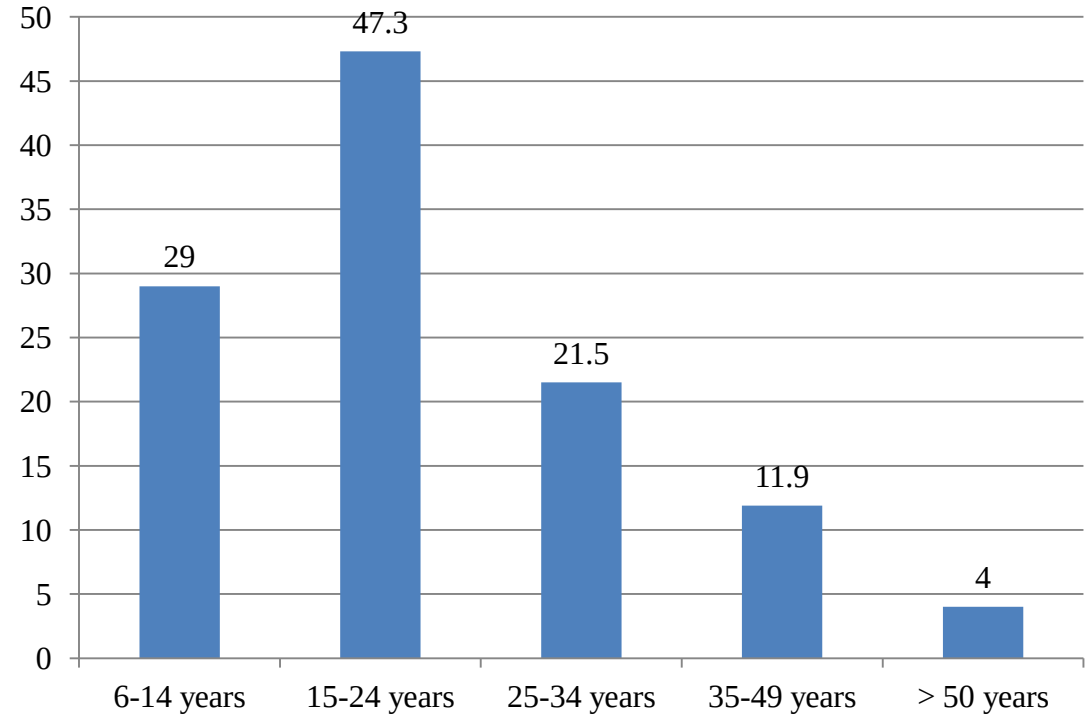

Figure 2.4. Thai Internet users (%) by age group in 2010.

Prevalence of IA.

The prevalence of IA has been examined in many countries among school student cohorts (see Table 2.1). IA has been reported at a wide range of rates, from a low of 1% in Greece (Tsitsika, et al., 2009) to a high of 36.7% in Italy (Milani, et al., 2009). Most research has reported a prevalence rate 10% or less, for example, 1.6% in South Korea (Kima et al., 2006), 2% in Norway (Johansson & Götestam, 2004), 2.4% in China (Cao & Su, 2006), 4% in South Korea (Lee, et al., 2007), 4.6% in Australia (Thomas & Martin, 2010), 6% in Poland (Zboralski, et al., 2009), and 7.1% in China (Lang, Jia, Li, & Su, 2008). However, a few studies have reported a high prevalence rate of IA among students, for example, 10.7% in South Korea (Park, Kim, & Cho, 2008), 10.8% in China (Lam, et al., 2009), 18.2% in Taiwan (Ko, et al., 2007), and 36.7% in Italy (Milani, et al., 2009).

Table 2.1

Prevalence of IA among school students from 2003 to 2010

Incidence of IA	Country	Sample	Instruments	Authors
1%	Greece	937 junior and high schools students	IAT	Tsitsika et al. (2009)
1.6%	South Korea	1,573 high school students	IAT	Kima et al (2006)
2%	Norway	3,237 youth	DQ	Johansson and Götestam
2.4%	China	2,620 high school students	DQ Chinese version	Cao and Su (2006)
2.9%	South Korea	700 middle and high school students	Questionnaire	Hur (2006)
3.1%	Finland	7,229 adolescents	Internet Addiction Test	Kaltiala-Heino, et al.(2004)
3.1%	South Korea	676 middle school students	Internet addiction self-test scale	Seo, Kang, and Yom (2009),
4%	South Korea	628 school students	Korean Internet addiction test	Lee et al. (2007)
4.6%	Australia	1,326 students (Grades 7-12)	DQ	Thomas and Martin (2010)
4.9%	South Korea	328 high school students	IAT	Yang, Choe, Baity, Lee, and Cho (2005)
5.4%	Italy	275 high schools students	IAT	Pallanti, Bernardi, and Quercioli (2006)
6%	Poland	120 primary, middle, and secondary school students	Internet Addiction Questionnaire	Zboralski et al (2009)
7.1%	China	690 junior middle school students	IAT	Yan, Fu-jun, Heng-fen, and Lin-yan (2008)
8.2%	Greece	2,200 high school students	DQ	Konstantinos, et al.(2008)
10.7%	South Korea	903 middle and high school students	IAT	Park, Kim, and Cho (2008)
10.8%	China	1,618 high school students	IAT	Lam, Peng, Mai, and Jing (2009)
11.3%	China	476 high school students	Internet Interest Inventory	Yao-Guo, Lin-Yan, & Feng-Lin (2006)
11.7%(PIUST) 13.8%(DQ)	Taiwan	1,708 senior high school students	Pathological Internet Use Scale (PIUST) and DQ	Yang and Tung (2007)
18%	India	100 public school students	The Davis Online Cognition Scale (DOCS)	Nalwa and Anand (2003)
18.2%	Taiwan	517 high school students	Chen Internet Addiction Scale	Ko, Yen, Yen, Lin, and Yang (2007)
36.7%	Italy	98 high school students (14 to19-years-old)	IAT	Milani, Osualdella, and Blasio (2009)

Assessment of IA in the literature.

As seen in Table 2.1, worldwide prevalence rates of IA identified in the empirical studies vary significantly, depending on the country studied (e.g., developed versus developing society), as well as the definition of IA used and the assessment instrument employed. The most widely used instruments for classifying IA in the literature have been presented in various formats (e.g., criteria or scales), with differing content of items, differing numbers of items and different cut off points for addiction. For example, one of the most well known and accepted IA assessment tools, the Diagnostic Questionnaire (DQ), was introduced by Young (1996). This instrument was modified from the pathological gambling diagnostic criteria literature and then used to classify IA. Scoring (yes/no) was done by adding up the total number of positive responses and dividing by the total number of items. Respondents who answered yes to five or more of the eight questions, equivalent to 5/8 or 62.5% were classified as Internet dependent. Later, the Internet Addiction Test (IAT) was developed, consisting of 20 items but using a 5-point Likert scale, resulting in a total score of 100 points (ranging from a low of 20 to a high of 100 points). Individuals who have a total score over 70 points are classified as Internet addictive users (Young, n.d.). Still later, Morahan-Martin and Schumacher (2000) developed the Pathological Internet Use (PIU) to classify IA using a yes/no response set. Individuals who answered yes to four or more of the 13 items (4/13, equivalent to 30.8% of a total score), were classified as pathological Internet users. Based on just these three well utilised instruments, IA can be diagnosed if an individual scores over 30.8% (the PIU), or 62.5% (the DQ), or 70% (the IAT). Thus, it is quite apparent there is still much disagreement in this emerging field of academic inquiry.

Definitions of Addiction and their Relevance to IA

Introduction.

The general concept of IA has been described as the excessive use of the Internet. IA is based on the idea that any new development in technology has potential negative effects on its users (Stern, 1999; Surratt, 1999). The literature on IA has tended to focus on three approaches to understanding specific behaviours related to excessive use of the Internet: substance dependence, pathological gambling and the newest, technology addiction. This section of the chapter reviews the literature on the three main

conceptual frameworks used to study IA: substance dependence; pathological gambling and technology addiction, including definitions, terminology, diagnostic criteria, and factors influencing addiction, negative impacts; and treatment.

Addiction.

According to Potenza (2006), "addiction" comes from "addicere" in Latin, meaning "bound to" or "enslaved by". Initially, the concept of addiction was used as a non-specific reference to a variety of social behaviours, but is most often linked to alcohol abuse behaviours. Goodman (1990) defined addiction as:

> a process whereby a behaviour, that can function both to produce pleasure and to provide escape from internal discomfort, is employed in a pattern characterized by (1) recurrent failure to control the behaviour (powerlessness) and (2) continuation of the behaviour despite significant negative consequences (unmanageability). (A. Goodman, 1990, p. 1403)

Drugs and other substances have been used for thousands of years. By the mid 1800s, the terms drug abuse and addiction had been introduced and problems associated with addiction were growing. In 1952, the American Medical Association defined alcoholism, and in the late 1970s, the term alcoholism was gradually replaced by the concept of substance dependence.

The terms abuse and addiction have been defined and re-defined over the years. Traditionally, addiction has been defined as physical and psychological dependence on psychoactive substances (for example alcohol, tobacco, heroin and other drugs) which cross the blood-brain barrier and, once ingested, temporarily alter the chemical milieu of the brain. In 1957, the Expert Committee on Addiction-Producing Drugs defined addiction and habituation as components of drug abuse (WHO, 1957). Some psychology professionals now define addiction as including abnormal psychological dependency on a variety of things, such as gambling, food, sex, pornography, computers, Internet, work, exercise, watching TV or certain types of non-pornographic videos, spiritual obsession, cutting and shopping (Morrissey, Keogh, & Doyle, 2008). In the next section, the three addiction conceptual frameworks most related to IA are discussed: substance dependence, pathological gambling, and technology addiction.

Substance dependence.

Substance dependence, pathological gambling, and technology addiction all share characteristics of IA in terms of the core components of addiction. Substance dependence has been defined as a neurobiological disease with genetic, psychological and environmental factors causing one or more of the following: behaviour-impaired control, compulsive use, continued use despite harm, and craving (American Academy of Pain Medicine, American Pain Society, & American Society of Addiction Medicine, 2001). The American Psychiatric Association (APA) (2000a) expanded this definition to include seven characteristics of substance dependence: tolerance; withdrawal; increasing amount and period of use; unsuccessful efforts to control the use; lengthy time periods spent on activities to obtain drugs; cessation of important social, occupation or recreational activities; and continuation of substance use despite physical and mental health problems. The added specificity allows for a more sophisticated understanding of the behaviours now described as substance dependence and covers not only drug addiction but also alcohol addiction. The APA's definition (2000a) now represents the most widely accepted diagnostic criteria used in research and clinical care. For example, a recent version of the International Statistical Classification of Diseases and Related Health Problems, ICD-10 (WHO, 2007) described drug addiction as a strong desire to take the drug, difficulties in controlling its use, persisting in its use despite harmful consequences, drugs use becoming a priority, tolerance, and physical withdrawal, all of which mirror the APA definition and criteria. Specifically, the Diagnostic and Statistical Manual of Mental Disorders (text revision) defines substance dependence as:

> A maladaptive pattern of substance use, leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring at any time in the same 12-month period:
> (1) tolerance, as defined by either of the following:
> (a) a need for markedly increased amounts of the substance to achieve intoxication or desired effect
> (b) markedly diminished effect with continued use of the same amount of the substance
> (2) withdrawal, as manifested by either of the following:
> (a) the characteristic withdrawal syndrome for the substance (refer to Criteria A and B of the criteria sets for Withdrawal from the specific substances)
> (b) the same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms
> (3) the substance is often taken in larger amounts or over a longer period than was intended

(4) there is a persistent desire or unsuccessful efforts to cut down or control substance use
(5) a great deal of time is spent in activities necessary to obtain the substance (e.g., visiting multiple doctors or driving long distances), use the substance (e.g., chain-smoking), or recover from its effects
(6) important social, occupational, or recreational activities are given up or reduced because of substance use
(7) the substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance (e.g., current cocaine use despite recognition of cocaine-induced depression, or continued drinking despite recognition that an ulcer was made worse by alcohol consumption)
Specify if:
With Physiological Dependence: evidence of tolerance or withdrawal (i.e., either Item 1 or 2 is present)
Without Physiological Dependence: no evidence of tolerance or withdrawal (i.e., neither Item 1 nor 2 is present). (American Psychiatric Association, 2000a, substance dependence)

The concept of substance dependence was originally introduced by the World Health Organization in 1957 (WHO, 1957). This concept became the basis for conceptualising and describing IA because the addictive behaviours demonstrated by individuals suffering from IA appeared to be the same as those of drug or alcohol dependent individuals. In addition, the diagnostic criteria of substance dependence are equally applicable to IA; including tolerance, withdrawal, unsuccessful efforts to cut down or control substance use, impacts on important social, occupational, recreational activities, and physical or psychological health. Thus, initial research on IA was based within the conceptual framework of substance dependence.

Pathological gambling.

A second frequently used paradigm in the literature to understand IA is pathological gambling. The International Statistical Classification of Diseases and Related Health Problems, 10th version (ICD-10), categorises pathological gambling as a subset of habit and impulse disorders, asserting that this disorder consists of frequent, repeated episodes of gambling that dominate the person's life causing the impairment of social, occupational, material, and family values and commitments (WHO, 2007). From the mental health point of view, pathological gambling is diagnosed if individuals meet at least five (or more) of the following criteria:

A. Persistent and recurrent maladaptive gambling behaviour as indicated by five (or more) of the following:

(1) is preoccupied with gambling (e.g., preoccupied with reliving past gambling experiences, handicapping or planning the next venture, or thinking of ways to get money with which to gamble)
(2) needs to gamble with increasing amounts of money in order to achieve the desired excitement
(3) has repeated unsuccessful efforts to control, cut back, or stop gambling
(4) is restless or irritable when attempting to cut down or stop gambling
(5) gambles as a way of escaping from problems or of relieving a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression)
(6) after losing money gambling, often returns another day to get even ("chasing" one's losses)
(7) lies to family members, therapist, or others to conceal the extent of involvement with gambling
(8) has committed illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling
(9) has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling
(10) relies on others to provide money to relieve a desperate financial situation caused by gambling

B. The gambling behaviour is not better accounted for by a Manic Episode. (American Psychiatric Association, 2000b, pathological gambling)

The common themes in both the medical and mental health definitions and diagnostic criteria of pathological gambling relevant to IA are: preoccupation with Internet use; increasing amounts of time on the Internet; repeated unsuccessful efforts to control, cut back, or stop the behaviour; restlessness or irritability when attempting to cut down or stop the behaviour; using the behaviour as a way of escaping from problems; telling lies to family members, or others to conceal the behaviour; and jeopardising or losing a significant relationship, job, or educational opportunity due to the behaviour.

Technology addiction.

The newest conceptual framework applied to IA is technology addiction. A multitude of new technologies have been developed over the last 50-75 years that have altered the way people travel, live and interact. These new technologies have increased people's capacities and abilities. However, they may also lead to maladaptive behaviours. It has been asserted that all forms of technology are bound to impact on

their users, in both positive and negative ways. Research on IA from this perspective is a movement toward trying to understand and evaluate these impacts (Stern, 1999). This newer conceptual framework to understand IA was first introduced by Griffiths (1995), where technology addiction was defined as nonchemical or behavioural dependencies that involve human-machine interactions. The emergence of this form of addiction is based on the assumption that all new technologies potentially contain inducing and reinforcing features, much like other forms of addiction, that may contribute to addictive tendencies (Widyanto & Griffiths, 2006). For example, Schimmenti and Vincenzo (2010) argue that technology addiction shows some psychodynamic aspects similar to those of other forms of addictions such as obsessiveness, impulsivity, and compulsivity.

An example of technology addiction is television addiction (TV addiction). TV addiction was first introduced in the 20th century and later gained widespread acceptance among parents, educators, and journalists due to its impacts on its users (McIlwraith, Jacobvitz, Kubey, & Alexander, 1991). Smith (1986) developed a TV addiction scale comprising seven criteria. A TV addict is diagnosed if an individual meets at least 5 of 7 criteria (5/7 = 71%): tolerance; withdrawal; unintended use; failure to cut down its use; excessive time spent watching TV; TV displacement of other activities; and continued use regardless of problems. Although TV addiction is not recognised as a mental disorder, Kubey (1996) has argued that the behaviours of TV addiction are similar to pathological gambling**,** paralleling five of the seven criteria of substance dependence: television consumed large amounts of time; TV is watched for longer or more often than intended; repeated unsuccessful efforts to cut down TV watching have been made; withdrawal from or giving up important social, family, or occupational activities has occurred in order to watch television; and withdrawal-like symptoms of subjective discomfort when deprived of TV have been reported. Ultimately, the diagnostic criteria of TV addiction are relevant to IA: preoccupation with using the technology; increasing amount**s** of time using the technology; unsuccessful efforts to control or cut down on use; technology use replacing other activities; and technology use causing problems to its users and others.

Internet addiction.

The first study of IA was conducted by Young (1996), who reported that 79.88% of 496 general Internet users were classified as Internet dependents, using the

Diagnostic Questionnaire DQ via email and telephone survey. IA has increasingly been recognised as a potential problem since the introduction of the term by Goldberg in 1996 (Marshall, 1999). While different approaches to different addictions fill the literature, essentially the same ideas about addiction and many of the same behaviours are being described, whether it is substance dependence, pathological gambling, or technology addiction, (Horvath, 2004; McIlwraith, et al., 1991).

IA has generally been defined as an inability to control the use of the Internet, causing psychological, social, family, school and work impairment (Davis, 2001; Young & Rogers, 1998). However, the terminology or labels for IA are inconsistent in the literature. Some researchers recognise the phenomenon as Internet Addiction Disorder, IAD (e.g.,Goldberg, 1996; Hur, 2006) whereas others prefer the widely used terms Internet addiction (IA) (e.g.,Cao & Su, 2006; Chou, 2001; Kima, et al., 2006; Ko, et al., 2007; Lam, et al., 2009; Lin & Tsai, 1999; Nalwa & Anand, 2003; Thomas & Martin, 2010; Yen, Ko, Chang, Cheng, & Yen, 2009; Young, 1996). IA has become the most widely accepted label for the general behaviours identified with an addiction to the Internet. Others have used Pathological Internet use, PIU (e.g.,Davis, 2001; Milani, et al., 2009; Morahan-Martin & Schumacher, 2000; Niemz, et al., 2005); Internet addictive behaviour (e.g.,Li & Chung, 2006); compulsive Internet use (e.g.,Meerkerk, Van Den Eijnden, Vermulst, & Garretsen, 2009); or Internet dependency (e.g.,Scherer, 1997). This study uses the term IA to encompass all the various terms used in the literature.

As yet, there are no standard diagnostic criteria for IA agreed upon in the literature. Nevertheless, most researchers acknowledge the existence of IA. As Griffiths (1998) noted, "Excessive use of the Internet may not be problematic in most cases but the limited case study evidence suggests that for some individuals, excessive Internet use is a real addiction and of genuine concern" (p. 73). Similarly, while there is little agreement on the exact definition of IA, differing diagnostic criteria based on other forms of addiction have been put forth. For example, Goldberg (1996) conceptualised the diagnostic criteria of IA based on the criteria for substance dependence whereas Young (1996) conceptualised the diagnostic criteria of IA based on criteria for pathological gambling. Nevertheless, in actuality, Goldberg (1996) and Young (1996) identified similar diagnostic criteria for IA, including the inability to control Internet use, and impairments to daily living, e.g., work, family, or school, and use of the Internet to maintain mental well-being. Thus the various conceptual models of IA used in the literature share many characteristics but are distinct primarily as a result of the

exact discipline (e.g., substance dependence, pathological gambling, technology addiction) upon which a particular researcher bases his/her research. However, while there is a considerable overlap in these conceptualisations, this overlap has also led to a great deal of confusion in the field and makes defining IA somewhat complicated.

Researchers have also tried to develop an accurate assessment tool in order to diagnose IA. For example, a well known assessment tool to classify IA was introduced by Young (1996) in the form of an eight-item Diagnostic Questionnaire (DQ) which was based on pathological gambling criteria. The DQ utilises a set of yes/no questions regarding preoccupation with the Internet, the amount of time spent on the Internet, and the negative impacts of the Internet use. Subsequently, the DQ was modified into the Internet Addiction Test (IAT). Since the introduction of Young's instrument (Young, 1996), several other assessment tools have been developed. For example, the Internet-Related Addictive Behaviour Inventory (IRABI**)** by Brenner (1997); the Chinese Internet Addiction Scale, (CIAS) (1999); the IA Scale for Taiwan High School Students, (IAST) by Lin and Tsai (1999); and the Pathological Internet Use Scale (PIUS) by Morahan-Martin and Schumacher (2000). These instruments for measuring IA have been developed in various formats, e.g., as criteria or as scales; with differing numbers of items; differing response sets to questions; and with differing 'cut off' points to distinguish addictive behaviour from normal behaviour, which have presented challenges for a consistent assessment of IA across studies and across populations. These definitional criteria and methodological challenges are also evident in the IA literature documenting IA prevalence.

Conceptual Framework

The conceptual framework used in this research was generated from the literature surrounding the three major addictive behaviours and used for the basis for understanding IA: substance dependence, pathological gambling, and technology addiction (see Figure 2.5). Some empirical research suggests that the characteristics of IA are closer to those of substance dependence because some Internet users have been found to exhibit similar negative behaviours that have been recognised as substance dependence; that is, tolerance; withdrawal; increasingly larger amounts taken over a longer period than was intended; persistent desire or unsuccessful effort to cut down or control substance use; and a great amount of time spent obtaining the substance; and, continued use despite the resultant problems (American Psychiatric Association, 1994;

Brenner, 1997; Goldberg, 1996; Scherer, 1997). However, Internet addictive users have also been shown to exhibit similar symptoms to that of pathological gambling; such as tolerance, withdrawal, preoccupation, unsuccessful attempts to cut back, and feeling restless when attempting to cut back (Greenfield, 1999; Young, 1998). Finally, technology addiction and IA also share similar addictive behaviours: consuming large amounts of time; using the technology for longer or more often than intended; making repeated unsuccessful efforts to cut down the use; withdrawal from or giving up important social, family, or occupational activities in order to use the technology; and reporting withdrawal when deprived of the technology (Griffiths, 1995; Kubey, 1996; Schimmenti & Vincenzo, 2010).

Therefore, the definition and diagnostic criteria of IA used in this research was drawn from the three sources examined: substance dependence, pathological gambling, and technology addiction. The definition derived from the literature review was: *"psycho physiological disorder caused by an excessive, non-essential use of the Internet that brings harm to the user or others within the community. It includes psychological, physical, social or other important functioning impairments"*.

Substance dependence

(American Psychiatric Association, 2000a)

Substance dependence is diagnosed if individuals meet at least three (or more) of the following, occurring at any time in the same 12-month period:

- Tolerance
- Withdrawal
- Increasingly larger amounts taken over a longer period than was intended
- Persistent desire or unsuccessful effort to cut down or control substance use
- a great amount of time spent obtaining the substance
- important social, occupational, or recreational activities are given up or reduced because of substance use
- the substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problems

Pathological gambling

(American Psychiatric Association, 2000b)

Pathological gambling is diagnosed if individuals meet at least five (or more) of the following criteria:

- preoccupied with gambling
- needs to gamble with increasing amounts of money
- has repeated unsuccessful efforts to control, cut back, or stop gambling
- restless or irritable when attempting to cut down or stop gambling
- gambles as a way of escaping from problems or of relieving a dysphoric mood
- after losing money gambling, often returns another day to get even
- lies to family members, therapist, or others to conceal the extent of involvement with gambling
- committed illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling
- has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling
- relies on others to provide money to relieve a desperate financial situation caused by gambling

Technology addiction

Television Addiction Scale

(R. N. Smith, 1986)

TV addict is diagnosed if individual meet at least five of seven criteria

- Tolerance
- Withdrawal
- Unintended use
- Failed to cut down
- A great amount of time spent watching TV
- TV displacement of other activities
- Continued use regardless problems

Figure 2.5. Summary of the diagnostic criteria for three approaches to addiction.

Factors that may influence Internet use.

A visual presentation of the myriad factors shown in the literature to influence Internet use is shown in Figure 2.6. Four main categories of influencing factors have been identified: 1) personal factors such as gender, age, and personality/self-esteem; 2) Internet factors such as online activities and access; 3) family factors such as parental supervision; and 4) peer factors such as peer pressure. The research conducted in relation to these important influencing factors is described in detail in this chapter.

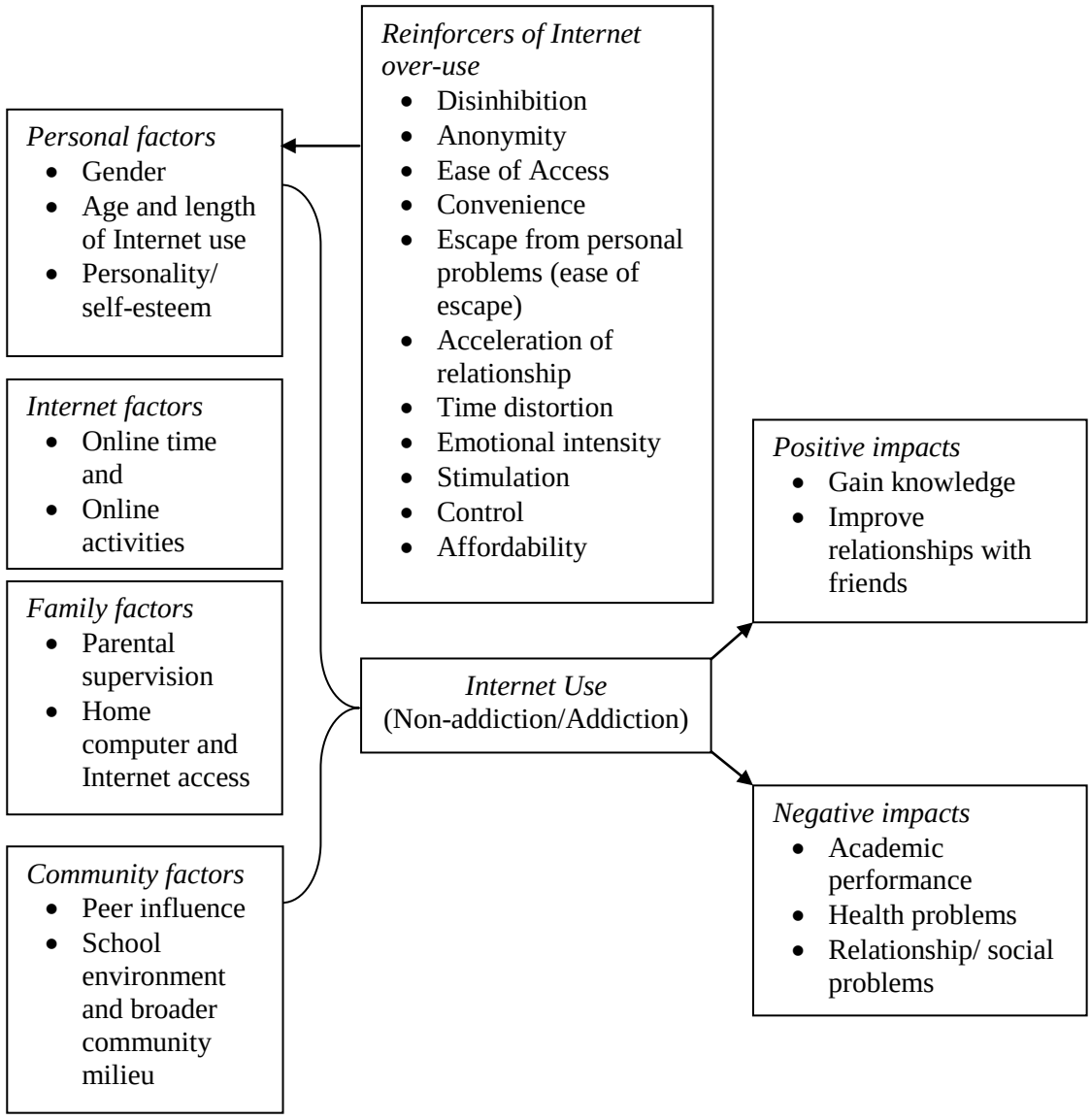

Figure 2.6. Conceptual model of factors that may influence Internet use.

Personal factor(s).

Gender.

Some empirical studies have found gender to be a significant factor influencing IA. For example, Morahan-Martin & Schumacher (2000) reported that more male students were classified with IA than female students (12% of males versus 3% of females). They also found that the male-to-female ratio for IA was almost four to one (3.8:1), which was similar to another study reporting the male-to-female IA ratio of almost five to one (4.8:1) (Hsu & Chuang, 2008). These studies suggest a strong gender difference in IA occurrence. Moreover, Griffith (1998), Chou and Hsiao (2000), and Scherers (1997) also reported gender as one of the predictive factors for IA but Scherer (1997) found no gender bias for normal Internet users. However, other research showed no gender effect for IA. For example, Brenner (1997) found that male and female Internet users were similar in both online time and related problems. Young (1996), however, reported the opposite gender effect: that females became Internet dependent more often than males. However, this finding could be a result of the fact that 60% of Young's respondents were female Internet users. Thus, it remains unclear what gender differences there may be in IA, as some of the differences in the findings from these studies can be attributed to differences in the research methodology and the sample used rather than gender alone.

Age.

Along with gender, age is another important factor influencing IA. Leung (2004) reported that among Hong Kong youths (16 to 24-years-old), Internet addicts tended to be students and younger in age compared to non-addicts. Yang and Tung (2007) identified a number of risk factors specific to adolescents that may increase the possibility of developing IA, such as a strong drive to develop a sense of identity, a desire to develop significant and intimate relationships, having a free and easily accessible Internet connection, and Internet use normally being promoted in the home and school settings. Other research suggested that it is the student lifestyle that makes adolescents predominantly vulnerable to developing IA. Students often have easy access to the Internet and flexible schedules, which may explain why IA is frequently observed in this population (Kandell, 1998; Nalwa & Anand, 2003; Widyanto & Griffiths, 2006; Young, 1998).

Personality characteristics/self-esteem.

Personality characteristics such as self-esteem appear to be a significant factor associated with the development of IA (Armstrong, Phillips, & Saling, 2000; Baek, 2005; Chou & Hsiao, 2000; Davis, 2001; Wang, 2001; Young, 1996). Jeon (2005) reported that excessive Internet use resulted in decreased self-esteem. You (2007) also reported a statistically significant negative relationship between IA and self-esteem. However, it is not clear whether low self-esteem results in IA or whether IA causes low self-esteem, (e.g., perhaps due to cyber-bullying).

Reinforcers of the Internet.

Alongside personal factors, reinforcers of Internet use have been viewed as significant factors associated with IA. Empirical studies have attempted to explain several unique characteristics or reinforcers of Internet use which contribute to addiction. For instance, Greenfield (1999) reported the existence of contributing factors or reinforcers unique to IA, including: disinhibition (a temporary loss of inhibition caused by an outside stimulus); anonymity; ease of access; convenience; ease of escape; acceleration of a relationship; time distortion; emotional intensity; stimulation; control and affordability. Young (1997) described three major reinforcers of computer-mediated communication (CMC) which cause addiction to the Internet: social support, sexual fulfilment, and creation of a persona (see Table 2.6).

Internet specific factors.

Online time.

The amount of time spent on the Internet has been shown to be significantly related to IA. Some studies indicated that the number of hours spent using the Internet is a significant factor influencing IA. For example, Young (1996) found that Internet addicts spent an average of 39 hours per week online, whereas non-addicts spent five hours per week. Similarly, Chen (2000) reported that, on average, addicts spent 25 hours per week online compared to the nine hours of non-addicts.

Internet activities.

Apart from the amount of time spent online, Internet activities are also important factors predicting IA. Of note, Internet addicts used predominately two-way communication functions such as chat or Multi-User Dungeons/ Dimension (MUDs), whereas non-addicts preferred search functions (Chou & Hsiao, 2000; Young, 1996). Nevertheless, there may be some gender bias in IA since the activities of males and females have been found to be different when using the Internet. Males tended to seek violent movies and games whereas females did not (Boy, 2003). Similarly, Young (1996) found that men participated in relaxed online activities such as games, whereas women looked for friendships and anonymous communication, often looking for romance in cyberspace. Young's study (1996) was discussed because it is the first study in this issue focusing on the differences between Internet addicts and non addicts.

The online community appears to provide a sense of belonging and opportunities to share feelings privately that may be more attractive to females. In terms of where computers are used, early research, such as that of Chang and Lin (2003), found that Internet cafes mostly provide rapid Internet connections which are necessary for a gaming experience and a variety of games. As a result, Internet cafes appeared to be considered primarily a male gaming place and thus were seen as highly gender specific. In the last decade, males and females have been using the Internet in different ways (Boy, 2003; Chang & Lin, 2003; Young, 1996). Recently, this trend of differential Internet use has been changing, however, as the penetration of female Internet users grows. In 2008, Hsu and Chuang (2008) reported that male and female Internet users used the Internet at about the same patterns (e.g., online activities) and the same rates (e.g., hours spent online).

Family factors.

Parental supervision.

Park, Kim, and Cho (2008) reported that risk factors of family violence, such as marital violence and parent-to-child violence was strongly associated with excessive Internet use and IA in middle and high school students in South Korea. Douglas and David (2002) reported that students from low income families use the computer and Internet less than those in the higher income brackets. Recently, Steeves and Webster (2008) examined the relationship between parental supervision and the protection of

children's online privacy by revisiting survey and focus group responses from children aged 13 to 17-years-old in Canada. The study reported that parental supervision contributed to the protection of children's online privacy. In addition, the high levels of parental supervision simply reduced risky behaviours associated with the Internet use.

Community factors.

Peer influence.

Peers are a strong influence in almost every culture around the world, especially for adolescents. A study of the effect of friends on first year students in Thailand found that close friends had similar characteristics, such as their processes of thinking and making decisions, processing of emotions and related activities, and attention to and imitation of behaviours, all of which affected their Emotional Quotient (EQ). Adolescents having fewer close friends have been found to be more frequent Internet users (Jantatam, 2003). Adolescents with fewer friends may turn to the Internet to find 'virtual' friends or to escape into games or adult Internet sites. Only a few studies have examined the relationship between peer pressure and IA and more research is needed. Esen and Gündoğdu (2010) studied the prevalence of IA among high school students between the ages of 15 to17-years-old in Turkey using the Internet Addiction Scale, Peer Pressure Scale and Perceived Social Support Scale. The results showed that IA is significantly influenced by peer pressure.

School environment and broader community milieu.

The influence of school social dynamics is critical when considering Internet use among secondary school students (Burns, Cross, Alfonso, & Maycock, 2008, p. 58). Whole of school approaches to school health promotion can have a significant impact on the factors that influence student behaviour in schools (Curless & Burns, 2003, p. 133). The World Health Organization's Global School Health Initiative, which is guided by the Ottawa Charter for Health Promotion (1986) has been the basis for a growing Health Promoting School Network (Curless & Burns, 2003).

According to the World Health Organization, a health promoting school is a school that is constantly strengthening its capacity as a healthy setting for living and working (WHO, n.d.-c). Thailand began participating in the Global School Health Initiative in 1998.

Subsequently, all primary and secondary schools (both public and private) in Thailand were encouraged to participate in the "Health-Promoting Schools" movement (WHO, n.d.-b). All schools are evaluated on their implementation of the strategies to be classified as a health promoting school, and as such, are ranked as bronze, silver, gold or diamond status, depending on the level of their success. In 2009, a total of 35,183 of all primary and secondary schools in Thailand (98% of the total of all schools) participated in Health-Promoting Schools; 94% achieved the goal of being considered a Health Promoting School with 16.8% reaching bronze status, 20% reaching silver status, 57.1% reaching gold and 0.1% reaching diamond status. In 2010, five public secondary schools in Chiang Mai were awarded diamond status (Department of Health, 2008). Four of these five diamond status public secondary schools in Chiang Mai participated in this research investigating the impact of Internet use.

While the focus of "Health-Promoting Schools" is one of strengthening school capacity as a health setting for living, learning and working, IA has not appeared as a specifically targeted area as yet. For example, there is a corresponding global school-based student health survey (GSHS), with ten key topics addressed by the survey (WHO, n.d.-c):

- Alcohol use;
- Dietary behaviours;
- Drug use;
- Hygiene;
- Mental health;
- Physical activity;
- Protective factors;
- Sexual behaviours;
- Tobacco use; and
- Violence and unintentional injury.

The GSHS has been applied in 43 countries to date (WHO, n.d.-a) including Thailand. In the Thai primary and secondary schools surveyed, the findings show that 37.5% of students spent three or more hours per day doing sitting activities, such as watching television, playing computer games, or talking on the telephone during a typical or usual day (Department of Health, 2008).

Impacts of IA.

As is the case with research into other addictions, e.g., substance dependence and pathological gambling, IA has been associated with both positive and negative impacts to different aspects of people's lives, including positive impacts, such as improving relationships between friends and family and negative impacts such as low academic achievement; health, personal relationships problems; and social problems. These are discussed below.

Positive impacts.

Sharing and collecting information.

The Internet e.g., World Wide Web, email, instant messaging, offers significant advantages for its users, for example, sharing and collecting information, searching for jobs, communication, and entertainment. Vast quantities of information of different types are stored on the Internet. Usually, the information on the Internet is free of cost and is available 24 hours a day. In addition, the Internet provides its users with the latest news of the world and most of the newspapers are available on the Internet, which are periodically or immediately updated with the latest news (Rice, 2006). Thus, Internet users can almost instantaneously learn about news events, read news articles or opinions about world events, and share this information and their own thoughts with others like themselves.

Searching for jobs.

People can now search for different types of jobs all over the world and can often apply for the required job using the Internet. Most of the organisations/departments advertise their vacancies on the Internet. A range of search engines are also used to search for jobs on the Internet (Metzger, 2007).

Communication and entertainment.

People around the world can now quickly communicate with each other through the Internet using a range of applications: chatting, video conferencing, email, and Internet telephone. The Internet also provides different types of entertainment. Internet users can play games with other people in any part of the world, watch movies and

listen to music. Internet users can form new relationships on the Internet (Ellison, Steinfield, & Lampe, 2007; Whitty & McLaughlin, 2007).

Negative impacts.

Academic performance problems.

Beside the benefits of Internet use, negative impacts of its use have also been identified, including: impaired academic performance, health problems, personal relationship problems and social dysfunction. For example, a number of studies have reported the ways in which IA impairs students' lives. Scherer (1997) found that 13% of his respondents reported difficulties in their academic work and professional performance due to their Internet use. Nalwa and Anand (2003) found that Internet addictive users used the Internet for long sessions, resulting in personal behavioural problems and neglect of important work responsibilities. Chou and Hsiao (2000) explored IA among college students in Taiwan finding that Internet addicts experienced more negative consequences in their studies than non-addicts. This conclusion parallels a study by Young (1996), who found that Internet addicts experienced personal, family, occupational problems, and academic difficulties, causing poor grades and eventually expulsion from universities.

Health problems.

Some young people are spending most of their free time using the Internet with potential deleterious effects on their physical and mental health. These significant negative impacts include Repetitive Strain Injury (RSI), declining physical fitness, eating disorders and Computer Vision Syndrome (CVS), typified by sore and itching eyes, and a lag in visual responses (Chou & Hsiao, 2000; Young, 1996). Jacobs and Baker (2002) investigated the ergonomic design of workstations and the muscular-skeletal wellbeing of a sample of 12-year-old students. They reported that ergonomics, relating to young people and their workstation setup, had been neglected; that is, furniture was often inadequate for the students' use, and there were problems adjusting keyboards, monitor placement and chair height to suit the needs of the children. A similar study among Finnish students reported that excessive use of computers and the Internet was related to neck, shoulder and lower back pain (Hakala, Rimpelä, Saarni, & Salminen, 2006). Another Finnish study found that computer and Internet use was significantly related to obesity in 16-year-old girls (Kautiainen, Koivusilta, Lintonen,

Virtanen, & Rimpelä, 2005). Vandelanotte, Sugiyama, Gardiner, and Owen (2009) studied the association of leisure time on the Internet and computer with overweight and obesity among Australian citizens. The survey's participants with a high leisure-time on the Internet and computer use were 1.46 times more likely to be overweight and 2.52 times more likely to be obese, compared to those who reported no Internet and computer use in their leisure-time. However, an Australian study examined sedentary behaviours, including technology use, in relation to obesity in youth but did not show a significant relationship between obesity and the use of technology (Burke et al., 2006).

Chou and Hsiao (2000) explored excessive Internet use among Taiwanese students and found that IA users reported negative impacts on daily life routines, such as missing meals and lack of sleep. Other studies also have found that excessive Internet use was associated with sleep deprivation (Ng & Wiemer-Hastings, 2005; Punamäki, Wallenius, Nygard, Saarni, & Rimpela, 2007). The mental health and wellness impacts caused by IA were also identified, including preoccupation with Internet use, aggressive behaviour, reduced learning ability, social alienation, loss of relationships, and altered sexual behaviour (Janwikulbut, Chatmas, & Tangsangeamwisai, 2004; Michelet, 2002; Sriudomsil, 2000).

Relationship and social problems.

While excessive Internet use can be an isolating activity, research investigating its social impacts has found both positive and negative impacts on its users (Mesch, Turjeman, & Fishman, 2008; Wolak, Mitchell, & Finkelhor, 2003). Young (1998) identified a number of relationship problems related to IA, including disrupted marriages and financial problems. Chou and Hsiao (2000) found that Internet use had very positive influences on their research cohort's personal relationships. Additionally, excessive use of the Internet by youths has been found to exacerbate anti-social behaviours (di Gennaro & Dutton, 2007).

Another negative social problem, using the Internet, is that of cyber bullying. Cyber bullying is the use of the Internet and related technologies to harm other people, in a deliberate, repeated, and hostile manner (Belsey, n.d) and subsequently has been defined as when the Internet, cell phones or other devices are used to send or post text or images intended to hurt or embarrass another person (National Crime Prevention Council, n.d). It is reported that about 10% of 2,000 middle-school students in the southern United States had been cyber-bullied in the previous 30 days while over 17%

reported being cyber-bullied at least once in their lifetime (Hinduja & Patchin, 2009). In Australia, the Australian Covert Bullying Prevalence Study (ACBPS) found that over a quarter (27%) of school students aged 8 to 14 years reported being bullied and 9% reported bullying others on a frequent basis (every few weeks or more often) (Cross et al., 2009). It is found a number of serious consequences of cyber bullying victimisation (Hinduja & Patchin, 2007, 2008). For example, victims have lower self-esteem, increased suicidal ideation, and a variety of emotional responses, retaliating, being scared, frustrated, angry, and depressed (Hinduja & Patchin, 2009). Thus, cyber bullying has become a focus for interventions, in a number of countries.

As highlighted earlier in this thesis, in the literature review chapter, the growing usage of and reliance on information and communications technology (ICT) among young people has been accompanied by the potential for technologies to be misused to bully others; a type of aggression termed 'cyber bullying' (P. K. Smith et al., 2008). Cyber bullying is defined as when an individual or a group use ICT to intentionally harm a person, who finds it hard to stop this bullying from continuing (P. K. Smith, et al., 2008). Whilst cyber bullying has attracted much media attention, there is a rarity of empirical research in this area, particularly regarding how to intervene to reduce cyber bullying amongst young people (P. K. Smith, et al., 2008). Hence, to address this behaviour many have drawn on what is known about effective approaches to deal with face-to-face (non-cyber) bullying (Dooley, Pyzalski, & Cross, 2009).

A number of strategies were identified to guide school investment to reduce bullying and cyber bullying behaviours. For instance, Cross's study (2011) reported that multidisciplinary whole-school interventions are the most effective, non-stigmatizing means to prevent and manage bullying behaviour. A whole-school approach to reducing bullying usually targets the school level; the classroom level; the home level; and the individual level (Cross, et al., 2011). The whole-school indicators are: (1) building capacity for action; (2) supportive school culture; (3) proactive policies, procedures and practices; (4) school community key understandings and competencies; (5) protective school environment; and (6) school–family–community partnerships (Pearce, Cross, Monks, Waters, & Falconer, 2011).

Treatment of IA.

Since IA was first introduced in the media and research literature, many research studies have been undertaken in an attempt to define, explore, investigate, and predict addiction and identify possible interventions or treatments for IA. Seven possible interventions have been identified as well as therapeutic approaches such as Cognitive Behavioural Therapy (CBT), Reality Therapy Group Counselling, and Psychopharmacology.

Seven possible techniques.

The seven possible treatment techniques introduced by Young (1999) to address IA are composed of:

1. Practise the opposite (construct a new reduced schedule or time pattern for using the Internet);
2. External stoppers (use concrete things such as time to work, or places to go, as prompters to help log off);
3. Setting goals (set clear and achievable goals to help develop new tangible Internet use schedules, prevent cravings, withdrawal, and relapse; and give the addict a sense of control) ,
4. Reminder cards (use tangible, portable reminders of what addicts want to avoid and what they want to do);
5. Personal inventory (generate a list of every activity or practice that has been neglected or curtailed since the online habit emerged);
6. Social support (organise support groups tailored to addicts' particular life situations to decrease their dependence on online cohorts); and
7. Family therapy focusing on moderation and controlled use (arrange therapy for addicts who have marriages and family relationships).

Yang and Hao (2005) investigated the effect of the seven interventions among 52 adolescents in China. The researchers found that IA scores and length of time online significantly decreased after three months of the treatment.

Cognitive-Behavioural Therapy (CBT).

The CBT method assists individuals to identify and modify their thoughts and feelings of addiction. Various studies have applied this model to address IA (Orzack, Voluse, Wolf, & Hennen, 2006; Wieland, 2005). The CBT method comprises six stages of change: pre-contemplation, contemplation, determination, action, maintenance, and relapse. This method also helps clients to develop problem solving techniques to change their current circumstance. One study utilised the CBT to deal with a group of IA users and found that after 16 sessions, the clients showed a decreased level of depression and an increased quality of life. However, the level of IA did not decrease significantly due to inappropriateness of the measuring instrumentation (Orzack, et al., 2006).

Reality therapy group counselling.

Kim (2008) recently suggested Reality Therapy Group Counselling as a way of addressing IA. The reality therapy is based on Choice Theory, which views individuals as completely responsible for their own lives. The reality therapy aims to encourage individuals to improve their lives by committing to changing their Internet-related behaviour (Kim, 2008). The therapy includes sessions that help clients understand that addiction is a choice, aids with the learning of proper time management skills, and introduces alternative activities to the addictive behaviour.

Psychopharmacology.

It has been suggested that psychopharmacology, especially selective serotonin-reuptake inhibitors (SSRIs), can be used to treat IA (Wieland, 2005). SSRIs have been found to be effective for obsessive-compulsive spectrum disorders; therefore, it may be effective for the treatment of IA (Wieland, 2005). Although various interventions have been used to address IA, there is a lack of evidence on the effectiveness of these treatments.

Summary.

Three conceptual framework approaches to addiction have been utilised in the literature: substance dependence, pathological gambling and technology addiction as the basis for understanding IA. A preliminary definition of IA used in this study was

developed from these three approaches to addiction because they exhibit similar core components to IA. The diagnostic criteria of IA used in this study were identified from the literature in the same way that the definition of IA was developed. Many factors have been shown in the literature to influence Internet use. For example, gender, Internet activities and amount of time spent on the Internet have been reported to be significant factors that may influence IA. In addition, impacts of Internet use, both positive and negative consequences, have been examined by previous researchers. It was reported that Internet use can help to improve relationships among its users, friends, and family but it can also cause negative consequences, such as academic, physical and mental health problems as well as relationship problems. There are a number of interventions recommended to address the consequences of IA; however, the effectiveness of these interventions requires further investigation.

CHAPTER 3
METHODOLOGY

Chapter Overview

A mixed method of exploratory research was employed to provide a comprehensive understanding of this new phenomenon rather than a single particular method, either quantitative or qualitative research alone, as suggested by Creswell & Plano Clark (2007). This exploratory research was divided into three phases.

Phase 1 A three-round modified Delphi Technique was employed to establish a consensus definition, diagnostic criteria for IA, and potential strategies for minimising its harm from 30 Thai experts in various addiction fields.

Phase 2 An online survey questionnaire was developed for use with secondary school students in a province in Thailand, based on the findings of the modified Delphi Technique and the literature review. The online survey questionnaire was the subject of a pilot study before being revised and administered to a random sample of secondary school students from the Chiang Mai, Thailand. The online survey questionnaire aimed to investigate the pattern of Internet use among the students, to explore the negative impacts of Internet use on its users, and to identify possible strategies to minimise those impacts.

Phase 3 In-depth interviews with 30 students from the cohort of respondents surveyed in order to obtain richer information and to better understand this relatively recent phenomenon as described in the following section.

Ethical Considerations

This proposal was submitted to the human subjects Ethics Committee of Edith Cowan University, Western Australia prior to implementation. Assurances were made in the research study information sheet provided to all potential study respondents in all stages of the data collection that participation in the study was voluntary and that the identities of the respondents would be kept confidential. Participants were informed that they could refuse or withdraw at any stage of the study with no associated risks attached to withdrawal. In addition, contact information for the researcher and her supervisors was provided in case any of the participants had questions about the study. All

communication with participants was in Thai language. All questionnaires were de-identified to ensure confidentiality. The list of prospective participants was kept at a location separate from the online survey questionnaires. Research records and raw data were stored in a locked-cabinet at ECU, to which only the researcher and her supervisor have access. Completed questionnaires and electronic data and all findings will be destroyed five years after completion of all phases of the study.

The Thailand National Statement on Ethical Conduct in Research Involving Humans has critical considerations on the subject of children and young people. This study involves randomly sampled students, aged 11 to 19-years-old, recruited from secondary schools in Chiang Mai, Thailand. Therefore, the researcher obtained statutory consent from participating school principals, standing in for parental consent, for the students who participated in this study as outlined in National Statement on Ethical Conduct in Human Research. Survey respondents had a number of opportunities to refuse or withdraw from participation in the interviews. The study presented minimal risks to the participants. To prevent or decrease the possibility of risks, the researcher:

1) Planned the research process carefully, especially the structured in-depth interviews; attended workshops on interview techniques, data collection, and managing and analysing qualitative data provided by the Graduate School of Edith Cowan University before the research commenced; and

2) Explained to the participants before starting the process that if any interviewees felt distressed, they had the right to leave the interview at any stage with no effects on their present or future studies. In addition, counselling was available from the school nurse, who was officially notified of the research and the possibility that some interviewees might feel distressed due to their participation to the study.

The students' confidentiality when counselled was protected by the Constitution of the Kingdom of Thailand, B.E. 2550, Chapter III Rights and Liberties of the Thais, section 35 Protection of the family rights of all persons, of their dignity and reputation, and their right to privacy and the Official Information Act, B.E. 2540, Chapter III Personal Information, section 21-25.

The Delphi Technique

Background of the Delphi Technique.

The Delphi Technique is a broadly accepted method for developing a consensus of opinions in relation to existing knowledge acquired from experts in particular areas. It was originally created in 1950 by the RAND Corporation (Delbecq, Van de Ven, & Gustason, 1975). The method was developed from the premise that "two heads are better than one" (Dalkey, 1972, p. 15). The Delphi Technique aims to explain 'what could/should be', whereas ordinary surveys attempt to identify 'what is' (Miller, 2006).

The Delphi Technique is a process of several iterations of communication for the purpose of gathering information and opinions from respondents within their areas of expertise. The process of initial idea generation, documentation of responses, and consolidation of responses for a second (or third, fourth, or more) iterations of communication is used to examine particular issues, for predicting prospective situations, setting goals, or investigating policies (Ludwig, 1997; Turoff & Hiltz, 1996). Recently the Delphi Technique has been utilised for determining priorities in a variety of areas (Beretta, 1996). The Delphi Technique has become especially popular in nursing and health research (McKenna, 1994).

The conventional Delphi Technique comprises four rounds from a diverse sample to reach the entire group's agreement (Moore, 1987). This classical version uses a series of consecutive questionnaires to aggregate the judgements of a group of individuals. There are now many different types of Delphi Technique; for example, the modified Delphi (McKenna, 1994), real time Delphi and policy Delphi (Crisp, Pelletier, Duffield, Adams, & Nagy, 1997). The modified Delphi Technique was used in this study.

Advantages of the Delphi Technique.

The Delphi Technique is designed for the development of a consensus on a particular issue from a panel of experts using a series of questionnaires, responses by the panel, and consolidation of the iterations of information into a final product. The Delphi Technique offers several advantages; including, anonymity and confidentiality because only the study investigators often know the identities of all respondents. In addition, the Delphi Technique offers a controlled feedback process of at least two and often four iterations of opinion seeking; thus giving respondents extensive opportunities

to virtually argue differences of opinion, offer rebuttals, and change of opinion as a result of the give and take of the review process. Moreover, the Delphi method offers appropriate data analysis and interpretation (Dalkey, 1972; Ludlow, 1975). Subject anonymity can minimise manipulation, influence, or coercion that dominant individuals can exert in focus groups or other face-to-face group situations. Confidentiality is enhanced by the usual geographic distribution of the panel and electronic communications used for information exchange (Dalkey, 1972; Ludlow, 1975). The controlled feedback process in particular can reduce the effect of noise; that is, extraneous or error driven information. Subsequent iterations of the Delphi consists of providing respondents with a summary of the prior responses and opportunities for individuals of the panel members to review and reconsider their initial opinion generated in previous rounds (Dalkey, 1972). The author notes, "… at the end of the exercise there may still be a significant spread in individual opinions" (Dalkey, 1972, p. 21) but these are represented in the final research document. Thus, each participant is free from group pressures such as social norms, customs, cultures, or professional status.

Limitation of the Delphi Technique.

Like other research methods, the Delphi Technique has limitations. For example, this technique often has low response rates and there is a general lack of evidence in the literature of the method's reliability and validity. The Delphi Technique requires the complete participation in all processes from the panel to achieve a 'true' consensus, but it is this very requirement that can cause a low response rate (Buck, Gross, Hakin, & Weinblatt, 1993). In light of these limitations and threats to the internal validity of the final result obtained, many researchers have modified the technique. For example, the process can be completed after the third round rather than the original four (Delbecq, et al., 1975).

The Delphi Technique also has been questioned regarding its reliability as it is uncertain that the same information would be acquired from same process with a similar panel of different individuals (Wijndaele et al., 2007). Validity is also of concern to the Delphi Technique. Nevertheless, it is believed that content validity can be reached if the participants of the study are representative of a particular content area (C. M. Goodman, 1987). Reliability can be assessed by using two comparable panels with the same starting information and comparing their results. Quintana et al., (2000) compared the

results from two parallel panels and also test-retest performance of the 'main' panel. Using a variety of statistical tests including Fisher exact tests, and Spearman and Pearson coefficients, they found a high degree of consistency between the panels and test-retest consistency in the main panel.

A modified Delphi Technique.

Theoretically, the process of the Delphi can be continued over and over until perfect consensus is achieved. Some researchers have found that three iterations are adequate for data collecting and reaching a consensus (Custer, Scarcella, & Stewart, 1999; Ludwig, 1997). Worthen and Sanders (1987, p. 312) asserted: "interactive procedure can continue for several more rounds, but the payoff usually begins to diminish quickly after the third round". Three iterations of the Delphi that included written questionnaires seeking opinions based on summarised, controlled feedback were used in this study in order to generate a consensus definition of IA and identify potential strategies for minimising potential harm of IA from the Delphi panel. Anonymity of all communication between the researcher and the Delphi panel during this stage was guaranteed (Bereiter & Scardamalia, 1993; Green, Jones, Hughes, & Williams, 1999).

The detailed modifications of the Delphi Technique include:

1) Employing an Internet search to recruit the Delphi panel from departments of the Thai government; and using a snowball technique, that is, a chain referral sampling process designed to identify other potential experts in a field of interest who present the characteristics of research interest from those experts already identified (Biernacki & Waldford, 1981);

2) Using email or telephone communication between researcher and the Delphi panel to reduce the cost and time consumed, and to facilitate the process;

3) Providing the Delphi panel with background knowledge of IA and other related addictions from a literature review, allowing them to justify various assertions or provide their own opinions; and

4) Implementing three rounds of questionnaire followed by summarised feedback, or, if necessary, until a consensus was reached.

The modified Delphi Technique has distinct advantages over other methods for the generation of consensus opinion. The technique allows the recruitment of the panel

without geographical, financial or time limitations, preserves the anonymity of participants, and removes any possibility of dominating (Delbecq, et al., 1975). Because there is no universal understanding of this new phenomenon identified as IA, the Delphi Technique was the appropriate methodology to assist in achieving a consensus definition of IA.

Implementation of the modified Delphi Technique.

Setting.

The setting for this study was education, public health, law and order, information and communication technology departments, and non-government agencies of Thailand.

Participants.

Thirty experts drawn from Thai government departments and non-government agencies made up 'the Delphi panel'. The Delphi panel was selected by conducting an Internet search of government and non-government departments in Thailand, for example, ministry of public health, ministry of information and communication technology, institute of child and adolescent Ratchanakharin mental health, ministry of social development and human security, department of special investigation, and ministry of education.

A snowball technique was then introduced to allow the addiction experts to identify other relevant experts if possible. The snowball technique helps to ensure the investigation obtains sufficient suitable and interested experts (Delbecq, et al., 1975). Several of the original contacts gave the researcher names of other possible subjects, and they in turn provided more suitable names (Vogt, 1999).

It has been suggested that ten to fifteen respondents could be adequate in homogeneous groups. However, more subjects are required in diverse reference groups (Delbecq, et al., 1975). The usual panel in a Delphi study is normally less than 50 (Witkin & Altschuld, 1995). However, Ludwig (1997) reported that Delphi studies have used as few as 15-20 subjects. Thus, the sample number of Delphi experts needed is diverse. If it is too small, representativeness of judgments may be compromised.

However, too large a panel might cause implementation problems, such as low response rates or be more time-consuming for the researcher to conduct.

Thirty Thai experts in addiction were identified and approached via email and telephone, introducing this research study and asking for their participation in the project. They were invited to suggest other possible respondents. The experts were able to accept or reject participation via the email letter. However, once the expert consented to participate in the study via the email letter, the initial Delphi segment, designed to generate a consensus definition of IA and its diagnostic criteria and identify interventions for harm minimisation, was sent to the experts for their review and comment as the first step in three rounds of data collection. No potential adverse consequences were anticipated for this segment of the research.

Thirty experts were provided with details of this research and invited to participate in the Delphi Technique. Twenty-two completed all three rounds of the modified Delphi questionnaires, for a response rate of 73.33 per cent. This cohort of 22 Thai experts was representative of different academic and professional backgrounds, including: Psychology (3), Medicine (4), Computing Science (2) Neurology (1), Police (2), Mental Health Nursing (3), Education (2), Public Health (2), and Sociology (3).

Procedures.

A minimum of 45 days are required for the Delphi's implementation (Delbecq, et al., 1975). However, the development of technologies, such as email and telephone, can assist in streamlining the process of the Delphi. As Witkin and Altschuld (1995) noted,

> "... electronic technology provides an opportunity for individuals to employ the Delphi process more easily by taking advantage of: 1) the storage, processing, and speed of transmission capabilities of computers; 2) the maintenance of respondent anonymity; and; 3) the potential for rapid feedback". (Witkin & Altschuld, 1995, p. 204)

The three rounds of the modified Delphi Technique were coordinated using email or telephone contact to introduce the study and its goals, answer any questions about the research or what participation entailed, and invite participation in the study. An email was used to speed feedback and maintain respondent anonymity.

The first round questionnaire was sent to panellists with an explanation of the study's purpose and a statement by the researcher concerning the commitment made to ensure the respondents anonymity and the confidentiality of their contributions (Appendix 3.1).

Round one (R1).

The initial questionnaire consisted of open-ended questions related to the preliminary operational definition of IA and suitable diagnostic criteria of IA derived from the literature. The first round of the Delphi sought the Delphi panel's views on the preliminary definition of IA provided and the Delphi panel identification of the diagnostic criteria for IA and potential strategies to address IA. After receiving the responses from the Delphi panel, the collected information was analysed individually using content analysis for themes and overlap. A consolidated summary of the definition of IA, proposed diagnostic criteria, and suggested possible strategies in R1 was created by the researcher and returned to participants for consideration in the second round (R2).

Round two (R2).

In R2, statements from the first round were used to compose a questionnaire requesting the Delphi panel to review the summarised items based on the information acquired in R1. The Delphi panel was asked to reconsider the definition of IA and proposed intervention strategies. The Delphi panel was asked to rate the usefulness of each item of the diagnostic criteria and to establish priorities for criteria priorities using a 4-point Likert scale, ranging from 1 ('least useful') to 4 ('most useful'). Delphi panel experts were offered the opportunity to comment on any items (Appendix 3.2). The returned responses from R2 were analysed and the definition of IA and proposed possible strategies were summarised, based on content and thematic analysis. The usefulness scores of each item of the diagnostic criteria were calculated and ranked. The summary of response from R2 was transmitted to respondents for the final consideration in R3.

Round three (R3).

In the final round (R3), the Delphi panel received a summary of responses from R2 for their final consideration of the definition of IA, proposed diagnostic criteria and suggested strategies for address IA. This round gave the Delphi panel an opportunity to make further clarifications of any issues before consensus was reached. The Delphi panel was asked to clarify the consensus definition of IA, justify the major relevant diagnostic criteria from the ranking provided, and identify the potential strategies to prevent or minimise the harm caused by IA (Appendix 3.3).

The returned responses of R3 were summarised with an agreement on the definition of IA being achieved and treated as the consensus. The ten most relevant diagnostic criteria were identified. The potential strategies to minimise harm were categorised into three major areas. The researcher's final report to the Delphi panel summarised the goals, process and results. Each Delphi panel member received a summary of the results from R3 in order to achieve closure for the modified Delphi process.

Data analysis.

From the Delphi component, qualitative and quantitative data were collected. Content analysis was performed on the three rounds of open-ended responses using NVivo 7 software. As a part of these analyses, some of the qualitative data, e.g., diagnostic criteria of IA and intervention strategies were quantified by counting the frequency of occurrence of events. Descriptive statistics were employed to analyse quantitative data.

The definition of IA and the rated diagnostic criteria generated from the modified Delphi Technique and the literature review were utilised in developing the online survey instrument to identify and explore the extent of IA in Chiang Mai secondary school children in the next stage of this research. The potential intervention strategies suggested by the Delphi panel were employed to incorporate with the findings from secondary school students in the survey and interview phases.

An Online Survey Questionnaire

Introduction.

The online survey questionnaire was chosen as the means for conducting an investigation into the use of the Internet by a research sample of secondary school students in Chiang Mai. This method has been used in a variety of systematic studies (Couper, Blair, & Triplett, 1999) and found to be an acceptable methodology (Solomon, 2001). It has the distinct advantages of minimal cost and substantially reduced wastage of paper (Bachmann & Elfrink, 1996). Online or web-based surveys have become more broadly used in many areas of research**,** e.g., social sciences and education. An online survey offers advantages over the traditional methods, such as mail surveys by reducing cost, time and avoiding inaccuracy of data entry (Bachmann & Elfrink, 1996; Medin, Roy, & Ann, 1999; Parker, 1992).

However, there is potential for methodological bias in online surveys. For instance, a majority of people in many countries have no Internet access or, in countries with high Internet/computer access, there are many people who do not use the Internet. Researchers should be critically concerned about sample selection bias when conducting an online survey (Solomon, 2001). It has also been found that online surveys have significantly lower response rates than traditional mailed surveys, thereby introducing other biases into the data (Crawford, Couper, & Lamias, 2001). A variety of approaches have been utilised to increase response rates, including pre-notification with personalised cover letters, follow-up reminders, and simpler formats for the questionnaires themselves (Solomon, 2001). Witte, Pargas, Mobley, & Hawdon (2004) found that simple surveys have better response rates than more sophisticated online surveys that take longer for uploading. Moreover, as computer technology and software have developed, better and more sophisticated systems have also been created for online surveys.

Pilot study.

Setting.

The setting for the pilot testing of the online survey segment of this research project was 49 secondary schools in Chiang Mai, Thailand. Of the 49 schools, 37 are public schools and 12 are private schools. Each school is officially grouped for

administrative purposes within one of five education areas within the Chiang Mai authority.

Participants.

The pilot study population involved 300 students studying in Mattayomsuksa 1-6 (Year 7-12) secondary schools in Chiang Mai, Thailand. These schools were not included in the final online survey and thus served as an appropriate pilot setting.

Instruments.

An initial questionnaire, the online survey questionnaire (Appendix 3.4), was constructed based on information derived from the literature and from Stage One of this study, the modified Delphi Technique. The initial online survey questionnaire comprised of four sections: 1) demographic information; 2) patterns of Internet use; 3) IA scale; and 4) strategies to prevent IA.

Section 1: Demographic Information included age, gender, level of education, major of education, and type of school.

Section 2: Patterns of Internet use included ownership of computer and Internet, place and time of Internet use, duration of Internet use, and purpose of Internet use.

Section 3: An IA scale developed for this study based on ten diagnostic criteria of IA derived from the modified Delphi components of this study. In addition, the Delphi Technique resulted in the Delphi panel agreeing that a cut off point for classifying a respondent as IA should be when a respondent meets 7 of the 10 criteria.

The IA scale used in this study contained 20 items, derived from the 10 diagnostic criteria agreed upon by the Delphi panel, with a response set of a 5-point Likert scale indicating how often the respondent engaged in the behaviour described. The response set ranged from Never=1 to Always=5. The 5-point Likert scale was adopted for this study because this type of scale has been recommended as the most commonly used question format for assessing participants' opinions and obtaining a nuanced range of responses that is greater than just a YES/NO opportunity for response (Dumas, 1999). The scales require the individuals to make a decision on their level of agreement with a statement (Likert, 1932). The total score is obtained by adding the values for each response, thus these scales are also called ‘summated scales’. These

scales always allow for collapsing the responses into condensed categories (e.g., YES/NO), if appropriate, for analysis (Clasen & Dormody, 1994). Nonparametric procedures based on the rank, median or range, for example, Kruskall-Wallis (1952), are appropriate for analysing these types of data, as are distribution free methods, such as tabulations, frequencies, and Chi-squared statistics.

The IA scale used in this study comprised 20 questions, developed from the 10 diagnostic criteria agreed upon by the Delphi panel; that is, two questions for each individual diagnostic criteria. The items included in the scale were:

1. How often do you find that you stay online longer than you intended?
2. How often do you neglect household chores to spend more time online?
3. How often do you prefer the excitement of the Internet to spending time with your friends in person?
4. How often do you form new relationships with fellow online users?
5. How often do others in your life complain to you about the amount of time you spend online?
6. How often do your grades or schoolwork suffer because of the amount of time you spend online?
7. How often do you check your email before something else that you need to do?
8. How often does your job performance or productivity suffer because of the Internet?
9. How often do you become defensive or secretive when anyone asks you what you do online?
10. How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?
11. How often do you find yourself anticipating when you will go online again?
12. How often do you fear that life without the Internet would be boring, empty, and joyless?
13. How often do you snap, yell, or act annoyed if someone bothers you while you are online?
14. How often do you lose sleep due to late-night log-ins?
15. How often do you feel preoccupied with the Internet when offline, or fantasise about being online?

16. How often do you find yourself saying "just a few more minutes" when online?
17. How often do you try to cut down the amount of time you spend online and fail?
18. How often do you try to hide how long you've been online?
19. How often do you feel depressed, moody or nervous when you are offline, which goes away once you are back online?
20. How often do you use the Internet to escape from other problem in your life?

The respondents were asked to answer the questions in terms of how often they did or did not perform the activity by rating their use on a 5-point Likert scale. The 5-point categories of responses were: *Never* = 1, *Rarely* = 2, *Occasionally* = 3, *Often* = 4, and *Always* = 5. Based on the 5-point Likert response set, total scores on this scale could range from a low of 20 (Never answered on all 20 items) to a high of 100 (Always answered on all 20 items). Using the Delphi panel cut off measure of 7 of the 10 diagnostic criteria, the IA cut off score for this scale is 70%. Thus an IA score of 70% or higher was considered IA. Therefore, individuals who had a total IA score of 69 or below were classified as 'normal Internet use', and those above a score of 70 were classified as 'addictive Internet use'.

Section 4: Impacts of Internet use and intervention strategies to minimise harm caused by Internet over-use.

The initial online survey questionnaire was developed in English by the researcher, and its content validity was evaluated by a group of five health professionals skilled in the addiction field from the health department, Thailand. This group consisted of two nurses, two medical doctors, and a psychologist. The questionnaire was translated into Thai language by the researcher; the resulting version was then translated back into the English by this group of health professionals. The quality of the translation was checked and subsequent modification accomplished. To reduce the possibility of ambiguous translation, three of the five Thai health professionals from this group collaborated with the researcher in the necessary translations. In this study, the similarity between two versions of the questionnaire was accepted at 70% in parallel with Thorndik (1975) who reported that the total score correlation across languages was 0.70. Then, the Thai language version of the online survey questionnaire was trialled in a pilot study consisting of 300 students from the randomly selected sample of students

in Mattayomsuksa 1-6 (Year 7-12) before being adjusted for implementation with the full research cohort of students.

Procedures.

Five secondary schools were chosen from each of the five Chiang Mai Education Areas, and one from private schools using a random sampling technique. The researcher contacted school administrators to obtain their permission to conduct the research and to obtain their cooperation in the conduct of the pilot online survey questionnaire by providing the students' email addresses to the researcher. The online survey questionnaire was sent to the email addresses of 50 students from each school using a random sampling technique. Students were instructed to submit their completed survey questionnaire within four weeks. In the second week after the introduction of the survey, a reminder email was sent to participants yet to respond. The completed email questionnaires were sent to the researcher's electronic mailbox automatically.

Data analysis.

Data analysis consisted of both quantitative and qualitative techniques. A statistical analysis was conducted on the online survey questionnaire responses and content analysis was performed on the open-ended responses. As a part of these analyses, some of the qualitative data was quantified by counting the frequency of occurrence of events.

Findings of the pilot study.

The pilot study was designed to test the questionnaire in a like sample of students to assess its validity and feasibility, to simplify complicated or compound research questions, and to provide the researcher with data on issues arising from the survey questions in order to refine and clarify the final online survey questionnaire. It was found that IA scale has a high internal consistency ($\alpha = 0.893$). Initially, some 300 students were recruited to participate in the online survey questionnaire. Ninety-five (95) questionnaires were returned completed for a response rate of 31.67 per cent which is comparable to general online survey response rates (Hamilton, 2003). The age of respondents was concentrated among the 11 to 19-years-old age group, as would be

expected of secondary school students. Of the 95 students, 60 were male and 35 were female. The respondents spent about 15-30 minutes completing the questionnaire**.**

Several issues arose concerning the conduct of the pilot study. First, it was difficult to obtain students' email addresses because some schools did not provide the official address of students depending on the respective administration policy; no difference was evident between public and private schools. As a result, the pilot test students were required to make personal arrangements to provide the researcher with an individual, or personal, email address. Anecdotal evidence revealed that some students were tardy in checking their email regularly, which may have contributed to non-return of the online survey questionnaire. Again informal contact led a few respondents to comment that it took long time to complete the online survey questionnaire due to the slow downloading of the questionnaire where the Internet signal was weak especially in remote areas e.g., CM area 4 or 5.

The researcher revised the questionnaire, primarily focusing on closed-ended, IA relevant questions in order to address the criticism that the original survey had too many open-ended questions and took too long to complete. Nevertheless, some open-ended questions were still necessary to derive qualitative information to inform the development of the interviews.

Thus, the final questionnaire consisted of four sections (22 total questions). Section 1 covered demographic information (five closed-ended questions) including age, gender, level of education, and types of school; Section 2 asked about patterns of Internet use (10 closed and open-ended questions); Section 3 was an IA scale; and Section 4 asked about strategies the student might recommend to address IA. In order to encourage maximum participation rates, the researcher offered an incentive to students to complete the survey consisting of a raffle drawn in which students could win 1 of 2 iPods. Students who completed the survey and were willing to participate in prize draw needed to provide their contact details to the researcher. Only the researcher could access contact details of students to ensure confidentiality. All data are to be destroyed five years after the completion of this study.

Implementation of the online survey questionnaire.

Setting.

The setting for this study was 49 secondary schools in Chiang Mai, Thailand (37 public and 12 private schools). Each school is officially grouped for administrative purposes within one of five education areas within the Chiang Mai authority.

Participants.

The research population for the online survey questionnaire phase was students studying Mattayomsuksa 1-6 (Year 7-12), in 2006, derived from 49 secondary schools in Chiang Mai, Thailand. The number of students enrolled in Years 7 to 12 in 2006 in the study population was 14,719.The school population comprised a total of 49 secondary schools, 37 public schools administrated by the government, and 12 private schools administered by the Private Education Commission Office. Of the 37 public schools, each school was officially grouped for administrative purposes within one of five education areas in the Chiang Mai authority.

Of the 14,719 students being educated in secondary schools in Chiang Mai, 10,566 students attended public sector schools and 4,153 attended private schools. All were possible subjects for inclusion in the online survey. A power calculation using a simplified formula for proportions (Yamane, 1967) having at 95% confidence level and P = 0.5 would yield a minimum sample size of 390 students from this population.

Equation 3: $$n = \frac{N}{1 + N(e)^2}$$

The simplified formula of Yamane (1967), at 95% confidence level and *P* = 0.5. N = Size of population, n = sample size, and e = precision of 5%.

However, the response rate of the pilot study was only 30.2%, which is consistent with Hamilton's findings (2003), who reported the average response rate for online surveys to be 32.5%. Based on the pilot study response rate, and in order to ensure a sample of at least 390, the researcher over-sampled by increasing the total number of respondent students to 1,200.

Instruments.

The online survey questionnaire was modified and administered following lessons learnt from the implementation of the pilot online survey questionnaire.

Procedures.

Two private and two public schools were chosen from each of the five education areas using a random sampling technique. After obtaining permission from the Director of Chiang Mai Educational Service Area, each school principal, standing in the stead of parental consent, was asked to give statutory consent for student participation in the study which is required in Thailand (Appendix 3.5). This corresponded to the National Statement on Ethical Conduct in Human Research, Thailand. As required by the ECU ethics review, students had the opportunity to refuse participation in the online survey questionnaire.

In preparation for the distribution of the online survey questionnaire one week before implementation, the researcher met with each school principal to present an outline of the study, as preparation for the distribution of the survey one week before implementation. One hundred students from each school were chosen using a random sampling technique from the school student roster. Students' email addresses and telephone numbers where possible were acquired from the school principals. Instruction on how to access the online survey questionnaire and individual PINs to enable this access were both provided to students who had given an email address after having been assured of, and accepted the researcher's promise of confidentiality and anonymity. Thus, the names of respondents were separated from email addresses; the lists were kept on a protected computer to which only the researcher had access. The online survey questionnaires were randomly numbered with a list of names attached to these numbers being kept separate so that the response rate was valid with no number counted twice or otherwise duplicated. Finally, students were instructed to submit their completed online survey questionnaires within four weeks. A reminder email was sent to participants who had not responded by week two. This reminder notice was the only one sent because of time constraints and the technological difficulty some students had in downloading their online survey questionnaire. This reminder notice was the only one sent because of time constraints and the technological difficulty some students had in downloading their online survey questionnaire. In some remote areas, e.g. CM area 4 or 5 where there were some difficulties reported in downloading the survey, the study accepted students

completing the survey from school computers. The incentive of the iPod prize was considered to be a response-improving factor also. Additionally anecdotal evidence revealed that some students were historically slow in checking their Internet for mail, hence missing the return deadline.

Data analysis.

Descriptive statistics using SPSS (Statistical Package for the Social Sciences) were conducted on the quantitative data. The non-parametric procedures including, Mann-Whitney test and Kruskal-Willis test, were employed as the data of this study was not normally distributed. Non-parametric tests such as the above tests have been known as assumption-free tests. Most of these tests work on the principle of ranking the data. This process results in high scores being represented by large ranks. The analysis is then performed on the ranks rather than the actual data (Field, 2009). The Mann-Whitney test (1947), equivalent of the independent t-test, was used to test differences between two condition and different participants. The Kruskal-Willis test (1952), equivalent of the one-way independent ANOVA, was used to test differences between several independent groups. Chi-square was employed to identify the relationship between variables. The qualitative data were analysed using computerised content analysis procedures.

Cronbach's α was used to measure the internal consistency among items of the IA scale developed for use in the survey phase [Cronbach's α (alpha) is a coefficient of reliability used as a measure of the internal consistency or reliability of a psychometric test score for a sample] (Cronbach, 1951). It was found that the IA scale has a high internal consistency ($\alpha = 0.928$).

The Structured In-depth Interview

The purpose of this qualitative component was to explore with thirty online survey questionnaire respondents, in greater depth and triangulation of information provided, the extent of Internet use, especially regarding the personal, social and contextual factors which might lie behind the results of the quantitative responses elicited by the survey.

Background of the in-depth interview.

In-depth interviews are an outstanding method for program planning and evaluation. They are best suited for obtaining comprehensive information from the subjects' perspective (Creswell, 1997; Silverman, 1999). A number of essential characteristics of in-depth interviews can be identified including, open-ended questions, semi-structured formats, goal–seeking for understanding and interpretation, and interviews conducted in a relaxed, conversational style. Well constructed open-ended questions allow respondents to provide further details about a given topic instead of yes or no answer. The semi-structured format allows the conversation to flow naturally, without a specific order, but relating to the specific information provided by the respondent. Open-ended interviews offer the opportunity for the interviewer to clarify the statements from the respondent to gain a deeper understanding of the context and content of responses. Finally, conducting the open-ended interview in a conversational style, where the interviewer primarily serves as a purposeful listener, can build a smooth, ordered and cohesive conversation with the respondent (Rubin & Rubin, 2004; Willis, 2004).

Kvale (1996) identified some strategies for interviewers including: active listening whereby the interviewer listens and rephrases the statements of the interviewee to ensure complete understanding of the meanings being exchanged; patience which enables the interviewee to speak freely, and unhurried; flexibility so that the conversation is allowed to diverge marginally from the topic, so needing a reordering or revision of the questions; and audio taping the interviews with permission as this may be useful for reference and enhanced accuracy. However, the interviewer should guide the conversation to cover important topics. If the interviewees move away too far, then the interviewer should carefully draw them back to the topic. Audio recording: audio-taping of the interviews with permission should precede this may be useful for reference and enhanced accuracy.

The implementation of the structured in-depth interview.

Setting.

The setting for this study was the same as for the online survey questionnaire.

Participants.

A convenience sample of thirty students was randomly chosen from a list of online survey questionnaire participants who had volunteered to participate in the interviews. Thirty students aged from 11 to 18 years-old were chosen from six schools (5 public schools and 1 private school). The proportion of public (83%) and private (17%) schools was representative of the sample.

Instruments.

Structured open-ended questions were constructed in relation to the online survey questionnaire findings. The questions covered the experience of Internet use both positive and negative, the personal perspective of IA and potential strategies to overcome any harm caused by IA (Appendix 3.6).

Procedures.

The researcher contacted each of the thirty participants by phone or email inviting their participation in the interview sessions. Participants agreeing to be interviewed were allowed to choose the interview venue and time. The objective of the interview was explained together with a declaration of anonymity, confidentiality and minimal schoolwork interruption at the outset. Participants were questioned about their own personal experiences facing social, school or other difficulties caused by Internet use. The question prompts were guided by responses to the questions of the online survey questionnaire. These questions were further explored for a deeper understanding and clarity. For instance, if a student's response was: 'Fulfilment', the researcher might ask, 'Tell me what you mean?' Audio recording and note taking were used with permission during each interview. The researcher's summary of the recorded transcript was checked for accuracy with each participant as soon as possible after the interview concluded.

Data analysis.

Transcribing involved creating a written text of the interview responses. This step involved bringing together all of information-gathering approaches into one written form. The side notes were differentiated from the respondent's notes, typically by

highlighted text. The transcript was reviewed and studied before denoting important information related to the study.

The data from interviews were translated into English by the researcher; the resulting version was then translated back into Thai language by the experts. The quality of the translation was checked, especially to reduce the possibility of ambiguities in translation; three Thai experts in addiction field work collaborated with the researcher. In this study, the similarity between two versions of data was accepted at 80%, stricter than Thorndike (1975) who reported that total score correlation across languages should be at least 0.70.

Data from consultations and interviews were read and reread to identify common contextual issues, e.g., codes, categories and patterns. Transcribed data from individual in-depth interviews was analysed using content analysis procedures. The findings from these in-depth interviews were used to support, clarify, or even question some of the findings from the online survey questionnaire.

Summary.

The findings from the modified Delphi study were analysed, a consensus definition and diagnostic criteria of IA emerged and was used to be integrated with the students' perceptions on the possible treatments for IA. The findings were determined from the combined strands of data, the survey and the structured in-depth interviews. The findings then led to the development of recommendations from this study; the recommendations are intended for policy makers and professionals in respect to recognising IA and outlining potential strategies for minimising its harm.

The results flowing from this research will enable the establishment of a new framework to increase the understanding of Internet use and its impacts on students' lives in Chiang Mai, Thailand. Furthermore, in subsequent chapters recommendations will be made for generating potential strategies for minimising the negative consequences of excessive Internet use, thereby increasing the level of awareness of all concerned about the potential onset of IA.

CHAPTER 4
FINDINGS

Chapter Overview

Chapter three identified the research methodologies selected to investigate the research questions empirically. This chapter presents the findings of analysed data derived from the implementation of the study as follows:

Phase 1: a modified Delphi Technique was administered in three rounds to address the aims of the research: to clarify the Delphi panel's points of view on the proposed definition and diagnostic criteria of IA and potential strategies for minimisation of these harms.

Phase 2: an online survey questionnaire, developed from the outcomes of a modified Delphi Technique and the literature review, which was implemented electronically with a wide-ranging sample of Chiang Mai secondary school students. It aimed to investigate more completely this new phenomenon of Internet repetitive use leading to addictive behaviour (IA); and was slanted towards investigating patterns of Internet use, emphasising its impacts, and being the source of possible ameliorating strategies.

Phase 3: structured in-depth interviews of a convenient sample of thirty surveyed students were conducted to acquire a better understanding of this phenomenon.

The conclusion describes a detailed outline of the findings of the investigations derived from the three research phases outlined above.

IA from the Delphi Panel's Perspective

The Delphi Technique was modified to operate in three rounds to collect data for the following research questions:

1. What is an operating definition of IA developed from the Delphi panel's' opinions;
2. What are the diagnostic criteria for Internet over-use among secondary school students; and

3. What strategies are required to minimise the harm caused to those addicted?

The first round of the Delphi Technique asked the Delphi panel to give their opinions regarding:

1. The suitability and acceptability of a proposed operational definition of IA derived from the literature;
2. The classification of diagnostic criteria for IA; and
3. The identification of potential intervention strategies, based on their experience, which may help to minimise IA.

The second round of the modified Delphi Technique asked the Delphi panel to rate the essential elements summarised from the initial responses which gave a definition of IA, diagnostic criteria for IA identification, and strategies to minimise IA.

The final round of the study invited the Delphi panel to consider an agreed operational definition of IA, and compose diagnostic criteria and strategies for minimising harm caused by this phenomenon. Details of the implementation of the Delphi Technique are detailed below.

Definition of IA.

The Delphi panel were provided with details of this research and invited to participate in the Delphi Technique. Twenty-two participants completed all three rounds of the modified Delphi questionnaires, for a response rate of 73.33 per cent. In the first round questionnaire, the researcher's operational definition of IA was presented to the respondents for consideration and modification. The questionnaire asked for their reactions to its acceptability and suitability. This definition, (following) was derived from a focused literature review: "*IA is psycho physiological disorder caused by an excessive, non-essential use of the Internet that brings harm to the user or others within the community. It includes psychological, physical, social or other important functioning impairments".*

The majority of respondents (90.91%) agreed that the proposed definition was an acceptable consensus definition of IA. They believed that IA should be classified as a psychological problem due to its similarity to substance dependence and pathological gambling. Respondents also pointed to evidence that IA causes physical, mental, and

social and relationship problems for those addicted and others around them. A sample of the Delphi panel comments follows:

"I think any addiction causes harm to addicts, affecting people around them. I think the definition matches mine."

"Yes, I agree because there is evidence showing that IA involved the same area of brain functioning for the mechanism of addictions (Nucleus accumbent and ventral tegmental area)"

"IA in the Thai language can be described as an addictive behaviour because users always stay online, using the Internet very often, or too much when compared with normal users, causing psychological, socio-economic problems. This seems be to medical definition."

"In technological and educational terms, IA can be defined as the situation that people are interested in or have expertise in the technology, which is claimed as "normal" in terms of technological use. The users are usually addicted to a variety of interesting applications/functions of the technology. However, this use is not "abnormal" or "addictive" as it is no different from daily computer use for work or for entertainment. Watching TV daily occurs in every household but it is not claimed as TV addiction because serious physical or psychological problems are not caused by watching TV. Therefore, the definition of IA is a psychological definition which describes a phenomenon that Internet users like, love and are interested in the Internet."

"IA is a psychological, behavioural, impulse control disorder. It is not considered to be a psychiatric disorder as yet."

"This definition describes "Internet addiction" covering both medical and social aspects."

"Definition of IA is similar to those of substance addiction; tolerance, withdrawal, preoccupied, loss of control and functional impairments."

However, all respondents made three suggestions to develop a more comprehensive operational definition of IA: 1) the definition should have included abnormal use or inappropriate use of the Internet to make the definition more inclusive; 2) harmful use should include behavioural, mental and spiritual perversion in the definition; and 3) some negative impacts of IA, such as physiological problems, are not

yet fully understood and may not be attributable to the phenomenon. A sample of comments from the Delphi panel follows:

"I think that we should include abuse which is abnormal or improper use of Internet. Harmful use should include behavioural, mental or spiritual perversion."

"If you use this definition, you have to prove what kind of physiological disorder (agreed with psychological one) the IA cause, like brain malfunction or other issues. Secondly, what 'harm' means to the addicted person, whether he or she should realise the adverse effect on his/her actual life or not."

"I think it should add the words "preoccupy and seek the way to use the Internet."

"IA is slightly different from substance dependence. The Internet is used in daily life worldwide for several purposes including work, communication and education. The Internet is a medium of communication between people in a technology world. It becomes important in people's lives. However, it is difficult to classify how much is too much. An amount of time using the Internet is only one criterion for IA. The purposes of Internet use and online activities should be included in the addiction criteria. In addition, negative consequences of Internet use must be major criteria of addiction."

"The definition of IA should cover three main criteria of substance dependence: preoccupied with Internet use; loss of control; and function impairments."

"IA is a behaviour that consumes more than three hours per day. Usually, the player feels happy and satisfied in their world, but this behaviour affects the user physically, mentally, socially, spiritually. The addiction comes when the user needs more and more."

"IA is a psychosocial disorder that an excessive non–essential use of the Internet that causes harm to its user and others or the community in any way such as psychological, physical, social or other important functioning impairment."

Regarding respondents' opinions, the spiritual dimension as a potential negative consequence of IA might be more about the moral grounding a religion can provide for some people, whereas for others their moral code comes from other sources not immediately clear. The researcher reviewed these various comments, finding them useful in developing a more comprehensive definition which provided clinical and practical utility. Therefore, the revised definition of IA became: *"Repetitive Internet use leading to abnormal use which causes negative consequences to its users or others of*

the community in any way such as psychological, physiological, behavioural, sociological or other important functioning impairments.

The above revised operational definition became the focus of the Delphi Technique's second round. The Delphi panel was invited to give individual opinions about the revised consensus definition of IA; the suggested diagnostic criteria; and the suggested strategies for minimisation of harm. The results showed that 95.45 % of respondents agreed with the revised operational definition. However, a few respondents argued that the term 'obsessive' might make more sense than 'repetitive' Internet use. In addition, some of the Delphi panel pointed out that abnormal use is an unnecessary part of this definition, as the negative consequences caused by repetitive use represents an adequate explanation for abnormal use. A review of the term obsessive in the Collins English Dictionary (obsessive, n.d.; repetitive, n.d.) showed that the term 'obsessive' was identified as a subjective, mental health diagnostic term whereas 'repetitive' was identified as objective with respect to observable behaviour. Repetitive behaviour may not lead to abnormal use (e.g., someone who checks their emails regularly may not qualify for abnormal use if dealing with a rapidly changing market, for instance). Therefore, the word repetitive was retained for the final IA definition used in this study.

All experts (100%) of the Delphi panel agreed on the definition of IA provided in the final round of the Delphi Technique and had no further suggestions. Therefore, Internet addiction (IA) is defined as: *"Repetitive Internet use leading to abnormal behaviour which causes negative consequences to its users or others in the community in any way, such as psychological, physiological, behavioural, sociological or other important functional impairments"*.

Diagnostic criteria of IA.

In addition to the development of a consensus definition of IA, the modified Delphi Technique was also used to develop a consensus for proposed, clinically applicable, diagnostic criteria of IA. In response to the round one (R1) questionnaire, all experts on the Delphi panel suggested that a set of diagnostic criteria should be developed based on the definition of addiction. Therefore, 26 diagnostic criteria were proposed stemming from the Delphi panel. These can be summarised under five theme headings: Internet use; loss of control; lying or devious behaviours; neglect of other duties; and negative consequences (see Table 4.1).

Table 4.1
Diagnostic criteria of IA proposed from Round 1

Emergent Themes	Criteria
Internet Use	Number of hours using the Internet use the Internet more than three hours a day increased amount of time using the Internet Frequency of use use the Internet everyday use the Internet every free time Purposes of use leading to IA use the Internet for entertainment/fun use the Internet fulfil unmet needs use the Internet to escape from other problems use the Internet to get money Online-activities causing IA chatting gaming gambling emailing instant messaging watching online TV
Loss of Control	Inability to control, decrease or stop use of the Internet Behavioural changes, e.g., aggressive Thinking or acting out of reality or unable to recognise the differences between the virtual world and real life
Lying or Hiding Behaviours	Lying about or hiding the amount of time spent on the Internet or activities engaged in while staying online
Neglect of Other Duties	Internet become a priority in its users' lives Neglect of other activities such as homework, sport, or social activities due to spent too much time online School absences noticeable
Negative Consequences	Having physical health problems, e.g., back pain, eye soreness, or weight gain Having psychological symptoms, e.g., restlessness, anxiety, short attention span, or depression Having relationship problems with family members, friends, teachers, or others Having academic problems, e.g., school absences, poor grades, or low performance Having behavioural problems, e.g., aggressiveness, isolation, sleep deprivation, skipping meals or exercise, etc.

In the round two (R2) Delphi activity, the Delphi panels were asked to rate each of the 26 identified diagnostic criteria for their importance in the development of a clinical diagnostic scheme. The consolidated criteria were evaluated for usefulness using a 4-point Likert scale, with 1 being a numerical value identified as 'least useful' and 4 identified as 'most useful'. Thus a lower score closer to 1 represents a criterion considered by the Delphi panel to be least useful; while a higher score closer to three or

four represents criteria the Delphi panel considered most useful. Table 4.2 shows the ten highest scoring criteria ranked by usefulness.

Table 4.2
Usefulness of the diagnostic criteria consolidated from Round 2

Rank	Score	Criteria
1	3.91	Neglect other activities such as homework, sport, or social activities due to spending too much time online
1	3.91	Relationship problems with family members, friends, teachers, or others
3	3.82	Academic problems, e.g., school absences, poor grades, low performance, failing at school, having difficulties when performing easy tasks
4	3.77	Inability to control, decrease or stop use of the Internet
5	3.73	Behavioural problems, e.g., aggressiveness, isolation, sleep deprivation, skipping meals or exercise, etc.
6	3.68	Behavioural changes such as acting aggressively, yelling, swearing and unprovoked bad behaviour when not able to use the Internet or when asked to log-off
7	3.64	Lying about or hiding the amount of time spent on the Internet or similar activities while staying online
7	3.64	Psychological symptoms, e.g., restlessness, anxiety, short attention span, depression, agitated, etc.
9	3.59	Internet becomes a priority in the user's life
9	3.59	School absences are noticeable
11	3.36	Physical health problems, e.g., back pain, eye soreness, hand corns, weight gain, weight loss, dehydration, etc.
12	3.18	Gaming causing IA
12	3.18	Increased amount of time on Internet use
12	3.18	Thinking or acting out of reality or unable to recognise the differences between the virtual world and real life
15	3.05	Use of the Internet on every free time
15	3.05	Using the Internet as an escape from other problems
17	2.91	Use of the Internet for more than three hours a day
18	2.86	Engaging with the Internet every day
19	2.82	Chatting incessantly causing IA
20	2.59	Fulfilling unmet needs by Internet use
21	2.55	Using the Internet for entertainment/fun
22	2.45	Gambling obsessively causing IA
23	2.09	Watching online TV continuously, resulting in IA
24	2.05	Instant messaging being the cause of IA
25	1.86	Emailing causing IA
26	1.82	Using the Internet to solicit (obtain) money

In the final round (R3) of the Delphi Technique, the 26 criteria, ranked according to usefulness, were returned to the Delphi panel and asking them to justify the practical use of these criteria for identifying IA. These criteria were consolidated from the Delphi panel's views and the final 10 diagnostic items emerged:

1. Neglecting other activities, e.g., homework, sports, or social activities to spent time on the Internet;
2. Having relationship problems with family members, friends, or others;
3. Having academic problems, e.g., school absences, poor grades, low performance due to Internet use;
4. Being unable to control, decrease or stop use of the Internet;
5. Changing behaviour negatively, e.g., acting aggressively, yelling, swearing and unprovoked bad temper, isolation, sleep deprivation, skipping meals and exercise;
6. Lying about or hiding the amount of time spent on the Internet, or other online activities;
7. Exhibiting psychological symptoms, e.g., restlessness, anxiety, short attention span, depression, agitation;
8. Exhibiting physical health problems, e.g., back pain, eye strain, hand corns, weight gain, weight loss, or dehydration;
9. Increasing the time of Internet use; and
10. Making Internet use a priority in the user's life.

The Delphi panel agreed that individuals meeting a minimum of 7 of 10 the highest ranked criteria would be considered addictive. Thus a 70% (7/10 = 70%) of IA score or higher would be considered IA for this study. It should be noted that the cut off point for IA agreed to by the Delphi panel (70%) is higher than the cut off point for pathological gambling (42%) and substance dependence (43%), while, the agreed cut off point of 70% is similar to the cut off point for television addiction (71%).

Strategies for minimising impacts of IA.

In each round of the modified Delphi Technique, the Delphi panel was asked to identify various intervention strategies they had used in their daily practice for addressing IA. All experts of the Delphi panel agreed that strategies for minimising negative impacts caused by IA are needed in Thai society and suggested 31 in all in the first round. These were consolidated by the researcher into six themes: Knowledge; Equipment; Support; Alternative Activities, Regulation; and Alertness (see Table 4.3).

Table 4.3
Strategies for minimising impacts caused by IA consolidated from Round 1

Emergent Themes	**Strategies**
Knowledge *Education program*	Educate parents/family about the possible negative impacts of Internet use Raise public awareness of the negative consequences of Internet over-use Create partnerships with law enforcement agencies, school, and community Provide school programs to promote healthy Internet use
Equipment *Monitoring, screening and blocking*	Set and protect passwords Use up-to-date anti-virus software, anti-spyware software, and firewall Use filters to block unwelcome content Use a filter to screen offensive content Use a filter to monitor user's Internet activities
Support *Support and supervise*	Children to learn good habits of Internet use from an early age Parents and children to set and abide by rules about appropriate Internet use Parents ensure children understand the correctness of Internet use Parental discussion and review of the rules regularly to ensure children are competent enough to use the Internet creatively Parents stay in touch with what children are doing online Parents discuss and share Internet experiences with children regularly Home computers should be located in family areas thereby ensuring children use the Internet openly Parents must be a good role models for their children Counselling and therapy should be available when needed or mandated
Alternative Activities	Public spaces for social and physical activities should be provided in community Other creative activities, e.g., sport, art, or music should be promoted to Internet users Children should be encouraged to participate in religious activities Children should be assigned to household chores depending on their abilities
Regulation Regulation and law	The law/regulation regarding Internet use by young people should be strictly applied especially when used in such places as Internet cafes and game shops Internet business policy should be made to cover game limitation, and strict control of the number of Internet cafes and game shops The law should include punishment for any owners of Internet cafes or game shops who do not cooperate
Alertness Alert and awareness	Parents and teachers should take heed of any changes in user behaviour, especially if related to online activity Illegal activities must be reported Call for help or call the police should danger or risk becomes obvious

In the R2 of the Delphi Technique, the Delphi panel was asked to rate each of the identified intervention strategies in relation to their usefulness by scoring each strategy on a 4-point Likert scale, with a scores of 1 identifying the 'least useful', and 4 the 'most useful'. The responses from this round were summarised, enabling the ten most useful strategies to be ranked (see Table 4.4).

Table 4.4
Usefulness of strategies for minimising impacts of IA consolidated from Round 2

Ranking	Rating	Strategies
1	3.68	Educate parents and family about the possible negative impacts of Internet use
1	3.68	Children should learn the good habits of Internet use from an early age
3	3.59	Parental discussion and review of the rules regularly to ensure children are able to use the Internet creatively
3	3.59	Parents discuss and share Internet experiences with children regularly
3	3.59	Parents must be a good role models for their children
3	3.59	Other creative activities, e.g., sport, art, or music should be promoted to Internet users
7	3.55	Children should be assigned to household chores depending on their abilities
7	3.55	Counselling and therapy should be available when needed or mandated
7	3.55	Children should be encouraged to think carefully and critically about their Internet use
7	3.55	Raise public awareness of the negative consequences of Internet over-use
7	3.55	Parents and teachers should take careful note of any changes in user behaviour, especially if related to online activity
12	3.50	Illegal activities must be reported
12	3.50	Advise parents and family about deviant Internet use so they can be more aware when problems occur
12	3.50	Home computers should be located in family areas so ensuring children use the Internet openly
15	3.45	Public spaces for social and physical activities should be provided in community
15	3.45	Parents and children to set and abide by rules about appropriate Internet use
15	3.45	Parents and children should be more aware of the risks associated with Internet use
18	3.41	Provide school programs to promote healthy Internet use
18	3.41	The law/regulation regarding Internet use by young people should be strictly applied especially when used in such places as Internet cafes and game shops
20	3.36	Create partnerships between law enforcement agencies, school, and community
20	3.36	Children should be encouraged to participate in religious activities
20	3.36	Parents should find out more about the risk from using the Internet
23	3.32	The law should include punishment for any owners of Internet cafes or game shops who do not cooperate
24	3.23	Call for help or call the police should danger or risk be apparent
25	3.18	Parents stay in touch with what children are doing online
26	3.14	Internet business policy should be made to cover game limitation, and strictly control the number of Internet cafes and game shops
27	2.86	Use filter to monitor user activities
28	2.59	Set and protect passwords
28	2.59	Use filters to screen offensive content
30	2.45	Use filters to block unwelcome content
31	2.05	Use updated anti-virus software, anti-spyware software, and firewalls

The results of the ranking of the usefulness of the intervention strategies from R2 were sent to the Delphi panel asking them to review the amended definition of IA and then asked them to select the strategies they considered most 'effective' in their professional experience. No limit was placed on the number of strategies the Delphi panel could nominate. A review of the results of R2 generated types of intervention strategies: family, school and community. These three strategies are discussed below.

Family strategies.

Family strategies, which include individual and parental actions, were identified as the most important mechanism helpful in minimising the negative impacts caused by IA among secondary school students. For example, the Delphi panel suggested that rules of Internet use should be set by parents and reviewed regularly by parents and their children together. Parents should discuss and share Internet experiences regularly with their children and educate themselves about the possible risks caused by Internet use. In addition, the Delphi panel suggested that parents be good role models for their children; that is, adhering themselves to any rules set up in the home for Internet use. Moreover, parents should monitor their children, taking note of any changes in behaviour, especially if related to online activity. In addition, the Delphi panel suggested that education programs for parents about possible IA, incorporating these suggested components, are essential. Finally, the Delphi panel suggested that home computers should be located in family areas to ensure that children can be supervised when using the Internet and computer software, e.g., filter, anti-virus, anti-spyware, and firewalls should be installed in home computers for screening or blocking offensive or unwelcome content.

School strategies.

School actions were also recommended to ameliorate the problem. For example, the Delphi panel suggested that educational Internet use programs be provided in schools to educate students about online use. School programs should also support the use of the Internet from an early age to prepare pupils for the possible negative consequences of its use. Teachers should be taught to recognise and respond to any changes in student behaviour, especially if related to online activity.

Community strategies.

Community actions were also highly recommended for minimising harm caused by IA. For example, educational programs about Internet use should be provided to the public in each community to train parents and teachers to recognise and respond to problems from Internet over-use. In addition, appropriate stemming alternatives for social and physical activities should be provided in the community together with other creative activities as options to combat IA. The latter might include sport, art, or music and should receive widespread promotion, especially to Internet users.

Partnerships should be established between law enforcement agencies, schools, and communities to encourage a coordinated response to IA. Public awareness of the negative consequences of the Internet over-use should be raised. Appropriate access to the police should be encouraged if danger or risk occurs and illegal activities should be reported. Counselling and therapy should be available when needed or mandated. Furthermore, the Delphi panel recommended that laws and regulations regarding Internet use by young people should be established and strictly applied, especially when used in such places as Internet cafes and game shops. These regulations should incorporate terms of punishment for shop owners who do not cooperate. Internet business policy should be conceived to limit access to some sites and to strictly control the number of Internet cafes and game shops. In addition, the Thai government should take this problem seriously by mandating that all organisations or stakeholders take action together and consider this matter as a national social problem. Each local authority, especially sub-district administrations, should allocate a budget for the investigation and supervision of computer over-use and its causes, especially if a connection with IA is detected.

Summary.

A consensus definition of IA, diagnostic criteria, and suggested strategies for their minimisation were derived from the implementation of three rounds of the modified Delphi Technique of 22 Thai experts in the fields of addiction. The findings of the Delphi Technique informed the development and application of an online survey of 1,200 students in secondary schools in Chiang Mai, Thailand. The consensus definition and intervention strategies were also used in the development of an in-depth interview instrument conducted with a sub-set of survey respondents from the main research activity.

IA from the Student's Perspective

An online survey and in-depth interviews of secondary school students in Chiang Mai, Thailand were designed to collect data about Internet use and its impacts from the students' perspective for the following research questions:

1. What is the current prevalence of IA among secondary school students aged from 11 to 19-years-old in Chiang Mai, Thailand?
2. What are the important factors that may influence IA among secondary school students aged from 11 to 19-years-old in Chiang Mai, Thailand?
3. What are the impacts of IA among secondary school students aged from 11 to 19-years-old in Chiang Mai, Thailand?
4. What strategies are required for harm minimisation to address IA in a Thai context?

The following data were derived from the online survey and in-depth interviews completed by secondary school students from Chiang Mai, Thailand. The survey was designed to collect data responding to the above research questions and to obtain data on issues and questions that could be further explored in the in-depth interviews with a small number of students. Initially, 1,200 students were recruited to participate in the online survey. A total of 957 returned completed surveys for a response rate of 80%. However, five surveys were not used due to unreasonable answers; thus 952 completed questionnaires were analysed.

A large majority of survey respondents (77.5%) showed interest in participating in an individual, in-depth interview regarding Internet use and its impact. The structured in-depth interviews were conducted based on the findings of the online survey. Thirty students who previously responded to the online survey questionnaire and had volunteered to participate in the interview about Internet use were selected as a convenience sample. The reasons for selecting a student for interview included evidence from the survey, especially the small open ended section, that additional valuable, relevant data might be elicited. A suitable spread from among the sample populations represented by the research cohort was needed. This sub-cohort of 30 interviewees was deemed to represent the research cohort of secondary school students in Chiang Mai. Of the cohort, 16 were male and 14 were female.

Demographic data, prevalence of IA, factors influencing Internet use, impacts of Internet use, and intervention strategies for minimising harm caused by Internet use are presented in the following sections.

Demographic data.

The survey collected demographic data, including age, gender, level of education, major of education, type of school, and educational area as presented in Table 4.5. The median age of respondents was *M* = 15.04 years of age. The respondents divided almost equally on gender representation with approximately half being male (50.60%) and female (49.40%), thereby limiting one possible area of bias. The greatest number of responses to the survey was received from students in Year 9 and Year 12 with 24.70% and 23.90% of responses respectively. The majority of survey respondents (42%) were studying Science, a minority of students (9.20%) were studying the Arts, and 24.90% were classified as studying "other," which included subjects such as computers, sport, agriculture and accounting. The majority of respondents (79.60%) studied in public schools, whereas the remainder (20.40%) studied in private schools. In Thailand, the majority of students attend public schools. One thousand two hundred students were recruited for the study from all secondary schools - 200 from the two private schools and 800 from the remaining public schools. The public school sector is divided into five educational areas for administrative purposes. Of the 763 respondents from the public sector, Chiang Mai (CM) educational area 2 provided the majority of respondents (26 %), followed by CM educational area 4 and 5 (21.40% and 20% respectively).

Table 4.5
Demographic data

Demographic data	N	%
Age		
11-years-old	5	0.50
12-years-old	53	5.70
13-years-old	117	12.30
14-years-old	225	23.60
15-years-old	159	16.70
16-years-old	146	15.30
17-years-old	217	22.80
18-years-old	28	2.90
19-years-old	2	0.20
Gender		
Male	482	50.60
Female	470	49.40
Educational level		
Mattayomsuksa 1 (Year 7)	78	8.20
Mattayomsuksa 2 (Year 8)	123	12.90
Mattayomsuksa 3 (Year 9)	235	24.70
Mattayomsuksa 4 (Year 10)	148	15.60
Mattayomsuksa 5 (Year 11)	140	14.70
Mattayomsuksa 6 (Year 12)	228	23.90
Educational major		
Arts	88	9.20
Language	96	10.10
Mathematics	129	13.60
Science	402	42.20
Others	237	24.90
School type		
Private	194	20.40
Public	758	79.60
Education area of public sector		
CM area 1	123	16.20
CM area 2	197	26.00
CM area 3	124	16.40
CM area 4	162	21.40
CM area 5	152	20.00

Prevalence of IA.

The IA scale developed for this study was based on the 10 diagnostic criteria of IA derived from the Delphi components of this study. The three rounds of the Delphi Technique resulted in the Delphi panel agreeing that a consensus cut off point for IA should be 70%.

The IA scale used in this study comprised 20 questions derived from the 10 diagnostic criteria identified in the Delphi Technique:

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

20. How often do you use the Internet to escape from other problems in your life?

The respondents were asked to answer the questions in terms of how often they did or did not perform the activity by rating their use on a 5-point Likert scale. The Likert categories were: *Never* = 1, *Rarely* = 2, *Occasionally* = 3, *Often* = 4, and *Always* = 5. Each response was added together for a total score ranging from 20 to 100 points. Total score was obtained by adding the Likert values (e.g., 1, 2, 3, 4, or 5) indicated for each questionnaire item, or a summated scale (Clasen & Dormody, 1994). This study distinguished addictive Internet use from normal use by using a cut off point of 70% higher total IA score.

Classification of IA.

As can be seen in Figure 4.1, the vast majority of student respondents (n = 917/96.3%) were classified as normal Internet users, whereas 3.7% (n = 35) of Thai student respondents were classified as addictive Internet users using the 70% cut off criteria.

The survey results show that the overall median IA score of the respondents was 37. When comparing Internet addictive users to normal users, the data show that Internet addictive users had significantly higher median IA scores than normal Internet users (*Mdn* = 75.00 versus *Mdn* = 36.00, respectively), $U = .000$, $z = -10.55$, $p < 0.01$.

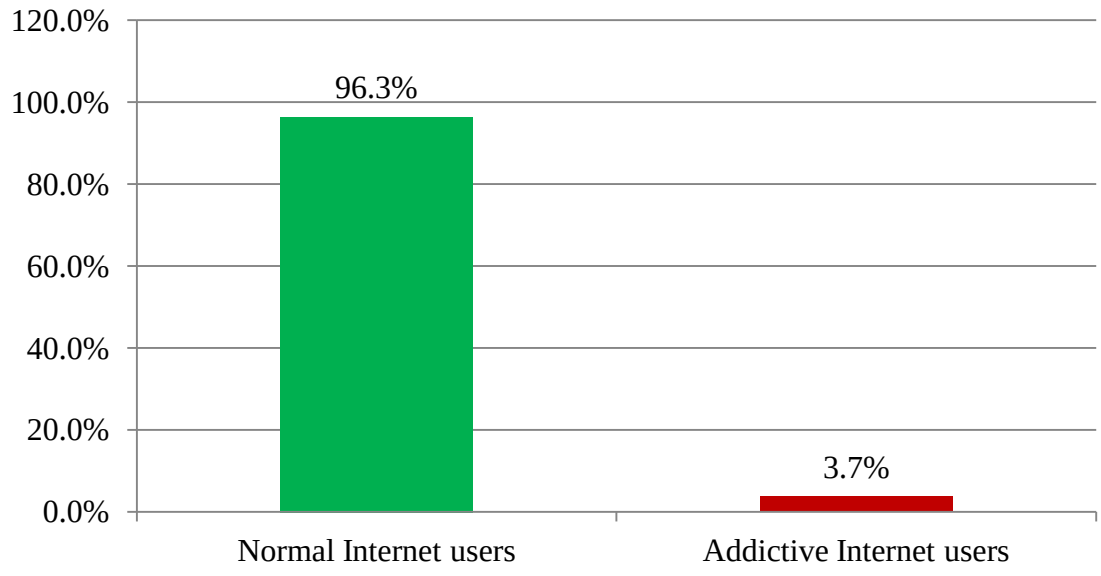

Figure 4.1. Types of Internet users classified by a total IA score using the 70% cut off criteria.

If a lower cut off point for addiction is used (e.g., as in the cut off of 43% for substance dependence and 42% for pathological gambling), a higher rate of IA is found in this group of survey respondents. When using a cut off point of 40%, 39.5% (n = 376) of the respondents could be classified as addicted, whereas 60.5% (n = 576) were classified as normal Internet users (see Figure 4.2).

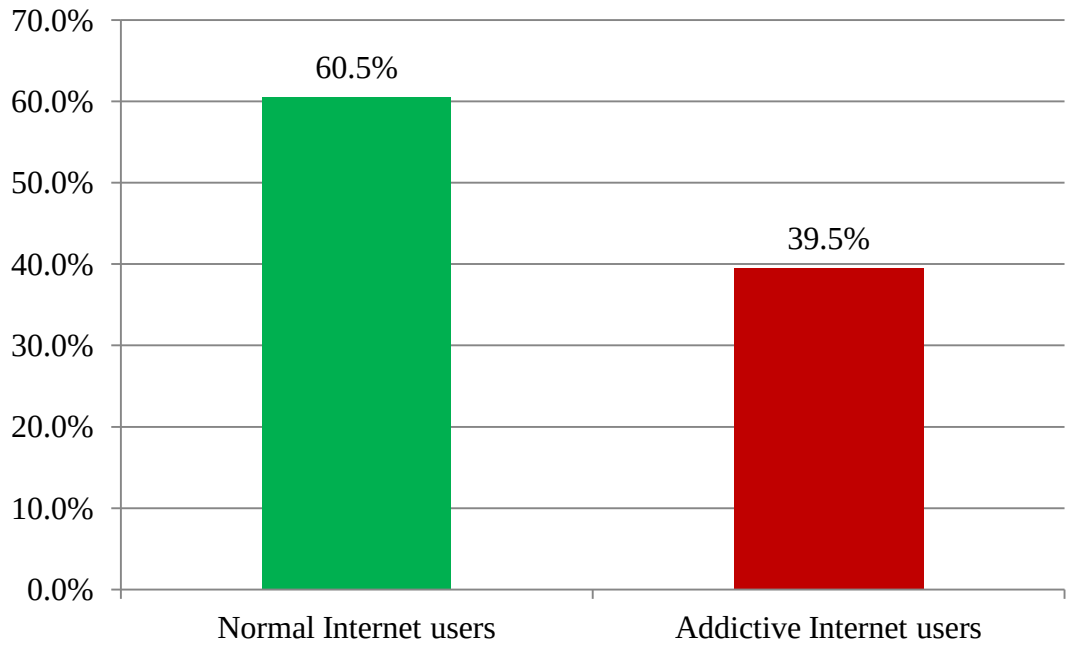

Figure 4.2. Types of Internet users classified by a total IA score using the 40% cut off criteria.

This study found that gender influences IA in that total IA scores of male students (*Mdn* = 37.00) were significantly higher than for female students (*Mdn* = 33.00), U = 97,689, z = -3.68, $p < 0.01$) (see Table 4.6). In relation to family factors, students from private schools (*Mdn* = 45.50) had significantly higher IA scores than public schools students (*Mdn* = 32.00), U = 38,190, z = -10.34, $p < 0.01$.

Table 4.6
Relationship between IA score and factors

Factors	N	Mann-Whitney U Test			
		Median	*U*	*z* score	*P* value
Internet use types			.000	-10.055	.000*
Addictive users	35	75.00			
Normal users	917	36.00			
Types of School			38,190	-10.34	.000*
Private	194	45.50			
Public	758	32.00			
Gender			97,689	-3.67	.00*
Male	482	37.00			
Female	470	33.00			
Internet access at home			29,141	-10.69	.000*
Yes	431	43.00			
No	262	32.00			
Companion while using the Internet			89,906	-4.94	.000*
Yes	549	35.00			
No	403	40.00			
		Kruskal Wallis Test			
		Median	H	df	*P* value
Experience of the Internet use			31.09	3	.000*
< 6 months	68	33.50			
6 months - 2 years	222	34.00			
2 years - 5 years	343	36.00			
> 5 years	319	41.00			

**P < 0.01*

Moreover, IA scores of students who had Internet access at home (*Mdn* = 43.00) were significantly higher than students who did not (*Mdn* = 32.00), *U* = 29,141, *z* = -10.69, *p* < 0.01. In terms of parental supervision, students who used the Internet alone (*Mdn* = 40.00) had significantly higher IA scores than students who had companions in the room while using the Internet (*Mdn* = 35.00), *U* = 89,906, *z* = -4.94, *p* < 0.01, (see Table 4.6). Furthermore, IA scores were significantly affected by previous experience in using the Internet, *H* (3) = 31.09, *p* < 0.01, in that students who had more than five years experience using the Internet had the highest IA scores (*Mdn* = 41), whereas students who had less than six months experience of using the Internet had the lowest score (*Mdn* = 33.50). The data show that male gender, higher socioeconomic status (SES) as represented by attendance at a private school, and Internet access at home were the most highly associated factors with IA. In addition, experience with Internet use was an important factor in predicting IA. Using the Internet alone has also been found to influence IA among these students.

Specific factors that may influence Internet use.

As discussed in the literature review, specific factors that may influence Internet use, including: personal factors; Internet factors; family factors; and peer factors. This section discusses the findings from the survey phase along with the findings from the in-depth interviews where relevant.

Personal factors.

Gender.

The respondents divided almost equally on gender representation, approximately half being male (n = 482/50.60%) and female (n = 470/49.40%), thereby limiting one possible area of bias. Figure 4.3 shows that male students have been categorised as addictive Internet users significantly more than female students (4.8% (n = 23) and 2.3% (n = 11) respectively, $p < 0.05$).

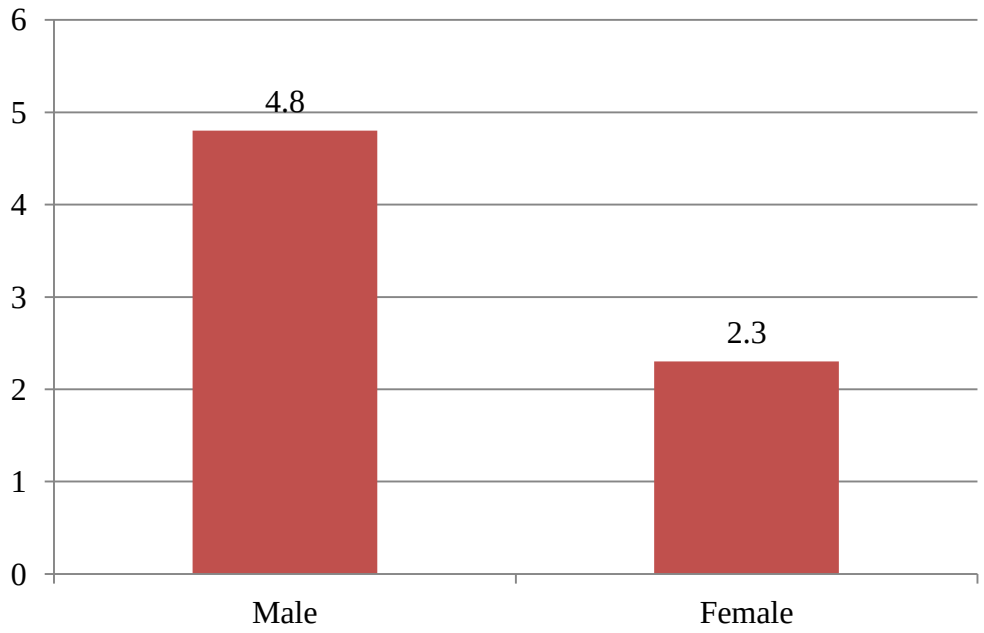

Figure 4.3 Addictive Internet users (%) categorised by gender.

Age.

Figure 4.4 shows that the highest percentage of addictive Internet users (n = 9/5.7%) was found to be in the group of students aged 15-years-old, followed by the group of 17-year-olds (n = 8/3.7%), then the groups of 18-year-olds (n = 1/3.6%). However, there was no statistical difference between the age groups. As found in the literature, age seems to be a factor predicting IA, indicating that younger Internet users

were more likely to be addictive users (Leung, 2004; S. Yang & Tung, 2007). However, the results of this study did not show a statistical difference between age groups in relation to addictive Internet use. This is not clear from the data why no age difference were found in this group of students.

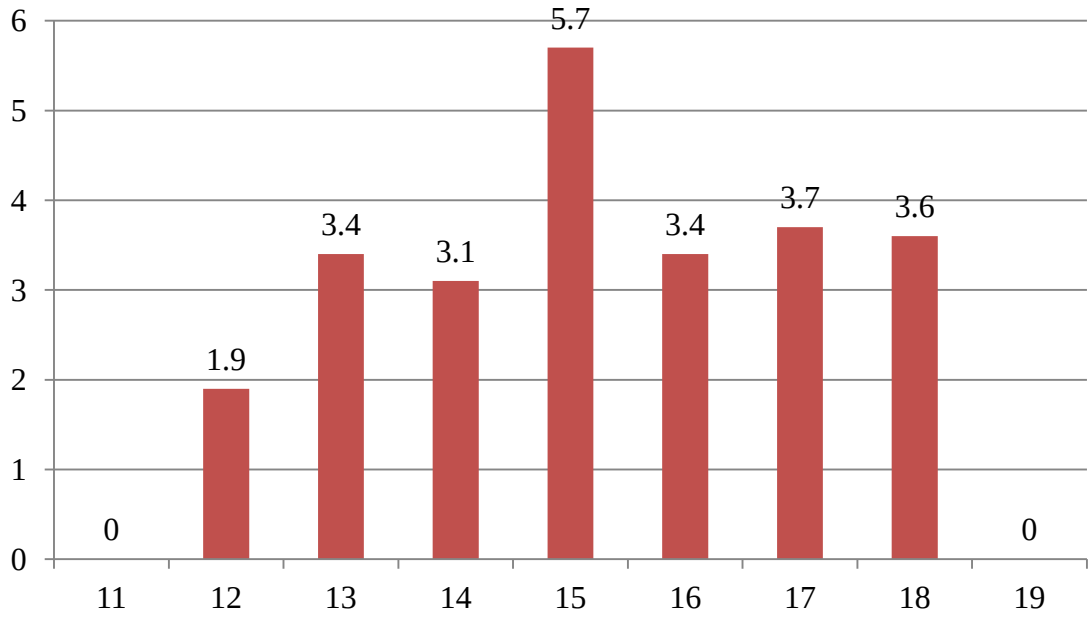

Figure 4.4. Addictive Internet users (%) categorised by age group.

Experience of Internet use.

Experience with Internet use can be seen as to be related to age in predicting IA (Young, 1996). The literature reports that new Internet users (using Internet for less than six months) were more likely to be classified as IA than more experienced users (using Internet for more than six months) (Young, 1996). This study found that addictive Internet use was significantly higher in students who had Internet experience for more than five years (n = 21/6.6%), whereas students who had Internet experience for less than six months had the lowest percentage (n = 1/1.5%) of IA ($\chi^2 = 12.73$, $p < 0.01$, see Figure 4.5). The findings of this study differed from those in the literature; thus more research is needed to examine the relationship between experience of Internet use and IA.

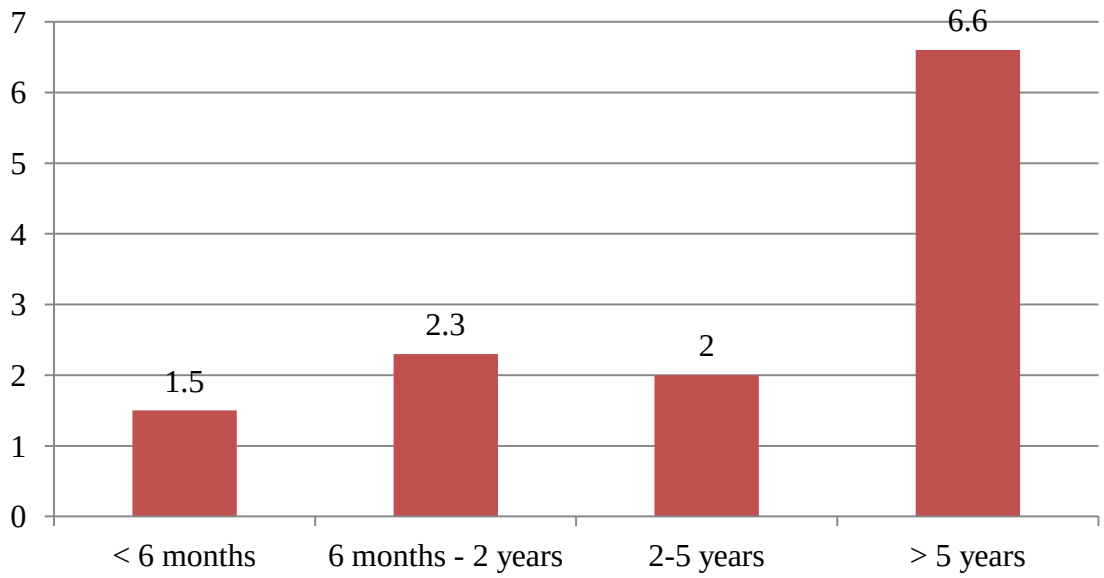

Figure 4.5. Addictive Internet users (%) categorised by experience of Internet use.

Internet factors.

Time spent on the Internet.

It has been found that the number of hours using the Internet could be an indicator of Internet over-use and/or IA (Chen & Chou, 1999; Chou & Hsiao, 2000; Young, 1996). For example, Young (1996) reported that Internet addicts spent 39 hours per week on the Internet, whereas non-addicts spent only five hours per week. Other studies reported that Internet addicts spent approximately 20 hours per week on the Internet, whereas non-addicts spent nine hours per week (Chen & Chou, 1999; Chou & Hsiao, 2000). The results from this study show that the time Thai secondary school students spent on the Internet ranged from 5 - 98 hours per week (*Mdn* = 16). The number of hours per week spent on the Internet reported by addictive Internet users (*Mdn* = 29.00) was significantly higher than normal users (*Mdn* = 16.00), U = 7,405, z = -5.43, $p < 0.01$, (see Figure 4.6). Thus this study seems to support the literature concerning the influence of the amount of time spent on the Internet as a significant factor influencing IA.

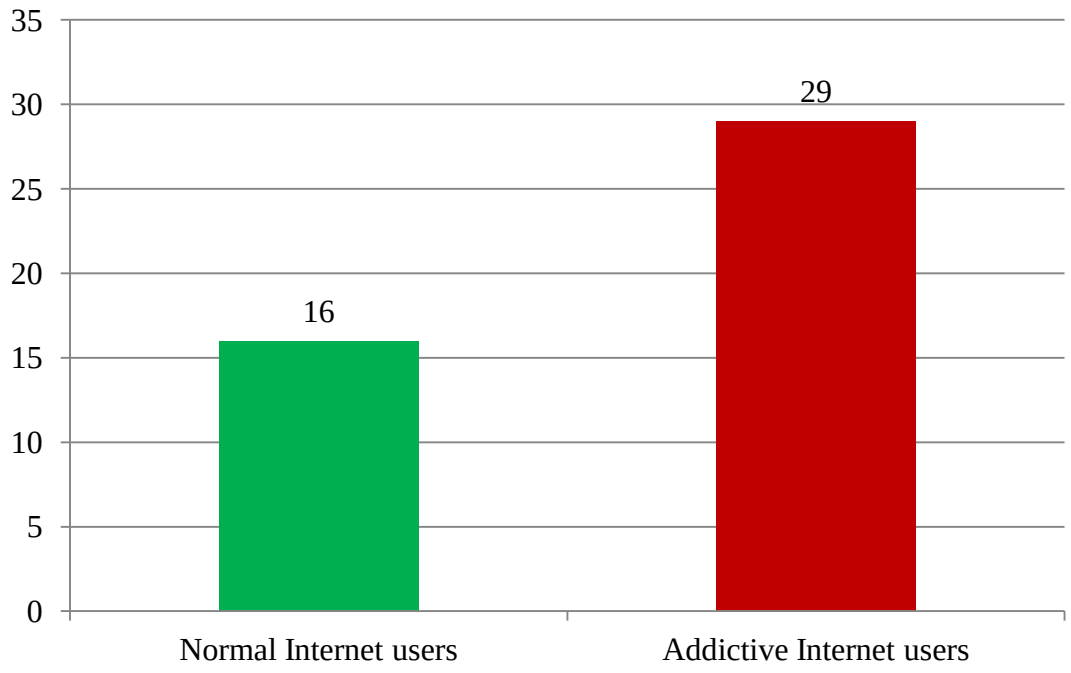

Figure 4.6. Number of hours per week spent on the Internet compared between addictive Internet users and normal users.

This study found gender differences in the amount of time spent on the Internet (see Table 4.7). The number of hours per week spent on the Internet by male students (*Mdn* = 19.00) was significantly higher than for female students (*Mdn* = 15.00), U = 90,421, z = -5.40, $p < 0.01$. In addition, the number of hours per week spent on the Internet was significantly associated with amount of prior experience in using the Internet (e.g., less than six months; more than six months), H (3) = 45.36, $p < 0.01$. Regarding the relationship between amount of time spent on the Internet and family factors, the data show that students from private schools (*Mdn* = 20.00) spent longer on the Internet than students from public schools (*Mdn* = 15.50), U = 54,567, z = -5.56, $p < 0.01$. In addition, students who had Internet access at home (*Mdn* = 20.00) spent significantly longer online than students who did not have Internet access at home (*Mdn* = 14.00), U = 31,585, z = -9.75, $p < 0.01$. Moreover, students who used the Internet alone (*Mdn* = 19) spent significantly longer online than students who had companions with them while using the Internet (*Mdn* = 15.00), U = 89,209, z = -5.12, $p < 0.01$. Thus being male and having more experience with the Internet were important factors associated with the amount of time spent on the Internet. In addition, family and related factors (e.g., private school students, having Internet access at home, and using Internet without supervision) were also important factors leading to spending more time on the Internet.

Table 4.7
Differences between groups of students on number of hours per week on the Internet

Factors	N	Mann-Whitney U Test			
		Median	*U*	*z* score	*P* value
Internet use types			7,405	-5.43	.000*
Addictive users	35	29.00			
Normal users	917	16.00			
Types of School			54,567	-5.56	.000*
Private	194	20.00			
Public	758	15.50			
Gender			90,421	-5.40	.000*
Male	482	19.00			
Female	470	15.00			
Internet access at home			31,585	-9.75	.000*
Yes	431	20.00			
No	262	14.00			
Companion while using the Internet			82,209	-5.12	.000*
Yes	549	15.00			
No	403	19.00			
		Kruskal Wallis Test			
		Median	H	df	*P* value
Experience of the Internet use			45.36	3	.000*
< 6 months	68	13.00			
6 months - 2 years	222	15.00			
2 years - 5 years	343	16.00			
> 5 years	319	19.00			

**0* P < 0.01*

Time of the day using the Internet.

The amount of time spent on the Internet and the time of the day that students go online appear to be factors influencing IA. Time of the day using the Internet was significantly related to the addictive Internet use, $\chi^2 = 30.22$, $p < 0.001$). Figure 4.7 shows the number of Internet addictive users by particular time of the day. IA was found to be significantly higher in students who use the Internet between 8:00 p.m. and 12:00 a.m. (10.7%), followed by those who use the Internet between 12:00 a.m. and 4:00 a.m. (7.7%), and between 12:00 p.m. and 4:00 p.m. (4%).

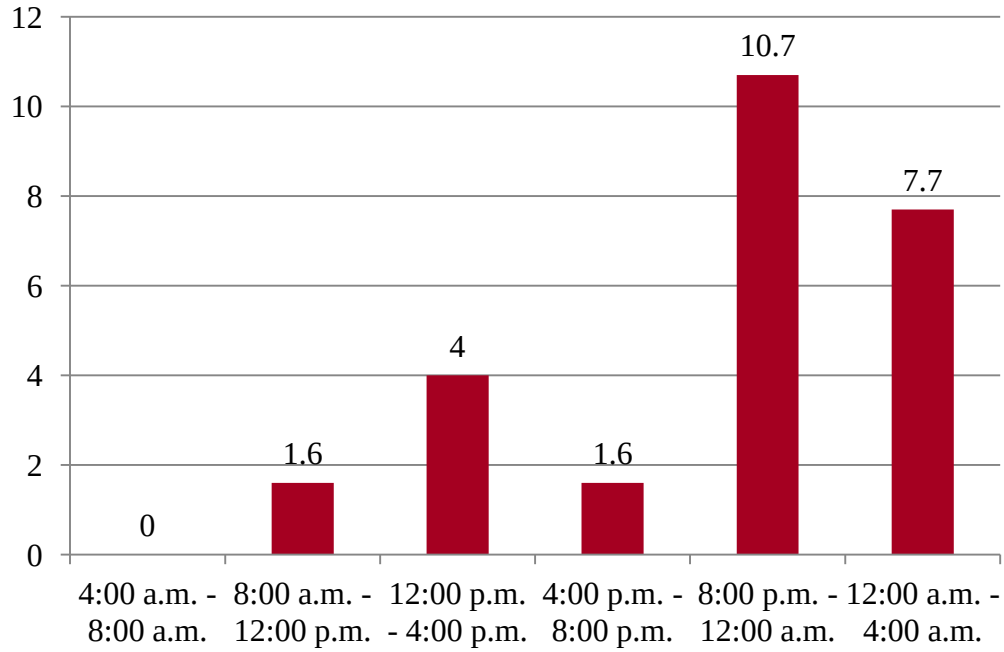

Figure 4.7. Addictive Internet users (%) categorised by time of the day using the Internet.

Internet use late at night.

The data from this study show that IA was found to be higher in students who used the Internet late at night (that is after 9:00 p.m.) compared to students who did not use the Internet late at night (that is, day and evening use but not after 9:00 p.m.) (8.5% and 1.5% respectively, $\chi^2 = 30.68$, $p < 0.001$) (see Figure 4.8).

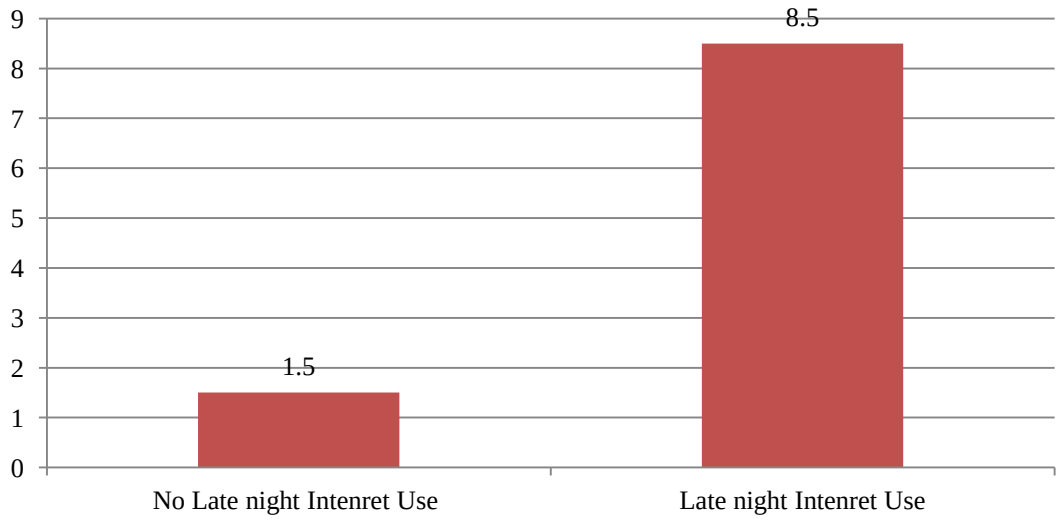

Figure 4.8. Addictive Internet users (%) categorised by late night Internet use.

Internet use on weekend.

The findings from the survey also showed that days of Internet use were found to be associated with IA. Figure 4.9 illustrates Internet users categorised by the use of Internet on weekends compared to use during weekdays. IA was found to be significantly higher among students who used the Internet on weekends than in students who only used the Internet on weekdays (4.7% and 1.3% respectively, $\chi^2 = 7.95$, $p < 0.01$). Although there is no literature evaluating time of the day of Internet use, or comparing weekend to weekday Internet use and IA, this study suggests that the time of the day (that is, late night and weekend Internet use) may be another factor that influences IA.

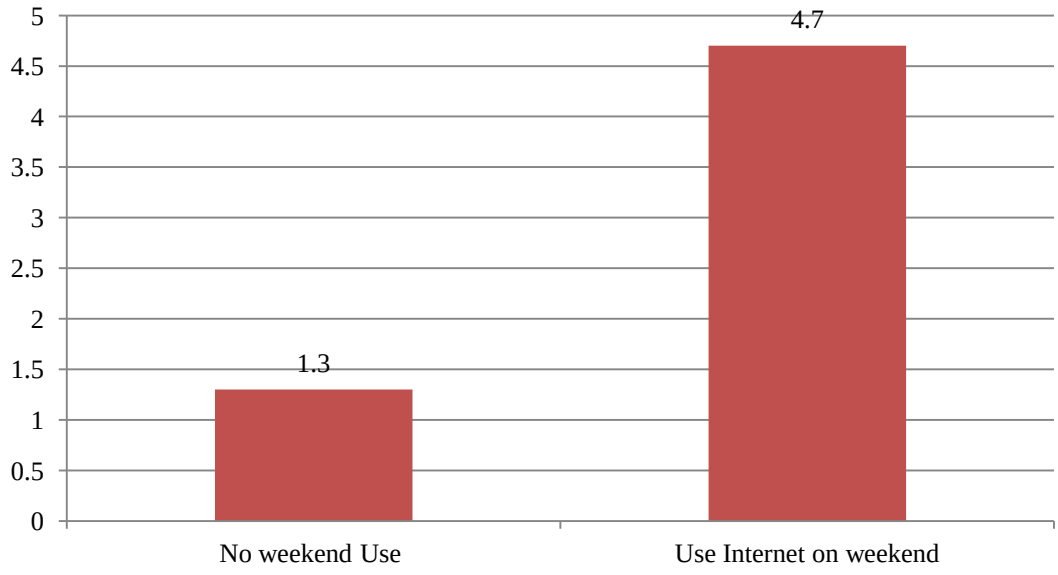

Figure 4.9. Addictive Internet users (%) categorised by weekend Internet use.

Internet activities

The types of activities that students engage in when using the Internet have been shown to be important influences on IA. The literature reported Internet addicts tended to use interactive applications, such as chat rooms or online games, whereas non-addicts use the information-gathering functions of the Internet (Chou, et al., 1999; Chou & Hsiao, 2000; Kandell, 1998; Young, 1998). The findings from this study identified the types of online activities students used when on the Internet (see Figure 4.10). The three most popular activities reported: surfing [Internet surfing is browsing the World Wide

Web without a specific goal in mind (Net surfing, n.d.)]; for personal interests (96.4%); surfing for school work (93.1%); and listening to music (82%).

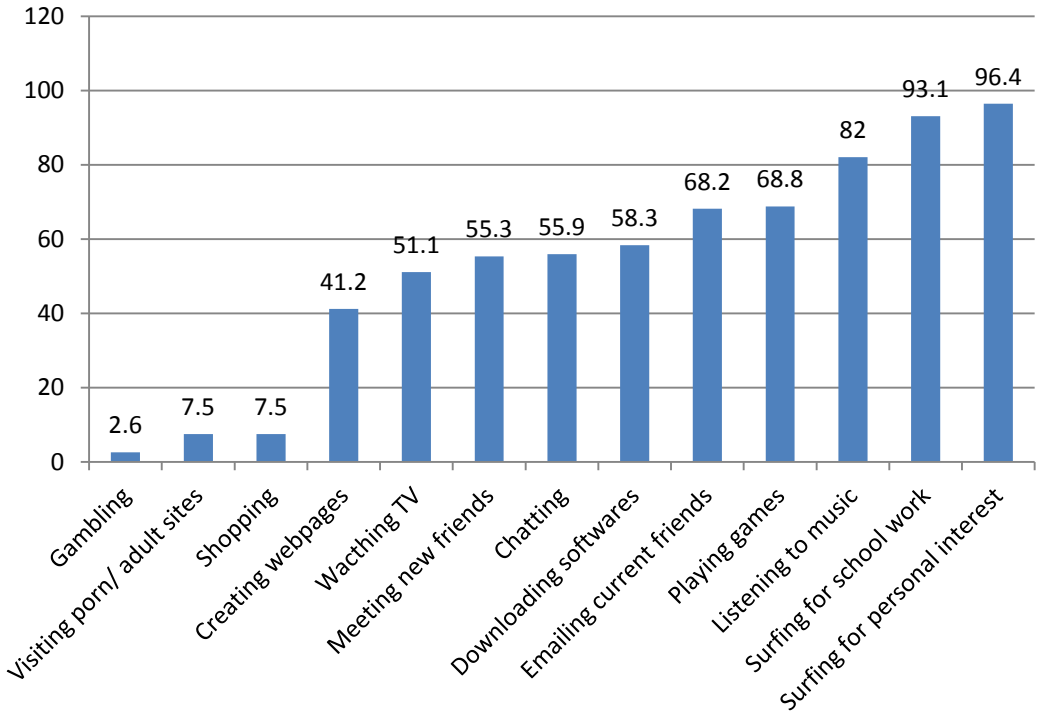

Figure 4.10. Internet activities (%) used by students.

Some Internet activities were associated with IA. Addictive Internet users were more likely to visit pornography/adult sites, participate in online gambling, and do online shopping (19.7%, 16%, and 12.7%, respectively (see Figure 4.11).

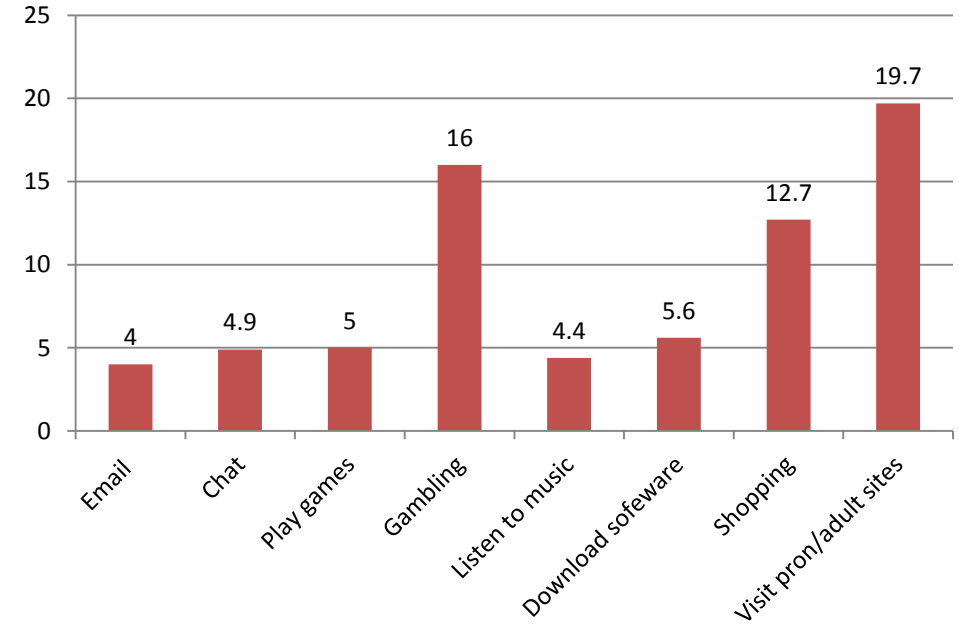

Figure 4.11. Addictive Internet users (%) categorised by online activities.

Moreover, the findings from the survey (see Table 4.8) show that students who used the Internet to visit porn/adult sites were classified as addictive users significantly more than students who did not visit porn/adult sites (19.7% and 2.4%, respectively, $\chi^2 = 55.75$, $p < 0.01$). Students who used the Internet for gambling were classified as addictive users significantly more than students who did not gamble (16% and 3.3%, respectively, $\chi^2 = 11.01$, $p < 0.01$). Students who used the Internet for shopping were classified as addictive users significantly more than students who did not shop online (12.7% and 3%, respectively, $\chi^2 = 17.55$, $p < 0.01$). Students who used the Internet for playing games were classified as addictive users significantly more than students who did not play games online (5% and 0.7%, respectively, $\chi^2 = 10.99$, $p < 0.01$). Students who used the Internet for chatting were classified as addictive users significantly more than students who did not use chat rooms (4.9% and 2.1%, respectively, $\chi^2 = 11.01$, $p < 0.05$). While gaming and chatting have been identified in the literature as contributing to IA, this study uniquely found that visiting pornography/adult sites, gambling and online shopping were also significantly associated with IA.

It seems that interactive activities on the Internet such as, visiting porn/adult sites, gambling, games, chatting and shopping are key factors that may influence addictive Internet use. The findings of the survey thus support the results from the literature. As mentioned above, it is assumed that particular interactive functions are conducive to the development of IA.

Table 4.8
Internet users and addictive users categorised by Internet activities

Internet Activities	All Users		Addictive users		Chi-Square Test		
	N	%	N	(%)	Value	df	*P*
Using an email					0.626	1	.429
No	303	31.83	9	3.0			
Yes	649	68.17	26	4.0			
Chatting					4.99	1	.025*
No	420	44.12	9	2.1			
Yes	532	55.88	26	4.9			
Creating webpage					3.82	1	.051
No	560	58.82	15	2.7			
Yes	392	41.18	20	5.1			
Searching for homework					3.05	1	.081
No	66	6.93	5	7.6			
Yes	886	93.07	30	3.4			
Searching for personal interest					2.63	1	.104
No	34	3.57	3	8.8			
Yes	918	96.43	32	3.5			
Playing games					10.99	1	.001**
No	297	31.20	2	0.7			
Yes	655	68.80	33	5.0			
Gambling					11.01	1	.001**
No	927	97.37	31	3.3			
Yes	25	2.63	4	16.0			
Watching TV					3.13	1	.077
No	466	48.95	12	2.6			
Yes	486	51.05	23	4.7			
Listening to music					5.63	1	.018*
No	171	17.96	1	0.6			
Yes	781	82.04	34	4.4			
Downloading software					13.7	1	.000**
No	397	41.70	4	1.0			
Yes	555	58.30	31	5.6			
Shopping					17.55	1	.000**
No	881	92.54	26	3.0			
Yes	71	7.46	9	12.7			
Visiting pornography/adult site					55.75	1	.000**
No	881	92.54	21	2.4			
Yes	71	7.46	14	19.7			
TOTAL	**952**	**100**	**35**	**100**			

* $P < 0.05$, ** $P < 0.01$

Family factors.

Using the Internet in the presence of others.

Steeves & Webster (2008) reported that parental supervision contributed to the protection of children's safety and the reduction of risky behaviours associated with Internet use. In this study, respondents were asked if they use the Internet in the presence of a companion, defined as anyone including a friend, parent, sibling, teacher, or other Internet users as in an Internet cafe. More than half of respondents (57.70%) indicated that they had company while using the Internet. The students identified the majority of the company when on the computer as friends (58.7%), followed by brother/sister/sibling (34.6%), mother (26.4%), or father (22%) (see Figure 4.12).

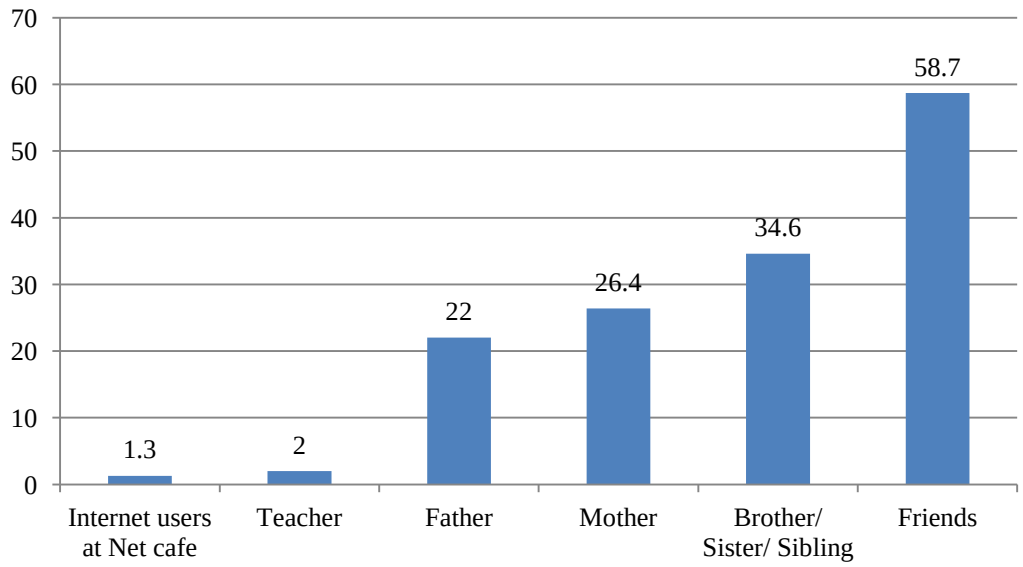

Figure 4.12. Companion (%) while using the Internet.

In this study, the results show that there was no difference in IA between students who use the Internet alone compared with students who use the Internet with a companion (4.2% and 3.1%, respectively, see Figure 4.13). This finding differed from those of the literature (Park, et al., 2008; Steeves & Webster, 2008). This may be explained by the fact that the types of companions which had an effect on IA were friends but not parents. Thus, impacts of using Internet with friends may differ when using the Internet supervised by parents. More research is required to examine the relationship between parents' supervision and IA.

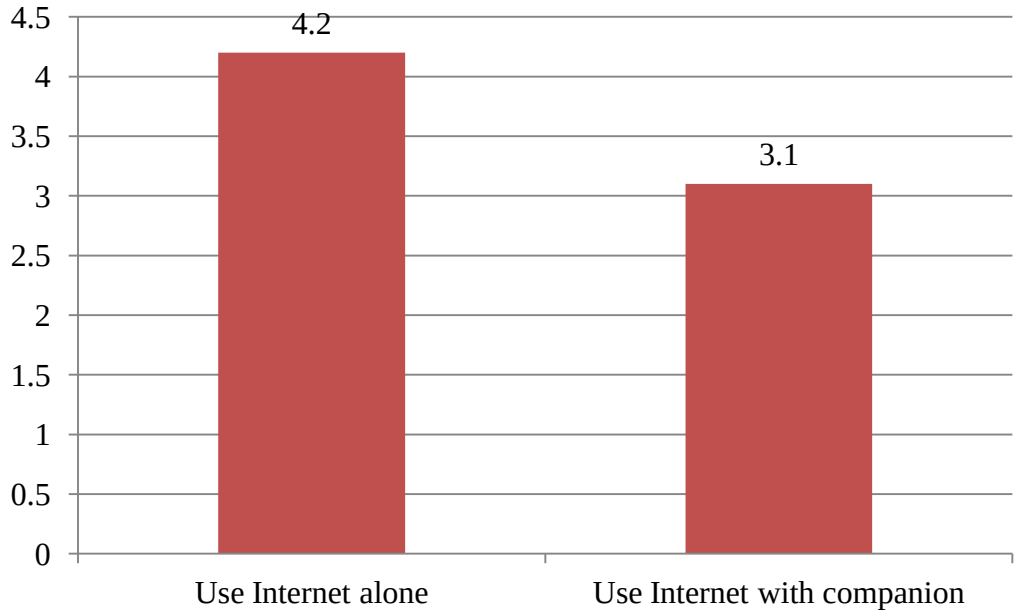

Figure 4.13. Addictive Internet users (%) categorised by companion types.

Computer and Internet access at home.

About 70% of respondents reported having a personal computer at home. Of those respondents having home computers, 60.73% reported they have Internet access via that home computer. This study found that IA was significantly higher in students who had Internet access at home than in students without this access (6.7% and 0.8% respectively, $\chi^2 = 22.8$, $p < 0.01$, see Figure 4.14).

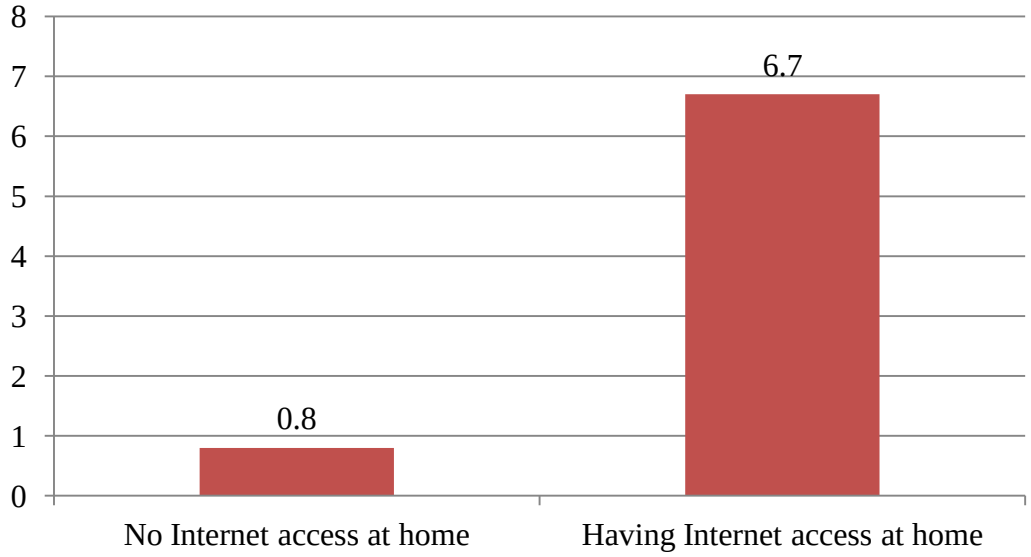

Figure 4.14. Addictive Internet users (%) categorised by Internet access at home.

Positive and negative impacts of Internet use.

Positive impacts of Internet use.

Many positive effects of computer and Internet use were reported by respondents (see Table 4.9). The three most frequently reported benefits of Internet use were: gaining knowledge (31.03%); helping to search for information of interest (25.07%); and relaxing (25.59%). Other research has shown that the Internet has become an invaluable tool for learning, teaching and research (Ojedokun & Owolabi, 2003) and for accessing global ideas/knowledge and sharing of information and ideas worldwide (Ehikhamenor, 2003).

Table 4.9
Positive impacts of Internet use

Positive impacts of Internet use	**%**
Gain knowledge	31.03
Help to search for information of interest	25.07
Relax	25.59
Update information	15.46
Assist with school work	14.94
Entertain	8.15
Communicate with others	6.58
Meet new friends	5.96

Negative impacts of Internet use.

Despite the benefits of Internet use, survey respondents also reported possible negative impacts of Internet use on student's life including: school problems, physical health problems and mental health problems (see Table 4.10). IA was significantly higher in students reporting school work, physical health, and/or mental health problems than in normal users (5.9 versus 1.5, $\chi^2 = 13.08$, $p < 0.001$; 4.5 versus 1.6, $\chi^2 = 4.42$, $p < 0.05$; or 5.3 versus 2.4, $\chi^2 = 5.48$, $p < 0.05$, respectively). These were similar to the findings reported in the literature, where IA users tended to have more academic, health and relationship problems than normal Internet users (Brenner, 1997; Chou & Hsiao, 2000; Lin & Tsai, 1999; Scherer, 1997; Young, 1998).

Table 4.10
IA categorised by negative impacts

Negative Impacts	N	Addictive user (%)	Chi-Square Test		
			Value	df	*P*
School impacts			13.08	1	.000**
No school impacts	476	1.5			
Had school impacts	476	5.9			
Physical health impacts			4.42	1	.036*
No physical impacts	256	1.6			
Had physical impacts	696	4.5			
Mental health impacts			5.48	1	.019*
No mental health impacts	537	2.4			
Had mental health impacts	415	5.3			

Physical health problems.

Respondents were asked about physical health problems attributed to Internet use and provided with a list of potential physical impacts derived from the literature that can result from Internet over-use. Students were asked to choose any physical problem they had experienced from the list of potential physical impacts. They were also provided with the opportunity to identify other problems they may have had at time they completed the survey. Students reported experiencing a number of physical symptoms, including: eye strain (67.5%), back pain (37.3%), headache (34.06%), fatigue (23.72%), difficulty concentrating (13.1%), and stiff joints (11.9%) (see Figure 4.15). This study found physical health problems caused by Internet use similar to those found in the literature (Chou & Hsiao, 2000; Hakala, et al., 2006; Kautiainen, et al., 2005; Ng & Wiemer-Hastings, 2005; Punamäki, et al., 2007; Young, 1996).

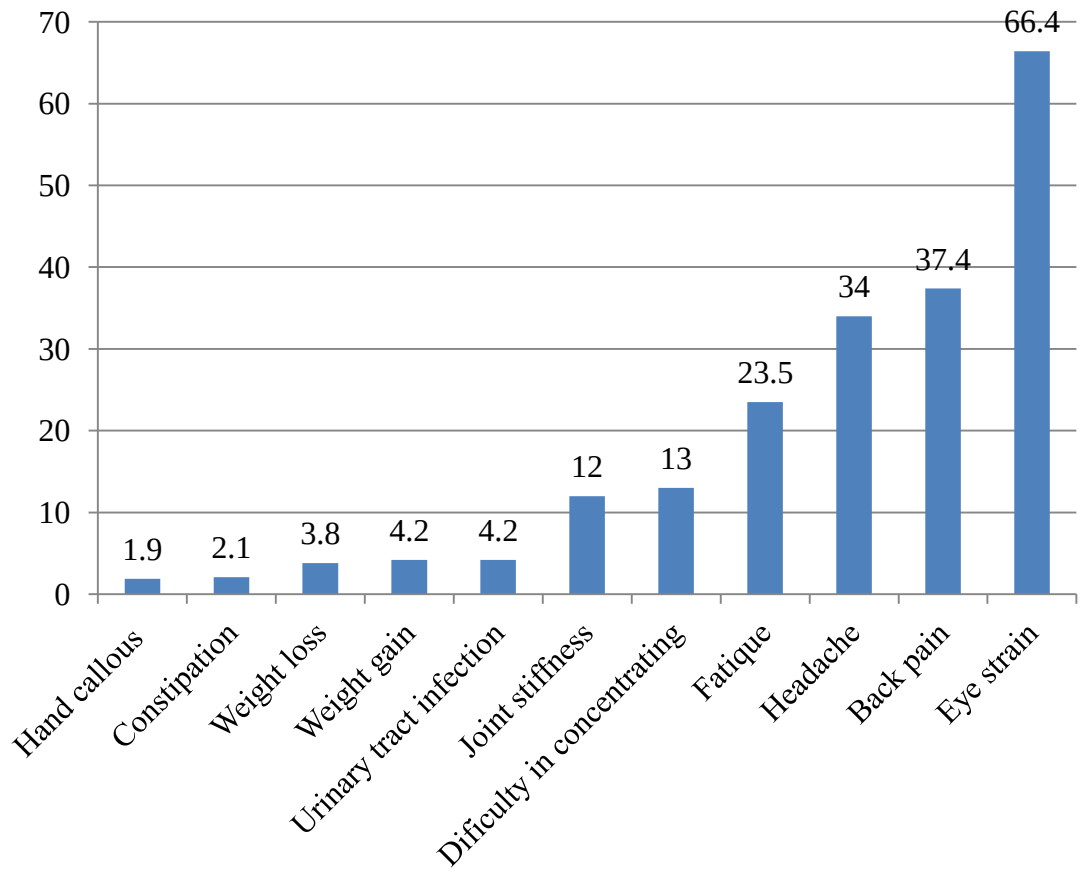

Figure 4.15. Physical health problems (%) caused by Internet use.

Mental health problems.

Respondents were asked to identify their feelings when using the Internet from the given list and were also provided the opportunity to identify other feelings they may have had while using the Internet. The majority of respondents (70.10%) reported they felt at ease and in control while using the Internet. Approximately 42.60% of respondents also reported being very happy and excited, while another 9.3% felt euphoric, and 5% felt powerful. In contrast, Internet use caused some students to lose track of time (23.3%), become preoccupied (14.7%), irritated (3.6%), anxious (2.6%), and to feel sad (0.8%) (see Figure 4.16).

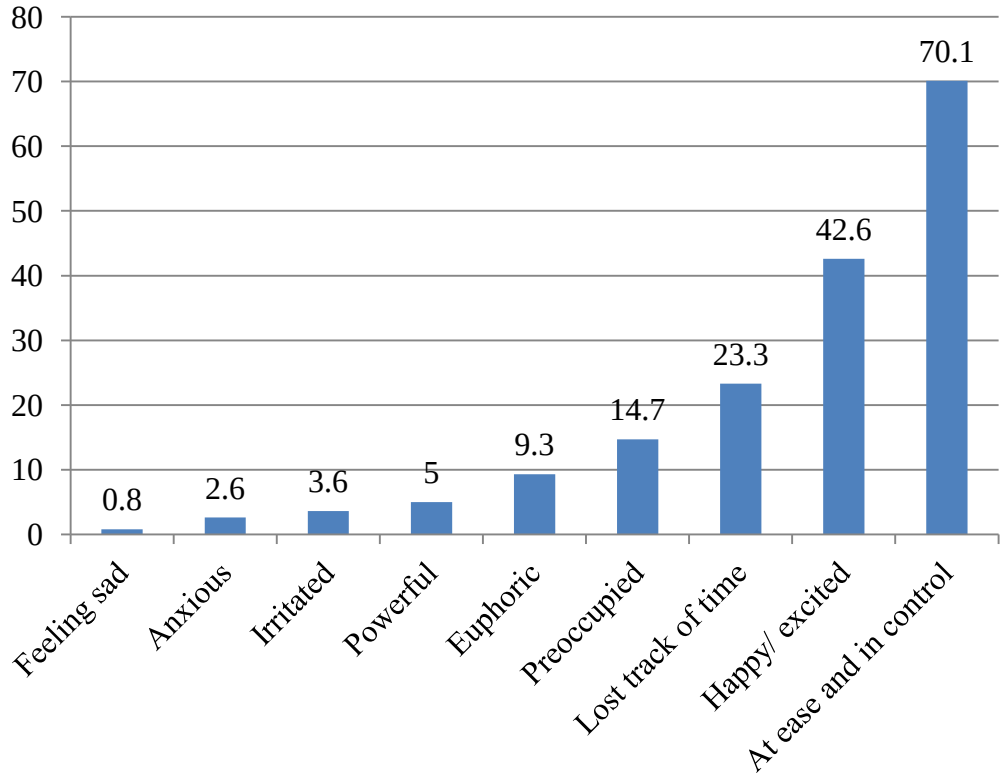

Figure 4.16. Feelings experienced (%) when using the Internet.

This study found that Internet use caused preoccupation, losing track of time, irritation, anxiety and sadness, all similar to the effects recorded in the literature (Janwikulbut, et al., 2004; Michelet, 2002; Sriudomsil, 2000). However, more research is required to examine comprehensively the mental health impacts of Internet use.

Relationship/social problems.

A small number of respondents reported relationship or social problems resulting from Internet use (see Table 4.11). These findings reflect similar results reported in the literature (Brenner, 1997; Chou & Hsiao, 2000; Lin & Tsai, 1999; Scherer, 1997; Young, 1998).

Table 4.11
Relationship and social problems caused by Internet use

Relationship/ social problems	**% of respondents**
Met strangers from the Internet in person	3.37
Had disagreements with friends due to Internet use	2.74
Had a sexual relationship with someone from the Internet	2.11
Had poor family relationships	2.11
Had romantic relationships	1.63

Intervention strategies for minimising harm caused by IA.

The survey respondents were asked to identify significant authority figures who they thought could help students, like themselves, prevent or minimise IA. They were also asked to identify intervention strategies that students, friends, families, schools, and the communities could implement to help minimise IA. Respondents suggested a number of key persons who could help in preventing and minimising the harm from IA. Parents and family were reported to be the most important, followed by the Internet user themselves, and then teachers or the school (35.63%, 14.52, and 13.69%, respectively, see Figure 4.17).

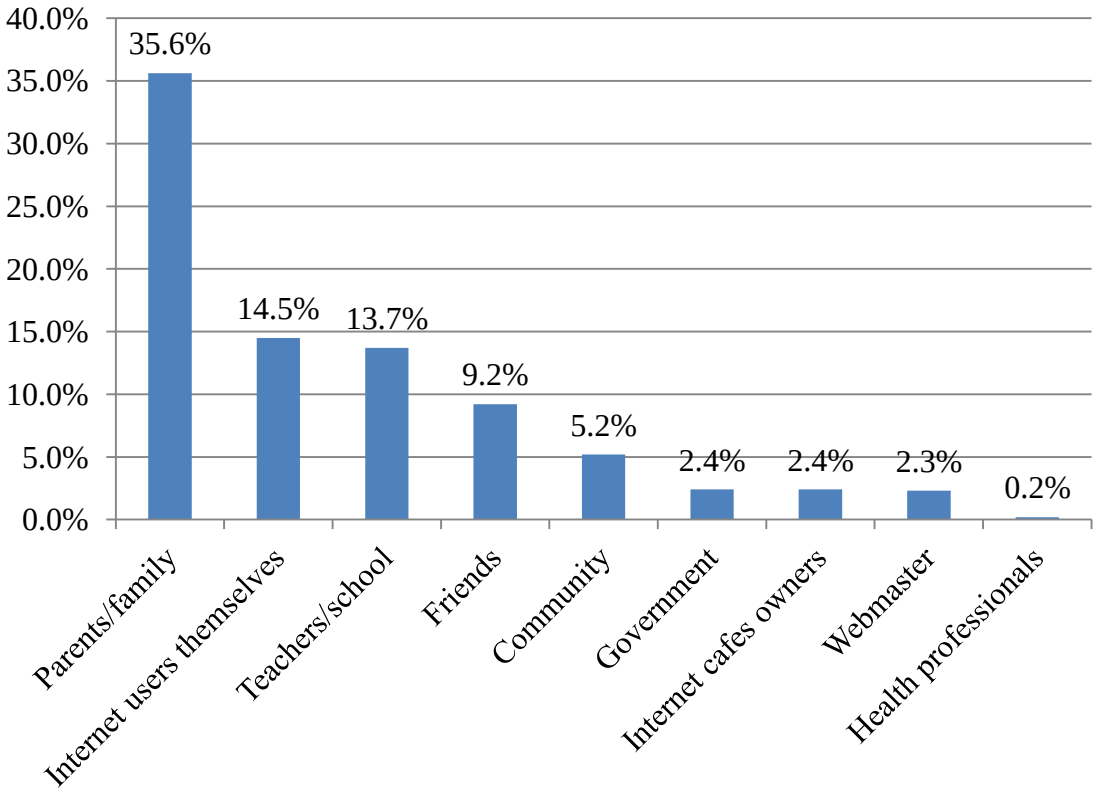

Figure 4.17. Key persons who should help students to minimise harm caused by IA.

Students were also asked to describe possible intervention strategies (see Table 4.12). Several strategies were suggested including: participating in other creative activities (9.61%); reducing the time spent on the Internet (6.79%); and limiting the activities of Internet use (6.27%).

Table 4.12
Intervention strategies for students to minimise harm caused by IA

Intervention Strategies for Students	**%**
Participate in other creative activities	9.61
Reduce the use of Internet	6.79
Limit Internet use	6.27
Manage time appropriately	5.85
Seek information about Internet use and its impacts	5.02
No Internet access at home	0.81
Self awareness	0.73
Control the use of Internet	0.21
Improve family relationships	0.21

Table 4.13
Strategies for parents to help students to minimise harm caused by IA

Intervention Strategies for Parents	**%**
Discuss and give advice about Internet use and its impacts	10.65
Supervise their children when they use the Internet	9.61
Set the rules to limit Internet use	8.57
Encourage them to participate in other creative activities	5.62
Spend more time with their children	4.70
Locate computer in a public area	1.25
Be good role models	1.04
Ban Internet access at home	1.04
Set an Internet-free day	1.02
Provide other activities	0.63
Limit daily expense	0.52

Moreover, respondents also suggested intervention strategies that parents could implement to help students who have IA (see Table 4.13). The three most important intervention strategies were: discussing and giving advice about Internet use and its impacts (10.65%), parental/teacher supervision of children when using the Internet (9.61%), and setting rules to limit Internet use (8.57%).

Summary.

Several major findings were reported from the completed study (the Delphi Technique, an online survey, and in-depth interviews) including:

I. A consensus definition was developed from the Delphi panel, resulting in 100% agreement.

The consensus definition for IA is was *"Repetitive Internet use leading to abnormal behaviour which causes negative consequences to its users or others in the community in any way, such as psychological, physiological, behavioural, sociological or other important functional impairments".*

II. Ten diagnostic criteria were also agreed upon by the Delphi panel.

The Delphi panel agreed that individuals meeting a minimum of any 7 of the 10 following diagnostic criteria would be considered addictive:

1. Neglecting other activities, e.g., homework, sports, or social activities to spent time on the Internet;
2. Having relationship problems with family members, friends, or others;
3. Having academic problems, e.g., school absences, poor grades, low performance due to Internet use;
4. Being unable to control, decrease or stop use of the Internet;
5. Changing behaviour negatively, e.g., acting aggressively, yelling, swearing and unprovoked bad temper, isolation, sleep deprivation, skipping meals and exercise;
6. Lying about or hiding the amount of time spent on the Internet, or other online activities;
7. Exhibiting psychological symptoms, e.g., restlessness, anxiety, short attention span, depression, agitation;

8. Exhibiting physical health problems, e.g., back pain, eye strain, hand corns, weight gain, weight loss, or dehydration;
9. Increasing the time of Internet use; and
10. Making Internet use a priority in the user's life.

III. A 20 item IA Scale was developed from the literature review and the Delphi Technique consensus on IA definition and diagnostic criteria.

The 20 item IA scale was derived from the literature used to described IA, substance dependence, pathological gambling, and technological addiction. Two questions were developed from each of the ten diagnostic criteria agreed upon by the Delphi panel. The 20 items developed for this scale are consistent with the two most widely used IA assessment tools identified in the literature; the Diagnostic Questionnaire (DQ) and the Internet Addiction Test (IAT), both based on the diagnostic criteria for pathological gambling. For example, items consistent across these instruments focus on domains such as preoccupation, increasing amount of time spent on the Internet, repeated unsuccessful efforts to control, cut back, or stop use, and negative impacts on relationships, job, education, and career. The response set of the IA scale (e.g., 5-point Likert scale) is consistent with IAT but not the DQ, which is a yes/no instrument.

Further research is required to determine the reliability and validity of this instrument and in relation to the DQ and IAT. This instrument was able to identify two IA rates, one of 4% and one of 40% of Thai secondary school students who exhibited IA behaviours. This instrument shows promise for making a contribution to the diagnostic understanding of IA.

IV. A number of factors were found to be associated with IA that was consistent with the existing literature.

This study found that male gender, private school attendance, Internet access at home, use of the Internet alone, Internet activity, hours spent on the Internet, and longer experience with Internet use were significantly associated with IA in this student population. For the most part, the findings obtained in this study were consistent with those of the IA literature. Distinctive findings from this study include the discovery that the time of the day and the day of the week of Internet use were highly associated with

IA. Finally, while the IA literature has found that use of the Internet under supervision reduces the incidence of IA, this study did not replicate this finding.

CHAPTER 5
DISCUSSION

Chapter Overview

Few Thai researchers have studied Internet use and addiction (Butraporm, 2002; Makasiranonth, 2002) and the number of references in the available Thai literature is limited. In addition, there is no generally agreed upon definition of IA. While there is a great appreciation of IA in the international literature, in Thailand, both academics' and students' understanding of this phenomenon is deficient. This study bridges these gaps by developing a consensus definition of IA and its diagnostic criteria through the use of a Delphi Technique with Thai addiction experts. In addition, a 20 item IA scale was developed from the literature review and Delphi components of this study for the measurement of IA. Moreover, opinions from both the Delphi panel and students about the positive and negative impacts of IA were solicited. Finally, this study elicited and incorporated opinions from the Delphi panel and students on methods and strategies to minimise the negative effects of IA. Limitations of the study are discussed. Recommendations for students, families and friends, schools, communities, and the Thai government to minimise the impacts of IA are provided, and recommendations for future research are offered.

The study explored Internet use and its impacts among secondary school students in Thailand. It comprised three phases: a Delphi phase, an online survey, and in-depth semi-structured interviews with a sample of the online survey respondents. The first stage of this study utilised a modified Delphi Technique among 30 Thai experts in addiction fields to: 1) develop a consensus definition of IA; 2) indentify diagnostic criteria for IA; and 3) identify intervention strategies to minimise harm caused by IA. Twenty-two of the 30 experts completed all three rounds of the modified Delphi questionnaires resulting in a response rate of 73 per cent.

The second stage of the study comprised an electronic survey of 1,200 Thai secondary school students aged from 11 to 19-years-old in Chiang Mai, Thailand, to explore the patterns of Internet use among this student population, describe its impacts and identify potential intervention strategies to address IA from the students' points of view. A total 957 respondents completed the survey, a response rate of 80 per cent.

The last stage employed in-depth interviews with 30 secondary school students selected from the online survey cohort who agreed to be interviewed. The interviews allowed the researcher to explore in greater depth the information the survey respondents had provided in the online survey.

This study resulted in a number of significant findings and contributions:

- A consensus definition of IA derived from the Delphi panel;
- Ten diagnostic criteria for classifying IA;
- Development of an IA scale based on the consensus definition and diagnostic criteria from the Delphi panel;
- That 3.7% of Thai secondary school students were classified as addictive Internet users when using the higher cut off point and a further 39.5% could be classified as addictive users when using a lower scale cut off point;
- That gender, time spent online, private school attendance, online activities, Internet access at home, and longer experience with Internet use were identified as important factors that may influence IA;
- That school, health and relationship problems were reported as negative impacts of Internet use; and
- Potential intervention strategies were proposed by the Delphi panel and the survey respondents for harm minimisation.

Definition and Diagnostic Criteria of IA

Although Internet addiction has been recognised and studied as a 'social problem' for decades, it has not been classified as a psychological or mental illness. For example, no standard definition and diagnostic criteria of IA has been included in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (American Psychiatric Association, 2000a). Because IA remains unclassified in the medical, psychological, and mental health field, no universally accepted definition of it exists. Empirical research has provided a number of working definitions of IA that have been modified from other accepted definitions of addiction, e.g., substance dependence, pathological gambling and technology addiction. The findings from the modified Delphi Technique suggest that IA, as defined for this study, was indeed seen to be parallel to

other addictions such as substance dependence, pathological gambling, and technology addiction. The Delphi panel subsequently agreed on a definition of IA as: *"Repetitive Internet use leading to abnormal behaviour which causes negative consequences to its users or others in the community in any way, such as psychological, physiological, behavioural, sociological or other important functional impairments".*

Prevalence of IA

Based on the IA scale developed for this study, the Delphi panel agreed that individuals meeting a minimum of 7 of 10 criteria would be considered addicted; thus a 70% or higher score would be considered IA. The first challenge of this study was to distinguish addictive Internet use from normal use. Because differing cut off points have been used in the literature (e.g., 43% for substance dependence and 42% for pathological gambling compared to 71% for television addiction), this study applied two cut off points (e.g., 70% and 40%) to the IA scale results and found that 3.7% of Thai secondary school students in Chiang Mai could be classified as addicted using the higher cut off point and 39.5% classified as addicted using the lower cut off point. Both IA rates are reflective of worldwide addiction rates in the literature (Milani, et al., 2009; Tsitsika, et al., 2009). However, because there is no consensus in the literature concerning the accuracy of differing cut off points for the various IA scales used, it is difficult to determine which rate is more accurate for this study's student population. Therefore, the two rates are reported as possible rates of actual addiction. Moreover, while the IA scale used is representative of existing IA instruments (e.g., DQ and IAT), important psychometric work still needs to be conducted on the IA scale. Finally, because this study was exploratory and conducted in only one province in Thailand, these findings should be interpreted with caution.

Nevertheless, the fact that the survey was conducted in an entire school district (e.g., all secondary school students in Chiang Mai were considered in the randomisation process for the online survey) and the exceptionally high response rate (80%) to the online survey provides some confidence that the Internet use rates, activities, identification of problems, and intervention strategies identified are honest reports of Internet use and representative of the student population of Chiang Mai. Replication of this study needs to be conducted to determine how representative the students from Chiang Mai are to secondary school students in the other provinces of Thailand as well as other student populations in other developed and developing countries.

The prevalence of IA among school students found in this study (3.7%) was closely related to that reported by some other studies of student Internet use worldwide; such as that of 1% in Greece (Tsitsika, et al., 2009), 4% in South Korea (Lee, et al., 2007), 3.1% in Finland (Kaltiala-Heino, et al., 2004), and 4.6% in Australia (Thomas & Martin, 2010). Alternatively, the higher rate of 39.5% (found using the lower scale cut off point of 40%) could be seen as comparable to Italy's rate of 36.7% (Milani, et al., 2009). However, when viewing the summary of worldwide prevalence rates (see Table 2.1), the lower rate of 3.7% appears more consistent to the literature.

While a low rate of IA was expected (e.g., due to the still limited access most Thai students have to the Internet compared to Western countries and differences in cultural and social traditions in Thailand as compared to other high IA prevalence societies; etc.), it is somewhat surprising to find such a low rate (3.7%) in light of the attention the Thai media and government pays to this problem. Thailand may yet reach higher levels of IA as more and more people gain greater access to the Internet over time. In addition, the findings obtained in this study are not representative or generalisable to the rest of Thai secondary school students per se. Future research is needed to replicate this study to determine if the results from Chiang Mai are representative of other parts of Thai society.

Important Factors Influencing IA

Five main categories of factors influencing IA have been identified: personal factors such as gender, age, and personality/self-esteem; Internet factors such as online time and online activities; and family factors such as parental supervision and Internet access at home.

Empirical studies have suggested gender as a predictive factor of IA. Some researchers have found that male Internet users were more prone to IA (Chou & Hsiao, 2000; Griffiths, 1998; Morahan-Martin & Schumacher, 2000; Scherer, 1997). In contrast, Young (1996) contended that women were more subject to IA than men. However, Brenner (1997) found no gender differences in relation to IA. A finding from this study supports the general literature that males tend to be more subject to IA. Further study is required to identify the association between gender and the development of IA. In this study, the age of survey respondents was concentrated among the 11 to 19-year-old age group. Like the general literature, there was no

statistical difference between age groups of respondents in relation to addictive Internet use.

This study found that students who had more experience of Internet use (more than five years) were more likely to be classified as addictive users than those who had less experience. This finding contradicts Young (1996) who found that new Internet users (using the Internet for less than six months) were more prone to be IA than experienced users. Very little research exists that examines the relationship between experience with the Internet and addiction, thus further research is warranted.

The amount of time spent on the Internet has been reported to be an influencing factor for IA. Several studies reported Internet addicts tended to spend at least twice the amount of time online as did non-addicts (e.g., Chou & Hsiao, 2000; Young, 1996, 1998). Other research showed that Internet addicts reported an average of 20-39 hours per week spent online as compared to the 5-9 hours of non addicts (Chou & Hsiao, 2000; Young, 1996, 1998). This study found that addictive Internet users spent approximately 29 hours per week on the Internet which is comparable to that of other research. However, this study found that normal users were online for about 16 hours per week, which is greater than the 5-9 hours found in other studies (Chou & Hsiao, 2000; Young, 1996, 1998). Interestingly, this study found that addictive Internet users were online at different times of the day and week than normal users (from 12:00 p.m. to 4:00 p.m. and from 4:00 p.m. 8:00 p.m. and weekends). Such use might be an interruption to other important activities such as completing homework, joining family activities or accomplishing household chores, or even resting. However, the issue of when students are online has not been investigated to any serious extent in the literature. On the contrary, most studies only examine the total amount of time per week spent online. Further research is needed to validate these findings and to explicate the potential influence time of day and day per week may have on IA.

The three most popular online activities reported in this study were: Internet surfing for personal interests, Internet surfing for school work, and listening to music. However, some other specific Internet activities had a high association with IA; such as, pornography/adult sites, online gambling, and online shopping. Several studies in the literature reported that Internet addicts tended to use interactive Internet applications such as chat rooms or online games, whereas non-addicts use the computer's information-gathering functions (Chou, et al., 1999; Chou & Hsiao, 2000; Kandell, 1998; Young, 1998). This study is consistent with the literature in that some particular

interactive functions appear to be more conducive to the development of IA than others. Future research needs to examine the relative contribution each type of online activity may have on IA.

Recently, Steeves & Webster (2008) reported that parental supervision contributed to the protection of children's online privacy and safety by reducing risky online behaviours. In this study, more than half of respondents (57.70%) indicated that they had company while using the Internet. However, students reported their companions to be friends and not parents. The results show that students who had companions while using the Internet spent less time online than students who used the Internet alone.

This study also reported that students who had personal computers and Internet access at home were more likely to be classified as addictive users than students without. Although there is little literature assessing the influence of place of Internet use and IA, the outcomes of this study showed that the use of the Internet at home may result in higher rates of IA. This issue needs further exploration.

Despite the benefits of the Internet, this study found that its use had negative impacts on students' lives including: school problems, physical and mental health problems, and relationship problems. Students who had problems caused by Internet use were more likely to be classified as addictive users than students who did not have problems. While both positive and negative impacts of Internet use were reported by respondents, promoting healthy computer and Internet use for these students should incorporate education in wise operating methods for all computer users, from the early learner to teenagers and upwards, to minimise the negative impacts.

Most of the findings from this study are consistent with the literature. However, this study found that activities, such as visiting pornography/adult sites and online shopping, and gambling, were associated with IA. These activities have not previously been identified as predictors of IA in the literature. Thus, more research needs to be done to explore in greater detail, and to what degree, specific Internet activities may influence the development of IA. In addition, this study found that IA was associated with the time of the day and the day of the week when students used the Internet. To the researcher's knowledge, this is first time that 'time of the day and day of the week' has been found to be important to the development of IA. This, and the specific activities used by those students who were classified as Internet addictive users, needs further research to validate the findings from this study.

Potential negative impacts of Internet use on students' life should be considered more seriously in the Thai context. Although the IA rate was only 3.7%, those Thai secondary school students who were classified as addictive Internet users reported having difficulties with school work, having physical and mental health problems, and having relationship problems. For example, the student respondents reported having health problems, such as eye strain, back pain, headache, and fatigue. In addition, these students also reported having symptoms of mental illness, such as losing track of time, being preoccupied, irritated, and anxious. These problems, as discussed above, should be considered together with the total IA score when classifying Internet addictive behaviours. In order to develop, test, and implement appropriate IA interventions, actual problems should be identified by addictive users.

Implications

In Thai society, IA has drawn attention from the government and the public regarding its potential negative impacts on the Internet users, particularly among young people. However, the prevalence of IA in Thailand has not been documented. The Thai government has attempted to resolve some of these problems by passing anti-cyber crime legislation in 2007. Many anti-IA campaigns have been launched since the occurrence of IA. However, the reaction from the government sector was to use government authority to control or eliminate access to this technology.

There are a range of knowledge, attitude and behaviour change models that could be applied to analyse problems and in turn, structure programs to achieve positive behaviour change. For example, such models would include, but not be limited to the following:

- The health belief model (Becker, 1974), a model for motivating people to take positive health actions that uses the desire to avoid a negative health consequence as the prime motivation;
- Protection motivation theory (Rogers, 1975), originally developed as a model of fear arousal to explain the motivational effect resulting from 'threat' communications;
- Social learning theory (Bandura, 1986), a model that posits that people learn from one another, via observation, imitation, and modelling; and

- Theory of interpersonal behaviour (Triandis, 1977), which includes two concepts, the influence of habit and personal normative beliefs. The concept of personal normative beliefs recognises that individuals' morals and internalised values are important predictors in addition to social norm.

The prevalence of IA should be assessed to capture the actual picture of this phenomenon. The government agencies and the media still need to do more public campaigns to support children and youth to recognise the problems associated with Internet over-use. Moreover, the successfulness of educational programs about the Internet should be evaluated and revised. This study proposed an IA Scale developed from the diagnostic criteria for IA to distinguish addictive Internet use from normal use. This study also recommended potential intervention strategies for preventing and minimising harm caused by Internet use among Thai secondary school students. This study will have significant implications for government policy makers, particularly in education, public health, law and order, and information and technology departments.

Recommendations for Thai Society

This study identified intervention strategies that may help address the problems caused by Internet over-use. This section presents recommendations drawn from the data collection activities conducted for this study including the literature review, the Delphi Technique activities, and the student survey and interviews. The recommendations presented are focused on strategies that the Thai government, communities, schools, and families and friends could implement to address the potential negative effects of IA and the associated problem behaviours (see Table 5.1). The Ottawa Charter for Health Promotion and its five action areas (build healthy public policy, create supportive environments, strengthen community actions, develop personal skills and reorient health services) provided a useful reference for the development of the study's recommendations.

Table 5.1
Summary of recommendations for the Thai society to minimise IA

Authorities	**Strategies**
Thai government	1. Develop strategic policy approaches across government portfolios and on a global scale
	2. Engineer legislative and organisational change within the strategic policy context
	3. Establish a standardised 'safe Internet use and harm minimisation' educational program
	4. Provide funding and resources to implement these strategies
Community	5. Implement a standardised 'safe Internet use and harm minimisation' educational program
	6. Provide infrastructure and a supportive environment to deliver a standardised 'safe Internet use and harm minimisation' educational program
Schools	7. Deliver a standardised 'safe Internet use and harm minimisation' educational program
	8. Support students in addressing IA
	9. Supervise students using the Internet
Individuals, families and friends	10. Become educated about responsible Internet use
	11. Support and supervise students in using the Internet
	12. Promote safe Internet use as well as intervening in over-use (friends and peer group)

Recommendations for Thai government.

1. *Develop strategic policy approaches across government portfolios and on a global scale*

A formal strategic policy adopting a 'harm minimisation' and 'safe Internet use' framework should be developed for a whole-of-government approach.

- This policy should be cross-sectoral, across government portfolios, and the catalyst for the development of related legislation;
- A broad consultation strategy needs to underpin the policy development process; and
- A policy communication and policy implementation plan (including monetary and evaluation components) are critical components for achieving positive change and should be part of the strategic framework.

The Thai Government should consider embracing the World Health Organization's Global School Health Initiative and provide support to schools to collaborate on the global school-based student health survey (GSHS). As well, the Thai Government should advocate that the global school-based student health survey (GSHS), a collaborative surveillance project designed to help countries measure and assess the behavioural risk factors, consider including Internet use to its list of key survey topics.

- Collaboration between the Ministry of Public Health, Ministry of Education and Ministry of the Interior (Thailand), and with relevant non government agencies, interregional bodies, as well as the private sector, will be essential in the establishment of partnerships and harnessing support to progress the Health-Promoting Schools movement in Thailand.

2. *Engineer legislative and organisational change within the strategic policy context*

Laws and regulations regarding Internet use by young people need to be implemented and monitored.

- The passing and implementation of suitable laws and regulations directed to the control of the Internet and the amelioration of IA addiction should be encouraged;
- The full extent of laws and regulations concerned with Internet use should be clearly delineated, and strengthened where weaknesses are detected;
- Some online games should be controlled by regulation, and any consequent IA should be prevented or minimised, well resourced interventions by government and non-government agencies; and
- The government should ensure that its laws and regulations are properly enforced by all levels of law enforcement agencies.

3. *Establish a standardised 'safe Internet use and harm minimisation' educational program*

Educational programs about 'safe Internet use and harm minimisation' should be developed and provided.

- The government should be responsible for developing and activating a community awareness program about ‘safe Internet use and harm minimisation’ and related support services to minimise harm of IA among Thai people, especially students; and
- Research should be funded and promoted that explores Internet use and the behaviour problems associated with IA in the Thai context.

4. *Provide funding and resources to implement these strategies*

Appropriate supports, e.g., equipment or software, should be provided to the general public to help prevent and minimise problems caused by IA.

- Government should provide the Thai public with practical tools to assist parents and schools in blocking inappropriate Internet sites; and
- Government should fund appropriate alternatives for social and physical activities in the community together with other creative activities as options to Internet use.

Recommendations for community.

5. *Implement a standardised ‘safe Internet use and harm minimisation’ educational program*

Educational programs about ‘safe Internet use and harm minimisation’ should be provided for community members, such as;

- Develop resources for people to recognise at risk signs and how to identify and IA;
- Educational programs ‘safe Internet use and harm minimisation’ should be provided to the public in each community to train parents and teachers about IA, how to recognise and respond to problems from Internet over-use and provide support services to those with IA; and
- Encourage the empowerment of communities to enhance social support including self-help groups.

6. *Provide infrastructure and a supportive environment to deliver a standardised 'safe Internet use and harm minimisation' educational program*

    - Partnerships should be established among social and health organisations in the community to address 'safe Internet use and harm minimisation';
    - Appropriate alternatives for social and physical activities should be provided at the community level, together with other creative activities to minimise harm caused by IA; and
    - Equipment or computer software (e.g., anti-virus software, anti-spyware or firewall) should be provided to parents to monitor Internet use for screening and blocking of inappropriate Internet sites.

Recommendations for schools.

7. *Deliver a standardised 'safe Internet use and harm minimisation' educational program*

Educational programs about Internet use and its impacts should be provided for students through the Thai educational system.

- A standardised educational program about 'safe Internet use and harm minimisation' should be provided to teachers and regularly updated;
- Standardised age appropriate education should be required for students starting at an preschool age, so as to prepare and educate them to safety use the Internet creatively and purposefully;
- Safe computer and Internet use for educational purposes should be properly instituted, managed and supervised by local school districts;
- Changes to school organisational and management practices be considered to achieve health promoting school status, for instance, behavioural support plans and targeted programs for identified students at risk; and

- Thai secondary schools access the ongoing capacity building and support provided by the World Health Organisation and through the global alliance that has been formed to enable teachers' representative organisations, worldwide, to improve the health of young people through school-based initiatives.

8. Support students in addressing IA

Appropriate supports e.g., equipment or software should be provided to schools to prevent and minimise problems caused by Internet use.

- The importance of regular educational training, reinforcement of 'safe Internet use and harm minimisation' guidelines for supervision should be regularly conducted with the school's personnel; and
- Computer software, such as filters, anti-virus walls and anti-spyware should be installed in schools' computers to screen out inappropriate content.

9. Supervise students using the Internet

Internet use by students should be supervised by teachers, school staff and school administrators.

- Computer laboratories in schools should be in well supervised areas to ensure that students use the Internet appropriately to protect student's safety (e.g., cyber bullying);
- The rules for computer and Internet use should be established by consensus and democratic student involvement;
- Reporting any behavioural changes in students related to IA should be the responsibility of teachers;
- Teachers should be responsible for investigating patterns of Internet use by their students and required to instigate a plan of supervision to forestall any negative impacts on students from IA; and
- Teachers and parents should work cooperatively together for the benefit of all students regarding safe Internet use.

Recommendations for individuals, family and friends.

10. Become educated about responsible Internet use

An educational program about 'safe Internet use and harm minimisation' and the possible impacts of IA should be provided for family members and friends.

- Resources about 'safe Internet use and harm minimisation' and the possible impacts of IA and the appropriate parenting skills to assist parents in building the broad knowledge base are necessary to deal effectively with children and adolescents and the problems caused by IA.

11. Support and supervise students in using the Internet

Internet use by children should be supervised by parents or the nominated care giver/s.

- Supervision of children when they are using the Internet is important for parents to screen content and to monitor behavioural changes in their children;
- Parents should give encouragement for their children to participate in other creative activities beyond computer use;
- The home computer should be located in a public area such as living room to enable public supervision of Internet use;
- Rules for Internet use at home and elsewhere should be raised by parents, democratically discussed, agreed to and revised regularly with their children; and
- Parents should insist that schoolwork and homework be completed before their children go online.

12. Promote safe Internet use as well as intervening in over-use (friends and peer group)

- Peers should encourage over-users to spend more time with them off line and engaging in creative activities not related to computer use;
- Peers should advise over-users to pay more attention to their studies and to listen to and respect the wisdom of their parents; and

- Individuals should be encouraged to learn about healthy Internet use, to prepare themselves for any possible impacts and to cope with consequences if essential.

Recommendations for Future Research

Many areas of research remain for the provision of robust answers regarding the definition, classification, incidence, prevention and treatment of IA. Immediate future research should focus on clarifying and standardising the definition, terminology, diagnostic criteria and know factors influencing IA. In particular, future research is required for:

1. Developing a clearer concept and terminology for IA;
2. Developing a standard tool or tools to measure IA;
3. Validating cut off points for the interpretation of measures of IA;
4. Developing other measures for IA beyond the self-report instruments;
5. Establishing IA incidence using a standardised measure across cross-cultural samples;
6. Building and testing theory-based models that explain the antecedents and outcomes of IA;
7. Differentiating and clarifying IA as being different from other technology addictions, e.g., online gaming, online gambling, computer addiction and mobile phone addiction;
8. Differentiating healthy Internet use from over-use and IA;
9. Validating significant factors associated with IA;
10. Identifying both positive and negative outcomes associated with IA;
11. Identifying the connection between the use of Internet and physical and mental health problems among children, e.g., body weight and level of obesity, depression, and anxiety;
12. Exploring ways of encouraging young people to adopt health promoting behaviours while using the Internet, e.g., drinking water, moving regularly, and using Internet pop-up messages as reminders to encourage users to adopt health promoting behaviours;
13. Examining the role and responsibility of computer companies and Internet providers in relation to IA;

14. Examining the effectiveness of treatments for IA using appropriate experimental research;
15. Examining the role of pharmaceutical medicines such as Bupriopion in treating IA; and
16. Determining the casual relationship between IA, depression and insomnia.

Conclusion

The major findings from the study are:

1. That 3.7% of Thai secondary school students in Chiang Mai were classified as addictive Internet users, however it is suggested that 39.5% of this population could be at risk of IA;
2. The amount of time spent on the Internet is related to gender, having Internet access at home, using the Internet alone and private school attendance; and
3. IA is directly correlated with the amount of time spent on the Internet per week, with addictive users spending on average 29 hours per week on the Internet.

This study has made the following contributions:

1. A consensus definition of IA was achieved from the Delphi panel. The consensus definition for IA is *"Repetitive Internet use leading to abnormal behaviour which causes negative consequences to its users or others in the community in any way, such as psychological, physiological, behavioural, sociological or other important functional impairments".* Ten diagnostic criteria were also agreed upon by the Delphi panel. This is the first developed consensus definition and diagnostic criteria of IA based on a systematic research. The diagnostic criteria were subsequently used to develop the IA scale to identify addictive Internet users among Thai secondary school students.
2. An IA scale to classify Internet addiction was developed for Thai students. This IA scale is the first developed and trialled on a large sample as well being cultural and age specific (i.e., Thai secondary school students). However in acknowledging this specificity, it will be a useful tool to be modified and applied to other settings.

3. Potential intervention strategies were proposed by the Delphi panel and the survey respondents for minimising the harmful effect of Internet use. This study provides recommendations based on two frameworks: the Ottawa Charter for Health Promotion and harm minimisation to address IA in the Thai context. These recommended interventions can serve as guidelines for other populations and cultures as they are able to modified and applied to other contexts.

Confusion in the definition, diagnosis, and cut off points of measurement scales for IA has resulted in uncertainty, misinterpretations of the data and disagreement about what constitutes IA. Without a reliable evidence base and substantive agreement on these issues, government, community, school, parents, and individuals cannot adequately address the real problems that stem from Internet over-use and IA. The wide range of prevalence rates of IA internationally confounds an understanding of this phenomenon. This study found a low rate of IA (3.7%) using a 70% cut off point but a high rate of IA (39.5%) using a 40% cut off point. While acknowledging that more research is needed to clarify this and related issues, the consistent theme in the literature to date is that IA, at whatever level, is indeed, a real problem; a problem, that with the increase of access to the Internet, may only get worse. Rather than blaming the victim (i.e., the addict) and establishing overly restrictive laws and regulations, public policy should focus on promoting the healthy and safe use of the Internet. Further, educational programs about safe Internet use, harm minimisation, prevention programs, recovery centres, support groups, and the integration of training workshops specialising in IA must be activated and encouraged to address the emergence of this problem, especially among the secondary school students in Thai society. While a student's education must proceed using the most up to date and appropriate technology available, the dangers of these technologies must be recognised, studied, examined, and interventions developed to maximise the utility of these technologies while minimising the potential harm to the individual as well as society.

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APPENDICES

Appendix 3.1

Delphi Questionnaire Round One (R1)

Research Topic: Internet use and its impacts among secondary school students in Chiang Mai, Thailand
Researcher: Ms Kesaraporn Wanajak
Principal Supervisor: Professor Cobie Rudd
Co-Supervisor: Professor Anne Wilkinson
University: School of Nursing, Midwifery and Postgraduate Medicine, Faculty of Computing, Health and Science, Edith Cowan University, Australia

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There has been much debate over how Internet addiction (IA) should be defined. Current IA identification is based on known information about substance dependence and pathological gambling.

For the purposes of this study, an operational definition IA can be identified as *"a psychophysiological disorder that an excessive, non-essential use of the Internet that causes harm to its user or others or for the community in any way such as psychological, physical, social or other important functioning impairments".*

1. Do you agree or disagree on an operational definition of Internet addiction?
   □ Agree, please explain the reason
   □ Disagree, please identify your personal definition of Internet addiction

2. On the basis of current information on addiction, or your individual definition, please identify what you think should be the main criteria which might be used to identify Internet addiction

……

3. What strategies do you currently use or would advocate for or advise that might minimise Internet addiction? List up to five (5)

……

4. Is there anything else that you think I should know about Internet Addition, its definition, diagnosis criteria, and/or strategies to minimise the effects of IA that I did not ask you?

……

THANK YOU VERY MUCH FOR TAKING TIME TO COMPLETE THIS SURVEY
Please RETURN to kwanajak@student.ecu.edu.au

Appendix 3.2

Delphi Questionnaire Round Two (R2)

Research Topic: Internet use and its impacts among secondary school students in Chiang Mai, Thailand
Researcher: Ms Kesaraporn Wanajak
Principal Supervisor: Professor Cobie Rudd
Co-Supervisor: Professor Anne Wilkinson
University: School of Nursing, Midwifery and Postgraduate Medicine, Faculty of Computing, Health and Science, Edith Cowan University, Australia

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Thank you for your contributions to the first round of this Delphi. I have summarised responses to the questions from the first Delphi questionnaire into three sections: Definition, Diagnostic Criteria, and Strategies.

This round is designed to consolidate a definition of Internet addiction (IA) and to have you RATE the summarised components of diagnostic criteria and the summarised intervention strategies in the order from MOST to LEAST USEFUL. Please follow the instruction of each section.

Instructions

Section 1: Initial Definition

1. Please review a summary of respondents' agreements and disagreements on the operational definition of IA; and then
2. Give your opinion "Agree" or "Disagree" on a revised definition of IA and the reasons to support your opinion.

Section 2: Diagnostic Criteria

1. Review the consolidated criteria and comment on each item of the criteria if you wish; then
2. RATE the usefulness of the consolidated criteria in the order from MOST to LEAST USEFUL.

Section 3: Strategies

1. Review the strategies and comment on any item you wish; then
2. RATE the usefulness of the strategies in the order from MOST to LEAST USEFUL

Return your response to kwanajak@student.ecu.edu.au By 20 April 2008

Section 1: Initial Definition

The Delphi questionnaire #1 asked the panel of experts to state their opinion on the operational definition of IA: *"a psycho physiological disorder that an excessive, non-essential use of the Internet that causes harm to its user or others or for the community in any way such as psychological, physical, social or other important functioning impairments".*

Overall, the majority of respondents agree, but some disagree on this operational definition of IA. However, a few of these respondents agree or disagree on particular aspects of the operational definition. All respondents offer numerous reasons in support of their opinions. Please review this summary of respondents' responses.

Agreement from respondents:

A majority of respondents proposed numerous of reasons to support their agreement on the operational definition of IA. They believe that IA should be classified as a psychological problem because it can be thought of as similar to substance dependence. Evidence shows that IA affects the same area of the brain's function - the mechanism of the addiction-nucleus accumbens and ventral tegmental area. Alternatively, IA can also be seen as akin to pathological gambling or behavioural impulsive disorder. Additionally, IA can be described as addictive behaviour because addicts usually stay online using the Internet obsessively causing serious problems in their lives. Also, evidence is claimed that IA causes physical, mental, social and relationship problems for the users and others around them.

Disagreement from respondents:

There are three main reasons why experts disagree on the operational definition. Firstly, the definition of IA should have included abnormal use or inappropriate use of the Internet. Secondly, harmful use should include behavioural, mental and spiritual perversion. Lastly, the negative impacts of IA, such as physiological problems are not yet explored.

Therefore, based on the above, IA can be now defined as

"repetitive Internet use leading to abnormal behaviour which causes negative consequences to its users or others in the community in any way, such as psychological, physiological, behavioural, sociological or other important functional impairments."

□ Agree
□ Disagree

Please give the reasons to support your opinion; feel free to make comment.
……

Section 2: Diagnostic Criteria

There are number of proposed diagnostic criteria of IA derived from questionnaire #1 responses which can be summarised as five themes: Internet use; Loss of control; Lying or hiding behaviours; Neglect of other duties; and Negative consequences. However, the criteria identified were extremely varied. I would like to simplify the specifics by asking you to RATE the usefulness of the following consolidated criteria.

Please RATE as MOST useful to LEAST useful for diagnostic criteria: **4 = "MOST useful", 3 = Useful, 2 = "Somewhat useful", and 1 = "LEAST useful".** Please feel free to express your opinion about or comment on each item of criteria

Themes	Criteria	RATE	Comments
Internet Use	*Number of hours using the Internet* a. use the Internet more than 3 hours a day		
	b. increased amount of time using the Internet		
	Frequency of use a. use the Internet everyday		
	b. use the Internet every free time		
	Purposes of use leading to IA a. use the Internet for entertainment/fun		
	b. use the Internet fulfil unmet needs		
	c. use the Internet to escape from other problems		
	d. use the Internet to get money		
	Online-activities causing IA a. chatting		
	b. gaming		
	c. gambling		
	Online-activities causing IA (cont.) *d.* emailing		
	e. instant messaging		
	f. watching online-TV		

Themes	Criteria	RATE	Comments
Loss of Control	Inability to control, decrease or stop use of the Internet		
	Behavioural changes such as acting aggressively, yelling, swearing and unprovoked bad behaviour when not able to use the Internet or when asked to log-off		
	Thinking or acting out of reality or unable to recognise the differences between the virtual world and the real life		
Lying or Hiding Behaviours	Lying or hiding the number of time spent on the Internet or activities engaged in while staying online.		
Neglect of Other Duties	Internet become priority in its users' lives		
	Neglect other activities such as homework, sport, or social activities due to spent too much time online		
	School absences is noticeable		
Negative Consequences	Physical health problems e.g., back pain, eye soreness, hand corns, weigh gain, weigh lost, dehydration, etc.		
	Psychological symptoms e.g., restlessness, anxiety, short attention span, depression, agitated, etc.		
	Relationship problems with family members, friends, teachers, or others.		
	Academic problems e.g., school absences, poor grades, low performance, failing at school, having difficulties when performing easy tasks.		
	Behavioural problems e.g., aggressiveness, isolation, sleep deprivation, skipping meals or exercise, etc.		

Section3: Strategies

A number of strategies are suggested from questionnaire #1 to minimise IA. Six themes emerged: **K**nowledge; **E**quipment; **S**upport; **A**lternative Activities, **R**egulation; and **A**lertness.
I would like to simplify the specifics by asking you to RATE an order of importance of the following consolidated strategies.

Please RATE as MOST useful to LEAST useful for intervention strategies as 4 = **"MOST useful", 3 = Useful, 2 = "Somewhat useful", and 1 = "LEAST useful".** Please feel free to express your opinion or comment on each item of strategy.

Emergence Themes	**Strategies**	RATE	**Comments**
Knowledge *Education program*	Educate parents and family about the possible negative impacts of Internet use		
	Advi**s**e parents and family about deviant Internet use so they can be more aware when problems occur		
	Raise public awareness of the negative consequences of the Internet over-use		
	Create partnerships with law enforcement agencies, school, and community		
	Provide school programs to promote healthy Internet use		
Equipment *Monitoring, screening and blocking*	Set and protect passwords		
	Use update anti-virus software, anti-spyware software, and firewall		
	Use filters to block unwelcome content		
	Use filter to screen offensive content		
	Use filter to monitor of user activities		
Support *Support and supervise*	Children should learn the good habits of Internet use from an early age		
	Parents and children to set and abide by rules about appropriate Internet use		
	Parents ensure children understand the correctness of Internet use		
	Parent discuss and review the rules regularly to make sure children are able to use the Internet creatively		

Emergence Themes	**Strategies**	RATE	**Comments**
Support *Support and supervise (cont.)*	Parents stay in touch with what children are doing online		
	Parents discuss and share Internet experiences with children regularly		
	Children should be encouraged to think carefully and critically about their Internet use		
	Home computers should be located in family areas so ensuring children use the Internet openly		
	Parent must be a good role model for children		
	Counselling and therapy should be available when needed or mandated		
Alternative Activities	Public spaces for social and physical activities should be provided in community		
	Other creative activities e.g., sport, art, or music should be promoted to Internet users		
	Children should be encouraged to participate in religious activities		
	Children should be assigned to household chores depending on their abilities		
Regulation *Regulation and law*	The law/regulation regarding Internet use by young people should be strictly applied especially when used in such places as Internet cafes and game shops		
	Internet business policy should be made to cover game limitation, and strict control of the number of Internet cafes and game shops		
	The law should include punishment for any owners of Internet cafes or game shops who do not cooperate		
Alertness *Alert and awareness*	Parents should find out more about the risk from using the Internet		
	Parents and children should be more aware of the risks associated with Internet use		
	Parents and teachers should take heed of any changes in behaviour, especially if related to online activity		
	Illegal activities must be reported		
	Call for help or call the police should danger or risk occurs		

Thank you for completing this questionnaire
Please respond to kwanajak@student.ecu.edu.au by 20 April 2008

Appendix 3.3

Delphi Questionnaire Round Three (R3)

Research Topic: Internet use and its impacts among secondary school students in Chiang Mai, Thailand
Researcher: Ms Kesaraporn Wanajak
Principal Supervisor: Professor Cobie Rudd
Co-Supervisor: Professor Anne Wilkinson
University: School of Nursing, Midwifery and Postgraduate Medicine, Faculty of Computing, Health and Science, Edith Cowan University, Australia

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Thank you for your contributions to the second round of this Delphi. This is the last round of Delphi which asks you to review the definition of Internet addiction (IA), components of diagnostic criteria and intervention strategies.

Section 1: Definition of Internet addiction (IA)

The definition of IA consolidated from the previous two rounds of Delphi is:

"repetitive Internet use leading to abnormal behaviour which causes negative consequences to its users or others in the community in any way, such as psychological, physiological, behavioural, sociological or other important functional impairments".

Do you agree or disagree with this definition? If you have any further comment, please note your objections/comments here.

……
……
……

Section 2: Diagnostic Criteria of IA

There are 26 proposed diagnostic criteria of IA derived from the questionnaire #1 responses. These can be summarised under five themes: Internet use; loss of control; lying or hiding behaviours; neglect of other duties; and negative consequences.

The second round of Delphi aims to simplify the specifics by asking experts to rate the usefulness of 26 consolidated criteria. The findings show that neglect other activities and relationship problems with family members, friends, teachers, or others are the most useful criteria for IA, followed by academic problems, inability to control, decrease or stop use of the Internet, behavioural problems and Behavioural changes when unable to use the Internet or when asked to log-off. The ranking of diagnostic criteria is shown in Table 1.

Rank	Score	Criteria
1	3.91	Neglect other activities such as homework, sport, or social activities due to spending too much time online.
1	3.91	Relationship problems with family members, friends, teachers, or others.
3	3.82	Academic problems e.g., school absences, poor grades, low performance, failing at school, having difficulties when performing easy tasks.
4	3.77	Inability to control, decrease or stop use of the Internet.
5	3.73	Behavioural problems e.g., aggressiveness, isolation, sleep deprivation, skipping meals or exercise, etc.
6	3.68	Behavioural changes such as acting aggressively, yelling, swearing and unprovoked bad behaviour when not able to use the Internet or when asked to log-off.
7	3.64	Lying or hiding the number of time spent on the Internet or activities engaged in while staying online.
7	3.64	Psychological symptoms e.g., restlessness, anxiety, short attention span, depression, agitated, etc.
9	3.59	Internet becomes a priority in its users' lives.
9	3.59	School absences are noticeable.
11	3.36	Physical health problems e.g., back pain, eye soreness, hand corns, weigh gain, weigh lost, dehydration, etc.
12	3.18	Gaming causing IA.
12	3.18	Increased amount of time using the Internet.
12	3.18	Thinking or acting out of reality or unable to recognise the differences between the virtual world and the real life.
15	3.05	Use the Internet whenever have free time.
15	3.05	Use the Internet to escape from other problems.
17	2.91	Use the Internet more than 3 hours a day.
18	2.86	Use the Internet every day.
19	2.82	Chatting causing IA.
20	2.59	Use the Internet fulfil unmet needs.
21	2.55	Use the Internet for entertainment/fun.
22	2.45	Gambling causing IA.
23	2.09	Watching online TV causing IA.
24	2.05	Instant messaging causing IA.
25	1.86	Emailing causing IA.
26	1.82	Use the Internet to get money.

Section: 3 Strategies for minimising IA

There are thirty one strategies for minimising IA consolidated from the first round of Delphi. The findings from the second round show the ranking of strategies that can be summarised as family actions, school actions, and community actions.

1. Family actions including individual and parent actions
Parents and children set the rules about Internet use and review the rules regularly to make sure children are able to use the Internet appropriately. Home computers should be located in family areas to ensure children use the Internet openly. Computer software e.g. filters, anti-virus software, anti-spyware software, and firewall should be installed into home computer to screen or block offensive or unwelcome content.

Parents and children should be more aware of the risks associated with Internet use. They should discuss and share Internet experiences regularly. Children should learn the good habits of Internet use from an early age and be encouraged to think carefully about their Internet use. In addition, parent must be a good role model for children and take care of any changes in behaviour, especially if related to online activity.

2. School actions
School programs to promote healthy Internet use should be provided. Teachers should take care of any changes in behaviour, especially if related to online activity and encourage students to think carefully about their Internet use.

3. Community actions
Education program for parents should be provided in community to educate parents and family about the possible negative impacts of Internet use. Public spaces for social and physical activities should be provided in community and other creative activities e.g., sport, art, or music should be promoted to Internet users. Moreover, children should be encouraged to participate in religious activities.

The law/regulation regarding Internet use by young people should be strictly applied especially when used in such places as Internet cafés and game shops. The law should include punishment for any owners of Internet cafés or game shops who do not cooperate.
Internet business policy should be made to cover game limitation, and strict control of the number of Internet cafes and game shops.

Partnerships should be set up between law enforcement agencies, school, and community. Public awareness of the negative consequences of the Internet over-use should be raised. Illegal activities must be reported. A call for help or a call to the police should be made if danger or risk occurs. Counselling and therapy should be available when needed or mandated.

Do you agree or disagree on these strategies? If you have any further comment, please note your objections/comments here.

……
……
……

Please return your response to kwanajak@student.ecu.edu.au by 20 September 2008

Thank you very much for your cooperation.

Appendix 3.4

Internet Use Survey

SECTION I: DEMOGRAPHIC INFORMATION
DIRECTIONS: Please WRITE IN or CHECK one answer for each of the following questions in this section.

1. Age years

2. Gender □ Male □ Female

3. Level of education
□ Mattayom 1 □ Mattayom 2 □ Mattayom 3
□ Mattayom 4 □ Mattayom 5 □ Mattayom 6

4. Major of education
□ Science □ Mathematic □ Language □ Art

□ Others…….

5. Type of school
□ Public, link to (Chiang Mai Education Area 1-5) □ Private

SECTION II: PATTERNS OF INTERNET USE
DIRECTIONS: Please respond to EACH of the following questions in this section by indicating WHAT YOU USUALLY DO when you use the Internet.

6. Do you have a computer at home?
□ Yes, go to 6a and 6b □ No, go to 7
6a. IF COMPUTER IS AT HOME: Where is your home computer located?
□ Public area e.g. living room/ dining room
□ Computer room/ study/ separate room
□ Your bedroom
□ Brother/sister bedroom
□ other…… (Please specify)
6b. IF COMPUTER IS AT HOME: Do you have Internet access on this home computer? □ Yes □ No

7. Where do you USUALLY access/use the Internet? (Choose one only, using dropdown)
□ Home □ School □ Internet Cafe
□ Friend's house □ Public area (e.g. shopping centre kiosk)
□ Other……. (Please specify)

8. Is there anyone else in the room during the time that you USUALLY access/use the Internet on that computer?
□ Yes, go to 8a. □ No, go to 9
8a. IF YES, Who is USUALLY in the room with you when you access the internet? (Please list ALL OF THE PEOPLE; for example parents, sibling, friends, strangers/public in Internet café).
.....

9. For HOW MANY years or months have you used the Internet? (Please SPECIFY the length of time you have used the Internet)

_____NUMBER OF YEARS and/or _____NUMBER OF MONTHS

10. What TIME OF THE DAY do you USUALLY log onto the Internet? (Choose one category only, using dropdown)

□ 0-4 am □ 4-8 am □ 8-12 am
□ 13-16 pm □ 16-20 pm □ 20-24 pm

11. Once you are logged onto the Internet, HOW MANY HOURS in a typical day do you USUALLY stay on the computer?

_____NUMBER OF HOURS PER DAY (Please specify, 0 up to 24 hours in any one day).

12. Do you use the Internet MORE during the weekend than during a typical week?

□ Yes, go to 12a. □ No, go to 13

12a. IF YES, approximately how many more hours a day do you spend on the Internet on a typical WEEKEND day than you do during a typical week day?

_____NUMBER OF EXTRA HOURS PER WEEKEND DAY (Please specify)

13. Do you USUALLY use the Internet late at night (e.g., after 9:00 PM)?

□ Yes, go to 13a. □ No, go to 14

13a. If you use the Internet late at night (e.g., after 9:00 PM), what do you USUALLY do after logging off the computer?
(For example, do you go straight to bed? Do you read a book? Do you do school work? Please list ALL the things that you TYPICALLY do when you log off the computer late at night?)

.....
.....

14. When YOU use the Internet for extended periods of time, do you USUALLY get up to take a break between sessions?

□ Yes □ No

Many people use the Internet for a variety of reasons; for example, for contacting family or friends, surfing for information, or for gathering news. We are interested in learning more about why YOU use the Internet. Please answer YES, NO, or Don't Know for EACH of the following Internet uses:

DIRECTIONS: Please CHECK YES, NO or DON'T KNOW.

15. Do YOU use the Internet for following these reasons? YES NO
15a. Emailing current friends?
15b. Meeting new friends
15b. Talking in chat rooms
15c. Creating or maintaining a personal Web page
15d. Information Surfing for study/school work
15e. Information Surfing for personal interests
15f. Playing Web games
15h. Internet gambling
15i. Watching TV on the Internet
15j. Listening to music on the Internet
15k. Downloading music/movies from Internet
15l. Shopping online
15m. Accessing pornography
15o. Other (Please Specify):
15p. Other (Please Specify):
15q. Other (Please Specify):

SECTION III: POTENTIAL IMPACT OF INTERNET USE
DIRECTIONS: PLEASE ANSWER EACH APPLICATION ITEM.

16. Often people use the Internet for long periods of time. We are interested in learning more about how YOUR Internet use may affect YOU and those around you. Please answer for ***Never, Rarely, Occasionally, Often, or Always*** EACH item in the table below.

1. How often do you find that you stay online longer than you intended?
2. How often do you neglect household chores to spend more time online?
3. How often do you prefer the excitement of the Internet to spending time with your friends in person?
4. How often do you form new relationships with fellow online users?
5. How often do others in your life complain to you about the amount of time you spend online?
6. How often do your grades or schoolwork suffer because of the amount of time you spend online?
7. How often do you check your Email before something else that you need to do?
8. How often does your job performance or productivity suffer because of the Internet?
9. How often do you become defensive or secretive when anyone asks you what you do online?
10. How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?
11. How often do you find yourself anticipating when you will go online again?

12. How often do you fear that life without the Internet would be boring, empty, and joyless?
13. How often do you snap, yell, or act annoyed if someone bothers you while you are online?
14. How often do you lose sleep due to late-night log-ins?
15. How often do you feel preoccupied with the Internet when offline, or fantasise about being online?
16. How often do you find yourself saying "just a few more minutes" when online?
17. How often do you try to cut down the amount of time you spend online and fail?
18. How often do you try to hide how long you've been online?
19. How often do you feel depressed, moody or nervous when you are offline, which goes away once you are back online?
20. How often do you use the Internet to escape from other problem in your life?

SECTION IV: IMPACT OF INTERNET USE AND INTERVENTIONS

Use of the Internet can positively and negatively affect people lives: their schoolwork, their physical and mental health, and their personal relationships. We would like to learn more about how YOUR use of the Internet MAY affect your life and relationships. Please answer each of the following questions with your own words.

17. Do you believe that YOUR use of the Internet affects your grades or your school work (such as students skipping classes in order to stay online; receiving poor grades because of being online too much, stopped or cut back on school activities; improved grades because of better access to information from the Web; etc)?

□ Yes, go to 17a. □ No, go to 18

17a. IF YES, please list ALL of the ways you think your grades/schoolwork are POSITIVELY AND NEGATIVELY affected by your use of the Internet?

.....
.....

18. Do you believe that YOUR use of the Internet affects your physical health (e.g., experience back pain, headaches, eye strain, weight gain or loss, strain on hands/arms, etc.

□ Yes, go to 18a., 18b. and 18c. □ No, go to 19

18a. IF YES, please describe/discuss ALL of the ways you think your physical health is POSITIVELY AND NEGATIVELY affected by your use of the Internet?

.....
.....

18b. While YOU are online, DO YOU take tablets/ drink coffee/ drink caffeine drinks to keep awake and stay online longer?

□ Yes □ No

18c. After being online for an extended period of time, DO YOU take sleeping pills to help you go to sleep?

□ Yes □ No

19. Do you believe that YOUR use of the Internet affects your mental health (e.g., feelings of happiness, enjoyment/pleasure in life; confidence, sense of control, loneliness, anxiety, depression, etc?

□ Yes, go to 19a. □ No, go to 20

19a. IF YES, please describe/discuss ALL of the ways you think your mental health is POSITIVELY AND NEGATIVELY affected by your use of the Internet?

.....

.....

Some people believe that Internet use causes problems, especially for high school and younger students. We would like to learn more about what effect using the Internet has on YOU and YOUR friends.

20. Do you think that Internet use may cause problems for secondary school students?

□ Yes, go to 20a., 20b., 20c., 20d., and 20e. □ No, go to 21

20a. IF YES, Please explain what YOU think the problems are that Internet use can cause for secondary students like YOU and YOUR FRIENDS?

.....

.....

20b. What strategies would YOU suggest that students like YOU can do to help students who may have problems from Internet use (e.g., set specific time limits for use of the computer, put in a specific room where parents usually are, make students promise to only use computer for a little while etc.). PLEASE LIST ALL THE WAYS YOU THINK THAT WOULD HELP?

.....

.....

20c. What strategies would YOU suggest that and parents like YOURS can do to help students who may have problems from Internet use? PLEASE LIST ALL THE WAYS YOU THINK THAT WOULD HELP?

.....

.....

20d. WHO ELSE would you suggest could have a role in helping students like YOU who may have a problem with Internet use (e.g., your secondary school? The government? Others?

.....

.....

20e. What do you think those groups can do to help these students?

.....

.....

21. What POSITIVE results has being able to use computers and access the Internet done for YOU?

.....

22. Is there anything else YOU would like us to know about the use of the Internet by secondary school students that we may not have asked that YOU think is important?

.....

.....

Thank you very much for taking the time to complete this survey.

If you want information on the findings from this study, or want to comment on the survey separately from the survey itself, Please feel free to send me a note at: k.wanajak@ecu.edu.au.

Appendix 3.5

Invitation and Consent Form for School Principals

School of Nursing, Midwifery and Postgraduate Medicine
Faculty of Computing, Health and Science
Edith Cowan University (ECU)
Pearson St, Churchlands, WA 6018, Australia
Ph: (618) 9273 8005 Fax: (618) 9273 8933

Dear Principal of……Name of School,

My name is Kesaraporn Wanajak. I am a Thai nursing educator by profession**,** currently studying for a Doctor of Philosophy at ECU, Australia. I am undertaking a research study which explores the use of the Internet by secondary school students in Chiang Mai, Thailand. The aim of this study is to gain a better understanding of Internet use among this group, particularly the impacts of Internet use on the students' lives. Potential strategies will be developed to minimise any negative consequences found. To provide data and thereby enhance further understanding, an online survey and structured, in-depth interviews will be administered to gather information from randomly sampled, secondary school students.

I write to seek your permission to contact a number of these students requesting their participation in the study. I have attached a copy of the approval of Minister of Education, Thailand and the Director of Chiang Mai Educational Service Area Office, and my proposal and ethical clearance from Edith Cowan University, Australia.

If you agree, I will contact each student individually via email to provide details of my study, to request their participation and to arrange the survey. School nurse will be invited to be a contact person for participants of this study. Please do not hesitate to contact me if you need further information. My mobile number is (668) 1951 2669 and my email address is k.wanajak@ecu.edu.au. Alternatively, please contact Mrs Waraporn Wanchaitanawong, the Director of Boromrajonani College of Nursing, Chiang Mai, Thailand by phone (66) 5312 1121 or by email: wanchaitanawongw@yahoo.com.

Thank you for your kind consideration.

Yours sincerely,

Kesaraporn Wanajak

Consent Form

School of Nursing, Midwifery and Postgraduate Medicine
Faculty of Computing, Health and Science
Edith Cowan University (ECU)
Pearson St, Churchlands, WA 6018, Australia
Ph: (618) 9273 8005 Fax: (618) 9273 8933

Research Topic: *Internet use and its impacts among secondary school students in Chiang Mai, Thailand*
Researcher: *Ms Kesaraporn Wanajak*
Principal Supervisor: *Professor Cobie Rudd* **Co-Supervisor:** *Professor Anne Wilkinson*
University: *School of Nursing, Midwifery and Postgraduate Medicine, Faculty of Computing, Health and Science, Edith Cowan University,* Australia

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___ I have been provided with a copy of the Information Form explaining the research study, have understood the information provided, and have been given time to consider whether I want to take part.

____ I have been given the opportunity to ask questions and they have been answered to my satisfaction.

____ I understand that I may withdraw from the study at any stage and my withdrawal will not interfere with my present or future profession.

____ I also understand that the information I provide will be kept confidential, and that the research data gathered from the results of this study may be published, provided that I will not be identifiable, or that my identity will be disclosed only with my consent.

____ If I have any queries or concerns I know that I can contact Kesaraporn Wanajak on her mobile number (668) 1951 2669, or by using her email address: k.wanajak@ecu.edu.au.

I give statutory consent to participate in this study.

_____ _____
Name of School Principal Signature of School Principal Date

Email address: _____

Telephone number: _____

Appendix 3.6

Interview Questions

1. Can you tell me about what you use the Internet for? About how long, on an average day, do you spend time using the computer for these things?
1.1 What do you think Internet use (.....Answer from Q1...) does benefit on your life?
Next I like to ask about whether you think using the Internet a lot might be harmful, to you or perhaps to others you know.
1.2. Have you had any bad experiences on the Internet? IF yes, can you tell me about it/them?
If YES to 1.2: then ask 1.2A. How do you think this has affected you and your perceptions/use of the Internet?
1.3. Anything else you think I should know about your experiences using the Internet?

Now I'd like to talk about your knowledge of your friends experience in using the Internet:
2. Do you know of anyone close to you (family or friends) who have had a bad experience/bad experiences using the Internet?
IF YES to 2: then ask 2.1 Can you tell me about their experience(s)?
IF YES to 2: the ask 2.2 What influence has your family member/friend's negative experience had on your use of the computer, if any?

3. Some people have a very hard time to get off the Internet use because they are so attract to it. Do you have that experience? IF Yes: Can you tell me more about it?

4. In thinking about you and/or your friends bad experiences with using the Internet:
4.1. What do you think you or your friends could do to help you/your friends deal with the problems of Internet use you have talked about?
4.2. What do you think your parent/family or your friends' parents/family could do to help you/your friends to deal with the problems of Internet use you have talked about?
4.3. What do you think your teachers and/or school administrators could do to help you/your friends to deal with the problems of Internet use you have talked about?
4.4. What do you think society as a whole can do to help you/your friends to deal with

the problems of Internet use that you have talked about?

5. Is there anything else you think is important for me to know about the positives and negatives of Internet use by other high school students like you and your friends that we haven't talked about yet?