

INFLUENCE OF PSYCHOLOGICAL, INTERNET USE AND DEMOGRAPHIC
FACTORS ON PATHOLOGICAL INTERNET USE AMONG UNIVERSITY
STUDENTS

LU XI

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ABSTRACT

The purpose of this study was to identify the prevalence of Pathological Internet Use (PIU), to test the hypothesized structural model of Pathological Internet Use (PIU) and explore the relationship between cognitive distortion, depression, motivation, loneliness, stressful life events, and PIU. A total of 1493 undergraduate students from Universiti Teknologi Malaysia (UTM) were selected as respondents of this study. The results of this study showed an overall prevalence of PIU was 1.2% and there was no significant difference across groups (Massively multiplayer online role-playing game known as MMORPG, Social Networking Sites known as SNS, and general). The structural model of PIU demonstrated a good fit and all the variables were identified as significant predictors of PIU. Cognitive distortion was identified as the most significant predictor influencing PIU (Beta=0.47, $p<0.01$), and was confirmed as the most significant mediator between motivation (Beta=0.45, $p<0.01$), stressful life events (Beta=0.15, $p<0.01$), depression (Beta=0.39, $p<0.01$) and PIU. Motivation was found as the second significant predictor directly influencing PIU (Beta=0.35, $p<0.01$), while stressful life events was the lowest significant predictor directly influencing PIU (Beta=0.10, $p<0.01$). All the three factors contributed 65% variance of PIU. Besides this, depression was identified as the second significant mediator fully mediating the effect of loneliness on cognitive distortion (Beta=0.71, $p<0.01$) and partially mediating the effect of stressful life events on cognitive distortion (Beta=0.22, $p<0.01$). The multi-group analysis was applied to test the moderating effect of Internet use group (MMORPG, SNS, general) on the structural model. The result confirmed the invariance of the structural model across groups. The discussions of results were based on cognitive-behavioral model and previous literatures related PIU. It is recommended to conduct research on pathological Internet use (PIU) among university students as it can identify the status of their Internet use.

ABSTRAK

Tujuan kajian ini adalah untuk mengenal pasti kadar kelaziman Patologi Penggunaan Internet (*Pathological Internet Use*, PIU), menguji model hipotesis struktur PIU dan meneroka hubungan antara penyimpangan kognitif, kemurungan, motivasi, kesepian, peristiwa-peristiwa hidup yang tertekan, dan PIU. Sebanyak 1493 pelajar sarjana muda dari Universiti Teknologi Malaysia (UTM) dipilih sebagai responden dalam kajian ini. Dapatan kajian ini menunjukkan kadar kelaziman PIU pada keseluruhannya ialah 1.2% dan tidak terdapat perbezaan yang signifikan antara kumpulan (*Massively multiplayer online role-playing game* dikenali sebagai MMORPG, *Social Networking Sites* dikenali sebagai SNS, dan umum). Model struktur PIU didapati sesuai dan semua pemboleh ubah dikenal pasti sebagai faktor peramal PIU yang signifikan. Penyimpangan kognitif terbukti sebagai peramal paling signifikan dalam mempengaruhi PIU secara langsung (Beta=0.47, $p<0.01$), dan dikenal pasti sebagai pengantara paling signifikan antara motivasi (Beta=0.45, $p<0.01$), peristiwa-peristiwa kehidupan yang tertekan (Beta=0.15, $p<0.01$), kemurungan (Beta=0.39, $p<0.01$) dan PIU. Motivasi merupakan peramal kedua signifikan dalam mempengaruhi PIU secara langsung (Beta=0.35, $p<0.01$), manakala peristiwa-peristiwa kehidupan yang tertekan ialah peramal yang rendah sekali signifikannya dalam mempengaruhi PIU secara langsung (Beta=0.10, $p<0.01$). Kesemua tiga faktor tersebut menyumbang sebanyak 65% varians dalam PIU. Selain itu, kemurungan dikenal pasti sebagai pengantara kedua signifikan yang mengantara sepenuhnya kesan kesepian terhadap penyimpangan kognitif (Beta=0.71, $p<0.01$), dan mengantara secara sebahagian kesan peristiwa-peristiwa kehidupan yang tertekan terhadap penyimpangan kognitif (Beta=0.22, $p<0.01$). Analisis pelbagai kumpulan digunakan untuk menguji kesan moderasi kumpulan pengguna Internet (MMORPG, SNS, umum) terhadap model struktur. Keputusan kajian mengesahkan persamaan dalam model struktural merentas kumpulan. Perbincangan dapatan adalah berdasarkan model kognitif-behavioral dan kajian lepas yang berkaitan dengan PIU. Dicadangkan agar kajian tentang Patologi Penggunaan Internet (PIU) dijalankan dalam kalangan penuntut universiti kerana kajian seperti ini dapat mengenal pasti status penggunaan Internet mereka.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The advent of Internet and its applications have changed the world and people's daily lives. It has become more important in various aspects, such as work, study, and entertainment. As increasing number of Internet applications have been created, and with its easy accessibility, people spend more time online, ranged from 19 to 68 hours per week (Li, Wang and Wang, 2009; Hardie and Tee, 2007). Besides its benefits on academic, economic, and social aspects, the negative consequences of long-time Internet use were highlighted in numerous previous research, such as declined academic achievement (Soule, Shell and Kleen, 2003; Kubey, Lavin and Barrows, 2001; Chou and Hsiao, 2000), interpersonal relationship with others (Chou and Hsiao, 2000) and physical health problems (Kim and Chun, 2005).

Griffiths (1998, p. 73) indicated that "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". The term to describe those people is not consistent, which include "Pathological Internet use, Internet Addiction Disorder, Internet addiction, Internet addicts, Problematic Internet use, computer-mediated communication addicts, computer junkies, maladaptive patterns of Internet use, etc." (Caplan, 2002; Davis, 2001; Beard and Wolf, 2001; Chou, Chou and Tyan, 1999; Goldberg, 1996; Young, 1998). This research adopts the term "Pathological Internet use" (PIU) which refers to the

excessive use of Internet and significantly influences one's normal life including psychological, family, and social problems (Beard and Wolf, 2001; Davis, 2001).

The word "pathological" which has been used in The Diagnostic and Statistical Manual of Mental Disorders IV (DSM IV) of "pathological gambling" to describe individuals who have persistent maladaptive patterns of gambling behaviors despite the negative consequences was adapted into eight criteria by Young (1998) to assess maladaptive Internet use. Davis (2001) pointed that although the Internet addiction has been widely used, "addiction" in the literature was usually used to describe a physiological dependence between a person and some stimulus, usually a substance. The DSM-IV uses terms "dependence" (for substances) and "pathological" (for gambling disorders) instead the word "addiction" to describe pathological use of a substance or other such stimulus. Although DSM IV has not yet included the diagnosis of pathological Internet use or Internet addiction, the behavior and cognitive symptoms, as well as the abnormal brain function and lateral activation of the right brain was detected among the students with pathological Internet use (Du, Liu, Gao, Li, Li, Li, Zhang and Zhou, 2011; Meerkerk, Van den Eijnden, Vermulst and Garretsen, 2009; Caplan, 2002; Davis, 2001; Young, 1998).

The prevalence data varies across countries due to different criteria used to determine the prevalence. In Korea, it was 3.5% by using modified Young's Internet Addiction Scale (Whang, Lee and Chang, 2003) and 10.7% by using Internet Addiction Scale (Park, Kim, and Cho, 2008). Canbaz, Tevfik Sunter, Peksen and Canbaz (2009) identified 1.2% of Internet addicts (IAs) and 19.9% of possible Internet addicts (PAs) in Turkey based on Young's Internet Addiction Scale. Netherlands reported a prevalence of 0.9% measured by the Compulsive Internet Use Scale (Meerkerk, 2007). A study in Malaysia identified 43% of samples as Internet dependence by Young's Diagnostic Questionnaire (Ng, Isa, Hashim, Pillai and Harbajan Singh, 2012).

As the number of Internet user increased rapidly (usage rate increased 528.1% from 2000 to 2011) (Internet Usage World Stats, 2011), more and more people will be at the risk of developing pathological Internet use. In light of this, the increasing population and negative consequences of addiction or pathological Internet use

should not be neglected. Continuous research should be carried out to study the prevalence of pathological Internet use among Internet users and detect the characteristics of people who are vulnerable to develop pathological Internet use, as well as formulating interventions. Findings from these researches could offer useful information to help people under pathological Internet use and also provide the theoretical knowledge for the psychological counsellor to apply the appropriate intervention and counselling plan.

Some special Internet activities were found to be more attractive and addictive, such as the online game, social networking, chatting (Van Rooij, Schoenmakers, Van de Eijnden and Van de Mheen, 2010; Grüsser, Thalemann and Griffiths, 2007; Meerkerk, Van den Eijnden and Van Rooij, 2006). They were found to be associated with compulsive Internet use or pathological Internet use while social function was deemed as a special attractive trait of Internet (Chou and Hsiao, 2000; Ju, 2000). The strongest negative correlation between online game and social network provided the sign of competition between these two Internet applications, which further implied that individuals who were indulged in on online games would spend less time or no time on social network, while individual fascinated on social network would spend less or no time on online games (Van Rooij et al., 2010). Therefore, the Internet users who preferred these two online activities may have different characteristics, such as gender, motivation. Male students were reported with higher rates of playing online multi-user games, while female students reported higher rates of social networking (Durkee, Kaess, Carli, Parzer, Wasserman, Floderus, Apter, Balazs, Barzilay, Bobes, Brunner, Corcoran, Cosman, Cotter, Despalins, Graber, Guillemin, Haring, Kahn, Mandelli, Marusic, Mészáros, Musa, Postuvan, Resch, Saiz, Sisask, Varnik, Sarchiapone, Hoven and Wasserman, 2012).

Online gaming, such as massively multiplayer role-playing game (MMORPG) (i.e. World of Warcraft) was found to be most significantly associated with pathological Internet use (Van Rooij et al., 2010; Ducheneaut and Moore, 2004). Although the partial reinforcement effect (PRE) is the critical psychological component of gaming addiction, the MMORPG obtain the unique advantages from Internet compared to traditional games. The Internet provides a virtual context for gamers to build their own virtual organizations. The online social interaction is an

important element to play the game with their group members. Another new Internet application, social networking site (SNS) (i.e. facebook.com, xiaonei.com) makes up a new pattern of pathological Internet use. Although there is limited research on this topic, the negative influences on users' social and psychological function were detected (Daria, Kuss and Griffiths, 2011; Spraggins, 2009).

Both of these Internet applications – MMORPG and SNS have huge number of users and the amount is increasing with high speed (Young and Nabuco de Abreu, 2011; The Nielsen Company, 2009). They were always chosen as the most popular Internet application (Durkee et al, 2012; Kim, LaRose, and Peng, 2009; Yen, Ko, Yen, Wu, and Yang, 2007; Whang, Lee and Chang, 2003), which have some similarities related to Internet unique traits, such as virtual environment, remote social interaction, but they are totally different in content and function. Students who are attracted by these two Internet applications may be different in some aspects, such as motivation and gender. And those students who pathologically use these two applications may also share some similar characteristics, such as loneliness and cognitive distortion. Research compared these two Internet application is limited. This research intended to identify the prevalence of pathological Internet use (PIU), as well as the psychological, Internet use and demographic factors related to the PIU among MMORPG and SNS users respectively.

University students are deemed as one of the most vulnerable group to develop PIU ranged from 13% to 18.4% (Young and Nabuco de Abreu, 2011; Anderson, 2001; Hall and Parsons, 2001), which is usually higher than others (Young and Nabuco de Abreu, 2011). A pilot study in Universiti Teknologi Malaysia (UTM) among 90 undergraduate students identified 12 cases of PIU and students with PIU spent longer time (7.58 ± 1.93 h) on Internet than non-PIU (5.21 ± 1.93 h) (Lu and Yeo, 2013). Ling, Ramadass, Altaher and Arjuman (2011) identified 58 persons (29%) at the risk of PIU among 203 Malaysians and further suggested that individual at the age of 18 to 25 were more vulnerable to get PIU, especially students in universities or colleges. As they are more free and easier to access Internet, as well as have more rational reason in environment. On the other hand, they are psychologically at the stage from dependent to independent, which could bring various challenges, such as developing various interpersonal relationships (e.g.

romantic relationship) and ability (e.g. academic work, vocational skills). But some of the psychological aspects are still in development, such as self-regulation, emotional management. They may experience difficulties to cope with attractive Internet application and regulate their Internet use, which may lead to PIU (Frangos, Frangos, and Kiohos, 2010; Young, 2004).

Internet usage and its potential influence (Kaltiala-Heino, Lintonen and Rimpela, 2004; Kubey, Lavin and Barrows, 2001; Morahan-Martin and Schumacher, 2000) on the vulnerable group (students) have been well studied in many countries but little information could be obtained in Malaysia. Therefore, continuous research on this area should be conducted to enhance the current empirical research in Malaysia.

1.2 Background of the Study

The widespread use of Internet affects various aspects of society and people all over the world, such as communication, study, work, business, and shopping. It provides a global data communications system between computers, which bring many advantages such as faster communication, information resources, entertainment, social networking, and make life convenient and efficient. There are approximately 2.27 billion Internet users all over the world in 2011. The growth rate is 528.1% from 2000 to 2011. Asia takes the biggest population, more than one billion, followed by Europe and North America (Internet World Stats, 2011). As the technology advanced and multiple applications emerged, people are attracted and even obsessed with Internet. Previous research including review studies, pointed out that some people may develop abnormal Internet dependence, which present the similar symptoms as substance addiction, such as obsessive thoughts of Internet, tolerance, diminished impulse control, inability to cease using the Internet, and withdraw (Laura Widyanto and Mark Griffiths, 2006; Chou, Condrón and Belland, 2005; Davis, 2001, Young, 1998).

The various adverse consequences of abnormal Internet use and PIU were

found by most past researches, such as negative influence on students' daily routines, school performance, teacher and parental relation (Yang and Tung, 2007), poor health status (Kim and Chun, 2005), weak sense of time management, as well as behavioral and emotional problems (Cao and Su, 2007). The students may further get poor academic performance, psychological and physical problems (Cao and Su, 2007; Cao, Su, Liu and Gao, 2007).

There is no single standard instrument and criterion for the pathological Internet use, and the prevalence report varies widely across cultures and countries. Young and Nabuco de Abreu (2011) summarized the data from past researches and concluded that there were 6% to 15% of the general population are at the high risk for PIU. The report of PIU among students in Asian countries indicated fairly high excessive Internet use. Chou and Hsiao (2000) collected 910 valid responses from 12 Universities and Colleges in Taiwan and reported that a total of 13.7% of students were Internet addicts based on Young's Diagnostic Questionnaire (YDQ). In Mainland China, a study used the same instrument found 4.6% Internet addicts among 433 college students (Mei, Ge, Kou, Zhang, Chen and Yu, 2008). Li, Wang and Wang (2009) used Chinese version of GPIU scale to measure the generalized problematic Internet (GPIU) among College students which reported a prevalence of 13.6%. The prevalence of GPIU did not vary across gender, grade or major. Hechanova and Czincz (2008) reported that there were approximately 12% of Asian youth are at risk of being PIU based on the studies in Asian area: Mainland China, Hongkong, Taiwan and Korea. This study also found a higher rate of prevalence among university students compared to others.

In Malaysia, the proportion of individuals at the risk of PIU was reported in some researches, but most of them investigated a small sample size. The result is also varied widely due to the inconsistent definition, sample, and method. For examples, Yong (2011) used Internet Addiction Test (IAT) and identified 4 students (3.333%) as excessive user among 120 students in Sekolah Menengah Kebangsaan Jenis Pei Yuan Kampar, Perak. Ling, Ramadass, Altaher and Arjuman (2011) found 29% of PIU in a sample of 203 Malaysian by using Internet Addiction Test (IAT). Another study detected 43% of cases as Internet dependence in a sample of 162 students by Young's Diagnostic Questionnaire (YDQ) (Ng, Isa, Hashim, Pillai and Singh, 2012).

As mentioned above, the big scale investigation on Malaysian university students is limited. Furthermore, there is no research to examine the psychological deficits among different Internet application users (MMORPG and SNS). This research was conducted in a public university, Universiti Teknologi Malaysia (UTM) with a big scale investigation in order to examine the prevalence of pathological Internet use (PIU) in UTM, and find out the psychological vulnerabilities of MMORPG and SNS users who may tend to develop PIU. As UTM is one of the prestigious research universities and could be good representative of public university, where Internet was widely used and provided in campus (e.g. library, college, lecture room) as it is necessary in student learning (e.g. E-learning).

According to Davis's (2001) cognitive-behavioral theory of PIU, the maladaptive cognition or cognitive distortion is deemed as the proximal sufficient cause of PIU, which exist before the maladaptive behavior on Internet use. The psychopathology (e.g. depression, loneliness) is the distal necessary cause of PIU. This theory explained the development of PIU in cognitive-behavioral perspective and was supported by the following research which found that cognitive distortion was the important factor lead to PIU (Caplan, 2003; Kim, LaRose and Peng, 2009) and further developed instruments (OCS: Online Cognition Scale and GIPU: Generalized Problematic Internet Use Scale) to examine the cognitive symptoms of PIU (Davis, Flett and Besser, 2002; Caplan, 2010). The influence of psychopathology such as loneliness and stress was also confirmed (Harn, Wu, Chen and Chang, 2007; Kim, LaRose and Peng, 2009), but the effect of depression on PIU was not consistent in different countries (Yen, Ko, Yen, Wu, and Yang, 2007; Harn, Wu, Chen and Chang, 2007; Lu, Watanabe, Liu, Uji, Shono, and Kitamura, 2011).

The theory of Davis (2001) and Caplan (2002) highlighted the effect of cognitive distortion and the social function of Internet on the development of PIU, but ignored the effect of individual's motivation on the selection of Internet application. Currently, study found that individual was fascinated on some Internet applications (e.g. Facebook, World of War craft), not others (Van Rooij, Schoenmakers, Van de Eijnden and Van de Mheen, 2010; Grüsser, Thalemann and Griffiths, 2007; Meerkerk, Van den Eijnden and Van Rooij, 2006). Kuss and Griffiths (2011) found that the motivations related to dysfunctional coping,

socialization and personal satisfaction were the risk factors for PIU of online game users. While, the most frequent motivation for SNS users was keeping in touch with friends (Kujath, 2011). This study assumed the motivation as the important factor on the selection of Internet application which could show the different picture of PIU with different Internet application and further compensate the gap of current theory and realistic situation.

Van Rooij et al. (2010) explained that “the multiplayer online games can be played with other gamers. As a result, networks of relationships with other gamers become very important. Some games, such as First Person Shooters (FPS), are played in temporary environments, whereas Massive Multiplayer Online Role Playing Game (MMORPGs) utilize a persistent world that continues even if the gamer is absent.” “World of Warcraft” as one of the most famous massively multiplayer online role playing game (MMORPG), has developed over ten million members worldwide since 2004 (Blizzard Entertainment, 2008). Others are "Ever Quest", "Lineage", "Ragnarok Online", etc. It provides a persistent virtual world. Players may resume the role of one or more characters in the game and play with other members online to adventure in their virtual world. The different characters in this game usually take different responsibilities in a group and complete tasks with other characters, such as tank, healer in World of Warcraft. The type of characters determines the type of weapon and armor can be used, as well as the ability, powers and skills gained. As the gaming experiences accelerate, the characters could advance to the next higher level, which could gain weapons and values, become healthier and wealthier.

In addition, those games are never-ending and time consuming. It is impossible for players to complete all the tasks as the new content come continuously which draws them back to play the games. Social interaction online in MMORPG is used for the players to collaborate with others and cooperate to succeed in task. Those games do not only have the traits as the traditional ones, but also develop other attractive traits through Internet platform (Ng and Wiemer-Hastings, 2005). Preference of a virtual life was found as a predictor for PIU with MMORPG, which implied that the virtual world online is a special traits which attracted people (Liu and Peng, 2009). Therefore, many researchers look at virtual world games to be

more addictive than other games (Council on Science and Public Health, 2007; Lee, Ko, Song, Kwon, Lee, Nam and Jung, 2007; Chappell, Eatough, Davies and Griffiths, 2006). A study compared MMORPG players with video game players found that most of MMORPG players (11-40hours) played much longer than non-MMORPG players (1-6 hours). They sacrificed their sleep time, had more fun and felt more pleasant with in-game friends than friends in real life (Ng and Wiemer-Hastings, 2005).

While MMORPG have many members, another Internet attraction for many Internet users is the Social Networking Site (SNS), such as Facebook and MySpace. SNS provides virtual communities where users can create and design their personal profile, interact with real-life friends, meet and add other users (Daria, Kuss and Griffiths, 2011). SNS was defined as “web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system”(Boyd and Ellison, 2008). Facebook as one of the most popular sites has over 500 million users worldwide and 50% of the users log on to it every day (The Nielsen Company, 2009). The SNS contains almost all the ingredients of other Internet application, such as chatting, post message and pictures, blog, games (happy farm), email. SNS users could make up their profile, search and add friends, according to their interests, as well as visit their friends’ profile, post comment.

Wise, Alhabash and Park (2010) used skin conductance and facial electromyography to study the emotional responses during social information seeking on Facebook, which found that people felt more pleasurable on social searching, such as extracting information from friends’ profiles, compared with social browsing. It implied that the appetitive system may be aroused by goal-directed activity of social searching which is related to pleasurable experience (Lang, Potter, Bolls, 2009). This was also found on Internet game over users and addicts (Park, Kim, Bang, Yoon, Cho and Kim, 2010; Ko, Liu, Hsiao, Yen, Yang, Lin, Yen and Chen, 2009). Echeburua and de Corral (2010) pointed that the symptoms on people who pathologically obsessed on SNS, are similar to people with substances or other behaviors addictions. As its huge population and complex functions,

researchers stressed the necessities and importance of more researches on this new Internet application (Daria, Kuss and Griffiths, 2011; Echeburua and de Corral, 2010).

As mentioned above, MMORPG and SNS both have a huge number of users, provide virtual environment and online social interaction based on Internet platform, researches to examine the users belong to these two Internet applications is limited. Therefore, a study specifically examined these two Internet use groups should be encouraged to complement more empirical information on this field and fill the gap of current cognitive-behavioral theory and its application to reality, which could help to detect the characteristics of the vulnerable population regarding to these two applications and provide clues for intervention.

1.3 Statement of the Problem

Internet has become the ideal means of providing information to students and more importantly it is enjoyable due to the interactivity it provides. Students have the freedom of doing anything: to research and learn any topics, chatting, gaming, shopping and much more. One of the questions often arise is pathological Internet use (PIU) which refers to excessive Internet use with inability to control the impulse of Internet use, while various negative consequences turned up.

Researchers considered the university students as the most vulnerable population to be pathological Internet users based on past prevalence report in many countries (Young and Nabuco de Abreu, 2011; Hechanova and Czincz, 2008). A study in Malaysia also found the students in university or college were more vulnerable and got a higher prevalence of PIU (29%) (Ling, Ramadass Altaher and Arjuman, 2011).

As mentioned above, the research on PIU in Malaysia was just in the beginning and still lacking in many areas. Researches on university students were limited and restricted in the sample size and methodological design. Due to the

different characteristics of university students on various aspects, such as gender, the preferred Internet application, educational background, and psychological status, the tendency and possibility of PIU should be varied. Research to examine the effect of those factors on PIU is limited in Malaysia and the result is inconsistent in overseas.

Some previous research found that MMORPG users spent longer time compared to other non-MMORPG users (Ng and Wiemer-Hastings, 2005) and experienced higher level of loneliness (Parsons, 2005), while some did not find the influence of loneliness and depression on PIU among MMORPG users. But loneliness was positively related to PIU among SNS users (Wan, 2009; Spraggins, 2009). Both Massively multiplayer online role-playing game (MMORPG) and social networking site (SNS) are most popular Internet applications having huge number of users. They provide service worldwide via the Internet platform. Both of them use Internet unique traits to develop virtual community to interact and communicate with other users from different areas. They have shared some similarities via Internet, but the content and intention of them are totally different. MMORPG is a one kind of online games, which is mainly for entertainment; while, SNS is a kind of website for people to interact with other friends, which could be used for study, work, and entertainment.

It is unclear whether the MMORPG and SNS users with PIU have the same psychological vulnerabilities (e.g. stress, depression, loneliness) or not. Most previous research studied these two applications separately or compared with the offline activities. There is no such research to examine the PIU of MMORPG and SNS users in a same context either in Malaysia or overseas. This research studied the effect of motivation on Internet application selection based on the theory of Davis (2001) and Caplan (2002) to examine the relationship among psychological factors (cognitive distortion, motivation, depression, loneliness, stressful life events) in influencing PIU symptoms.

1.4 Research Objectives

The main objective of this study is to identify the prevalence of pathological Internet use and PIU (pathological Internet use) symptoms among university students of three Internet use groups (MMORPG, SNS and general Internet users) in Universiti Teknologi Malaysia (UTM); to examine the influences of psychological factors, Internet use factors and demographic factors to PIU among university students of three Internet use groups (MMORPG, SNS and general Internet users). Internet use factors include average number of hours cost on Internet per day and years of Internet use experience. Demographic factors include gender, major, grade and race.

Based on the main objective of the study, the following objectives are set as follows:

1. To identify the prevalence of pathological Internet use (PIU) among university students of three Internet use groups (MMORPG, SNS and general).
2. To identify the level of PIU symptom, cognitive distortion, motivation, loneliness, depression and stressful life events among university students of three Internet use groups (MMORPG, SNS and general).
3. To identify the difference on the level of PIU symptom, cognitive distortion, motivation, loneliness, depression and stressful life events between Internet use groups (MMORPG, SNS, and general) among university students.
4. To identify the important factors influencing the level of PIU symptoms among university students of three Internet use groups (MMORPG, SNS and general).
5. To identify the goodness of fit of a hypothesized model of relationship among PIU symptom, cognitive distortion, motivation, loneliness, depression and

stressful life events among university students for three Internet use groups (MMORPG, SNS and general) (Fig. 1.1).

1.5 Research Questions and Hypothesis

Based on the objectives, the following research questions are addressed:

Question 1:

What is the prevalence of pathological Internet use (PIU) among university students of three Internet use groups (MMORPG, SNS and general)?

Question 2:

What is the level of PIU symptom, cognitive distortion, motivation, loneliness, depression and stressful life events among university students of three Internet use groups (MMORPG, SNS, general and others)?

Question 3:

Is there any significant difference on the level of PIU symptom, cognitive distortion, motivation, loneliness, depression and stressful life events among university students of three Internet use groups (MMORPG, SNS and general)?

Question 4:

Are there significant predictors among psychological, Internet use and demographic factors on PIU symptom for MMORPG users?

Question 5:

Are there significant predictors among psychological, Internet use and demographic factors on PIU symptom for SNS users?

Question 6:

Are there significant predictors among psychological, Internet use and demographic factors on PIU symptom for general users?

Question 7:

What is the goodness of fit of hypothesized model of relationship among PIU symptom, cognitive distortion, motivation, loneliness, depression and stressful life events for the university students? (Fig. 1.1)

Question 8:

Does Internet use groups (MMORPG, SNS and general) moderate the relations between cognitive distortion, motivation, loneliness, depression and stressful life events and PIU symptom

Based on the research questions above, the null hypotheses for the study are formulated as follows:

Null hypothesis 1 for question 3:

H₀1: There is no significant difference on the level of PIU symptom, cognitive distortion, motivation, loneliness, depression and stressful life events across three Internet use groups (MMORPG, SNS and general).

Null hypothesis 2 for question 4:

H₀2: There is no significant predictor among psychological, Internet use and demographic factors on PIU symptom for MMORPG users.

Null hypothesis 3 for question 5:

H₀3: There is no significant predictor among psychological, Internet use and demographic factors on PIU symptom for SNS users.

Null hypothesis 4 for question 6:

H₀4: There is no significant predictor among psychological, Internet use and demographic factors on PIU symptom for general users.

Null hypothesis 5 for question 8:

H₀₅: There is no significant moderate effect of Internet use groups in the relationship of cognitive distortion, motivation, loneliness, depression and stressful life events and PIU symptom.

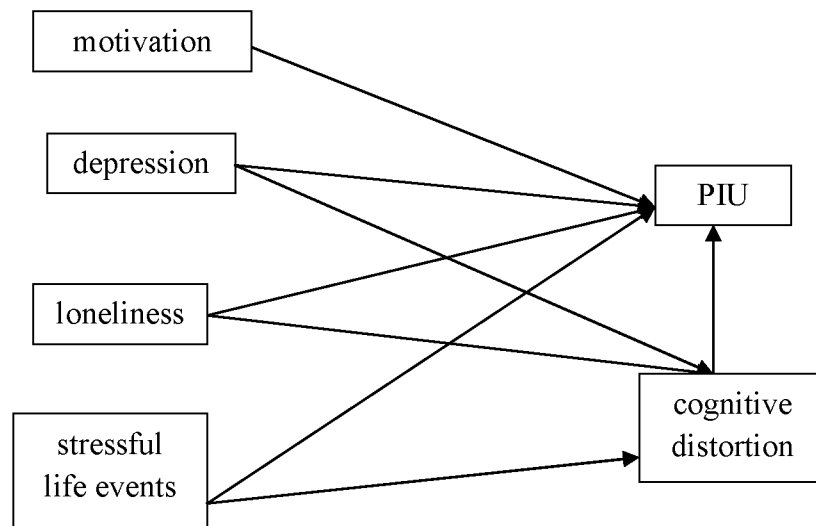


Figure 1.1 Hypothesized Structural Model for Conceptual Framework 2

1.6 Significance of the Study

This study provides an insight for a better understanding on the behavioral and cognitive aspects of individual with pathological Internet use, how the psychological factors (e.g. motivation, depression), Internet use factors (e.g. years experiences on Internet), and demographic factors (e.g. gender, major) are related to the pathological Internet use (PIU). Furthermore, this study took the undergraduate students in Universiti Teknologi Malaysia (UTM) as its research population, which intended to conduct a big scale survey on this vulnerable population to identify its prevalence of PIU. It provides information on problems of Internet use among university students, which could arouse the consciousness of Universities and The Ministry of Education Malaysia to pay attention on students with PIU or at the risk of PIU. The vulnerabilities of students with PIU detected in this study will help the educators and parents to identify students who are more likely to become PIU in

early stage, so that appropriate measure such as advise or cognitive intervention can be provided to these students.

In addition, examine the motivation of students using different Internet applications and its relationship of psychological factors (cognitive distortion, motivation, depression, loneliness, stressful life events) in influencing PIU, which could give a clear picture of students' Internet usage on MMORPG and SNS, identify the commonalities and differences of psychological vulnerabilities of PIU for MMORPG and SNS users. The different content and attractions between these two Internet applications fascinate students with different characteristics, such as psychological status, major, gender. This study presents the similarities of PIU on MMORPG and SNS for educators and counselors to better understand on psychological aspects of students with PIU and its risk factors; identify the differences on MMORPG and SNS users to better understand the specific psychological vulnerabilities related to PIU for MMORPG and SNS users for the educators and counselors to treat them differently.

Furthermore, the findings of this study do not only add to the richness of research data in this field, but also provide empirical evidence and theoretical clues of psychological aspects of students with PIU which could benefit the research on therapies and intervention regarding to PIU, and push the progress of efficient treatment. It also provides a baseline and theoretical evidence for the Universities and Ministry of Education Malaysia to develop related assessment or instrument in order to identify the students at risk of PIU and make further support action for those students. The systematic guideline of healthy Internet use for the university students will be suggested for the Ministry of Education.

1.7 Theoretical Framework

Not every Internet user is at risk for pathological Internet use. Individuals respond to Internet applications differently based on their own psychological and social traits. Although the criterion to define pathological Internet use or Internet

addiction is complex and inconsistent in academic research, some specific performance on this population have been confirmed and supported by most researches, such as loss of impulse control to become unmanageable for Internet, spend extremely long time on Internet which influence their normal daily activities, psychological and social negative consequence with excessive use of Internet (Young and Nabuco de Abreu, 2011). Starting from Young's first research on heavy Internet user, researchers dedicated on the Internet related research have proposed various theories based on different perspectives (Young and Nabuco de Abreu, 2011). The theoretical work on the pathological Internet use is still ongoing and encouraged. This study was conducted based on theories illustrated below.

The first theory introduced in this study is Use and Gratification theory. It was firstly proposed to explain the function of mass media and the media users' behavior in 1940s (Young and Nabuco de Abreu, 2011). The basic premises of this theory are that media users are active in their selection of media content and make deliberate choices among the media alternatives available to them based on their needs. In other words, media users choose different media to meet their specific needs and goals. Katz, Blumler and Gurevitch (1974) in their research on use and gratification assumed that individual use media based on their needs and motives, their following media use is reinforced by the obtained gratifications. "Gratification sought" and "gratification obtained" are typical concern of this theory. Gratification sought is refer to the various motivations based on expectations, which predict the media consumption; while the gratification obtained the perceived gratification level related to the media use behavior. The sense of satisfaction or gratification obtained on media use is the critical factor on continuous use of any media. If the users perceive that their motives are satisfied by the media, they are more likely to continue on using it. If not, they may seek for an alternative one. This theory has been frequently applied to the Internet use behavior currently (Young and Nabuco de Abreu, 2011).

Davis (2001) proposed a cognitive-behavioral model of pathological Internet use (PIU), which considered that beside the maladaptive behavioral, the problematic cognition as an important component related to the maladaptive response on Internet. It emphasized that the main source of the abnormal Internet use was the individual's

thoughts or cognitions. One of the most important components of this model is the maladaptive cognitions which are the proximal causes and are sufficient to cause symptoms of PIU. There are two types of maladaptive thoughts: thoughts of self and the world. While, the distal necessary cause of PIU is the psychopathologies, such as depression and social anxiety. The Cognitive-Behavioral Model assumes that the original psychopathology will make the individual more vulnerable to developing symptoms of PIU. The exposure to Internet (e.g. online auction service, online stock trading, chatting) is considered as the stressor in this model, which is also a distal necessary cause of PIU. The experiences with these Internet applications do not cause the symptoms of PIU, but is a contributory factor in the process of PIU. The reinforcement received from the Internet use is another key factor on individual's continuing Internet use. If the individual gets a positive experience with Internet, he or she is reinforced to reuse it.

Based on Davis' model, Caplan (2003) further proposed a theory of Problematic Internet use and Psychosocial Well-being, which regard that the psychosocial problems lead the problematic use of Internet. And the problematic use of Internet may in turn worsen their original psychosocial problems. There are three propositions in this theory. First, it proposed that individual with psychosocial problems such as depression and loneliness have more negative perceptions on their social competence than others; second, as these individuals get more efficacious and feel less threatening via online interaction with others, they tend to develop a preference for online social interaction rather than face to face communication; third, this preference would lead to excessive and compulsive use of computer-mediated interactions, which, in turn worsen their problems and create new ones at school, work and home. This theory considers the preference for online social interaction as a key contributor to the development of pathological Internet use.

The last theory introduced in this study is from the China Youth Association for Network Development (CYAND, 2005), which proposed a neuropsychological chain model of pathological Internet use. The primitive drive include various motives and impulses (pursue pleasure and avoid pain) to use Internet. The central nervous system is stimulated (e.g. increase of dopamine) by the Internet use, which produce the feeling to continuously use the Internet and extend euphoria. The euphoric

experience will soon be transformed into a habit and numbness state once addiction is formed. As the sensory threshold increases with the repeated Internet use, the user must increase the time and passion in order to achieve the same happy experience as the first time, which leads to high level of tolerance. Once the individual tries to control the Internet use such as stops or decrease the Internet use, the physical and psychological syndromes appear, such as emotional instability, irritability, dysphoria. The passive coping style is formed once the individual is faced with frustration or harmful effects, which include passive behaviors such as adverse event imputation, cognition falsification. The avalanche effect will happen at last, which includes passive experience consisting of tolerance and abstinence reaction, and combined drive consisting of individual passive coping styles on the basis of the primitive drive of the individual (Young and Nabuco de Abreu, 2011). According to this theory, the increasing time spent on Internet is the result of PIU which is aimed to achieve the previous happy experience.

Davis's theory deemed cognitive distortion as the proximal cause of PIU which was set as a mediator in this study. The psychopathology (e.g. depression, stress) were the distal factors influencing PIU through cognitive distortion in Davis's theory. Caplan upgraded Davis's theory and suggested that lonely people were more likely to develop preference for online social interaction (POSI) and become PIU. In this study, some psychopathologies (e.g. loneliness, depression) were selected as the independent variable directly or indirectly influencing PIU through cognitive distortion. Use and gratification theory explained the relationship between motivation and Internet application selection and viewed motivation as the critical factor of continuous use of Internet. Thus this study added motivation based on Davis's cognitive-behavioral theory, which was assumed to influence PIU directly or indirectly through cognitive distortion. With all the potential variables proposed by the three theories above, the Neuropsychological Chain Model deemed that individual develop PIU concurrent with the accelerate of Internet use (e.g. time spent online) which was set as the Internet use factors in this study.

Davis's theory provides a model of etiology, development, and outcomes related to pathological Internet use, which deemed the maladaptive cognition as the key factor facilitate the pathological Internet use. Other contributors, such as

psychopathology, Internet, have also been included in this model. Caplan's theory illustrated the relationship of psychosocial well-being and PIU, which provided another psychological factors (e.g. loneliness and depression) influencing PIU. The theory proposed by the China Youth Association for Network development (CYAND), explained the PIU on the neuropsychological perspective.

Based on all the theories above, this study generated a theoretical framework based on Davis's cognitive-behavioral model, ideas from Caplan's, and also support Use and Gratification theory and neuropsychological theory (Figure 1.2). The study proposed that the pathological Internet use was influenced by various psychological factors (e.g. motivation, loneliness), Internet use factors (e.g. number of hours cost on Internet), demographic factors (e.g. gender)

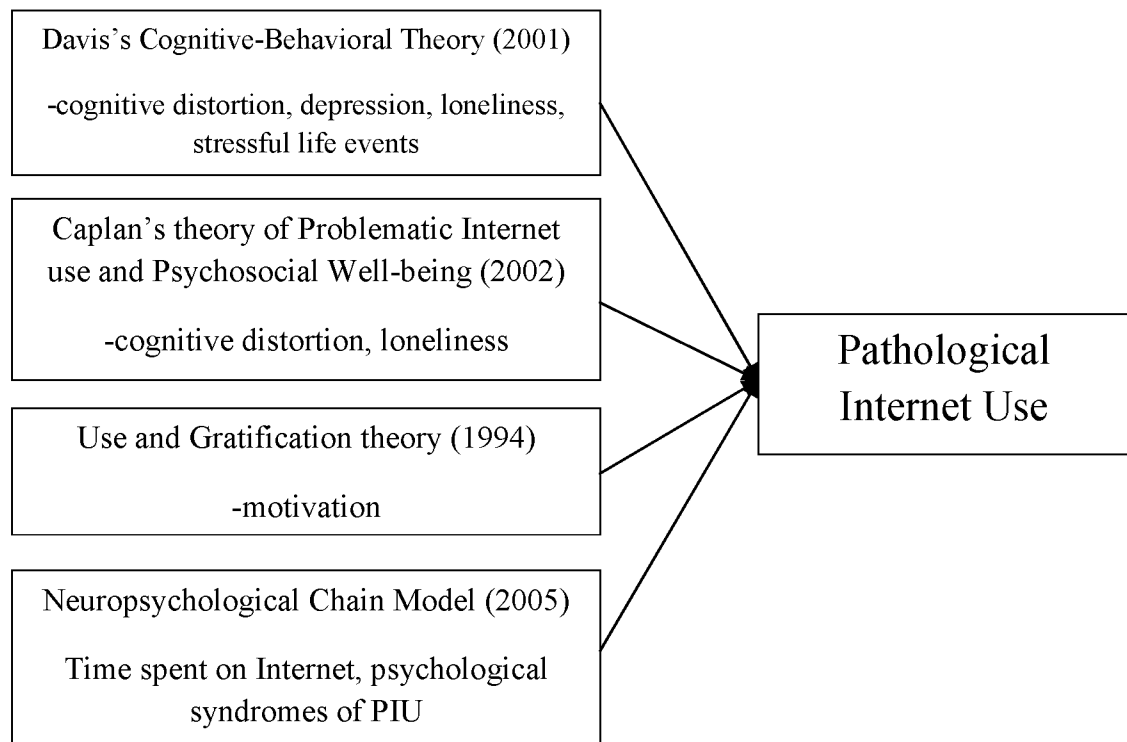


Figure 1.2 Theoretical Framework

1.8 Conceptual Framework

Not every Internet use will develop to be a pathological Internet user. Individual uses Internet differently based on their psychological status, background and social environment. Most of those factors have been well studied and confirmed by previous researches. This study proposed conceptual frameworks based on the past literatures and theoretical framework described above, as well as the research objectives (Fig. 1.3).

As shown in Fig.1.3, this study had proposed multiple independent variables from three aspects deemed important to pathological Internet use, which are psychological factors, Internet use factors and demographic factors. The psychological factors include cognitive distortion, motivation, loneliness, depression and stressful life events. Internet use factors include average number of hours cost on Internet per day and years of Internet use experience. Demographic factors include gender, major, grade and race. The effect of those variables were described in Chapter two.

There are numerous Internet applications including email, instant-message, games, social networking site, etc. Individual may use them simultaneously in one day according to their interests and needs. But some of them develop a preference on some special Internet application, who use it regularly and with long time, such as games and social networking site. This study divided responders into three groups (MMORPG, SNS, general users) according to their self-report on preference Internet application and time cost on the Internet application (Fig. 1.3), which is aimed to find out the differences between MMORPG and SNS users, as well as the relationship with pathological Internet use.

The level of pathological Internet use (PIU) symptoms is the dependent variables in this study, which may be influenced by various independent variables mentioned above. Another focus of this study is to explore the level of PIU symptoms among three groups (MMORPG, SNS, general users) and the relationship among cognitive distortion, motivation, loneliness, depression, and stressful life events in influencing PIU (Fig. 1.1).

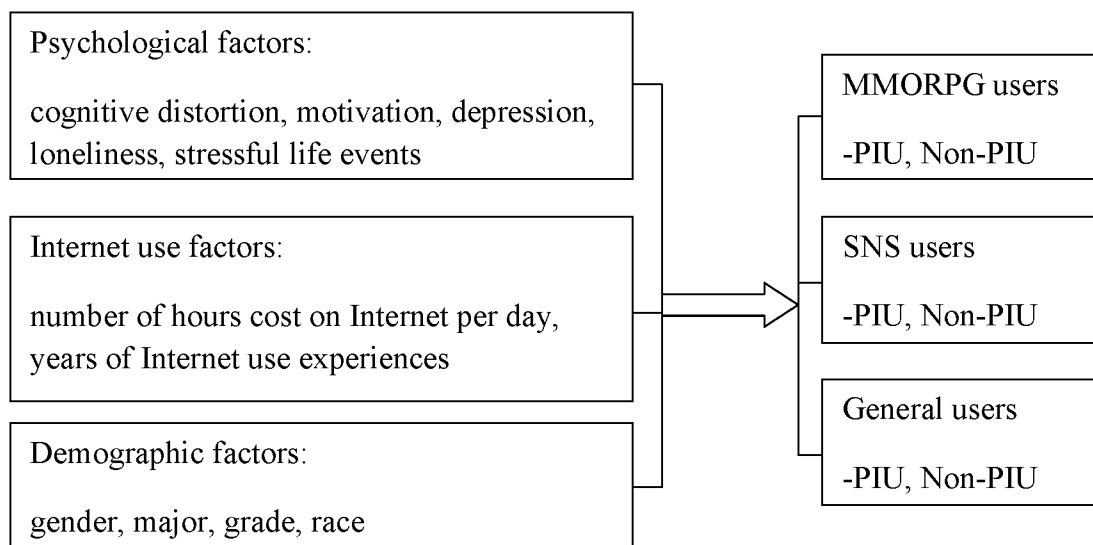


Figure 1.3 Conceptual Framework

1.9 Scope of the Study

This study explored the Internet use among university students in Universiti Teknologi Malaysia (UTM). Besides the prevalence of pathological Internet use, the researcher was interested in detecting the vulnerabilities of university students on pathological Internet use, such as cognitive distortions, stressful life events. The effect of different Internet application on Internet users is another interest, so this study also concentrates comparing three Internet use groups (MMORPG, SNS, general users).

This study focuses on the level of PIU symptoms among university students in UTM. The data are responses from the students' self-report questionnaires. In order to do the large scale survey, the study has to get at least 600 validate respondents. The researcher collected data using pencil-paper questionnaire.

1.10 Limitations of the Study

The study relied mainly on the self-report from university students which may not be objective in some aspects due to the different personality, value system and response style. The students with PIU or excessive Internet use may hide some of their behaviors or ideas, which may fail to detect some of them and not reflect the incidence accurately.

This study divided the samples into three groups based on their self-report of preference Internet application and time cost on it, which may ignore the effect of other Internet applications, such as chatting, blog. Most users are multiple Internet application user who may apply them simultaneously, the Internet application rated by the samples as less frequent use or preference may also contribute to their pathological Internet use.

The study was conducted only in one of the public universities, Universiti Teknologi Malaysia, which may not reflect the situation of students in Private universities and may be difficult to generalize the finding to the university students all over Malaysia.

1.11 Definition and Operational Definition

There are several terms frequently used in this research. The conceptual and operational definitions as used in this study are listed in the following pages.

1.11.1 Pathological Internet Use

Young (1998) first studied the pathological Internet use compared with the criterion of pathological gambling defined by the DSM-IV. Individual who meet the

five of eight criterion of the Internet Addiction Diagnostic Questionnaire (IADQ) is considered as suffering with pathological Internet use (PIU).

Davis (2001) divided pathological internet use (PIU) into two types which is specific and generalized. Specific pathological Internet use refers to the individuals that are dependent on a specific function of the Internet, which would exist without Internet, such as online sexual materials/services, online auction services and online stock trading, and online gambling. While, generalized pathological Internet use refers to overuse of Internet generally and multidimensionality, which can be related to the social aspect of Internet and increased desire to stay in a virtual social life, such as e-mail, chatting.

Pathological Internet use (PIU) in this study refers to the excessive use of Internet and significantly influences one's normal life including psychological, family, social problems, which was determined by Internet Addiction Scale (IAT). Individual who scored 68 or higher than 68 on the 17-item of IAT are deemed as PIU.

1.11.2 PIU symptom

PIU symptom refers to the symptom related to individual's pathological Internet use (e.g. behavioral, emotional symptom), which was measured by Internet Addiction Scale (IAT). As IAT in this study was identified as a three-factor model, including neglect work and social life, time management problem, emotional conflict, the PIU symptom in this study was divided into these three sub-constructs.

1.11.3 Massively Multiplayer Online Role-playing game

Massively Multiplayer Online Role-playing Game (MMORPG) are fantasy role-playing games played on the Internet, where several thousand various players from all around the world are present at the same time. A player controls his or her

character, which can fulfill various tasks, advance its capabilities, and interact with other player's characters. A player can perform a wide range of activities, from building his or her avatar's character to interacting with other players in both positive ways (conversation) and negative ways (aggression) (Young and Nabuco de Abreu, 2011).

Massively Multiplayer Online Role-playing Games (MMORPG) in this study refers to all the online role-playing games which allow a large number of individuals to play simultaneously in a virtual game world. These games include Everquest, Dark Age of Camelot, Ultima Online, Star Wars Galaxies, Final Fantasy XI, and World of Warcraft, etc.

1.11.4 Social Networking Site

Boyd and Ellison (2008) defined the social networking site(SNS) as “web-based services that allow individual to construct a public or semi-public profile within a bounded system; articulate a list of others users with whom they share a connection; view and traverse their list of connections and those made by others with the system”.

Social networking site (SNS) in this study refers to a web site that provides virtual community for individual to create their personal profile and interact with their real-life friends and other individuals with similar interests, such as Facebook, MySpace.

1.11.5 General Internet user and Others

General Internet user in this study is Internet user who may use various Internet applications, but is fascinated on some special Internet application or does not have favorite Internet applicaiton.

Others is Internet user who has other favorite Internet application than MMORPG and SNS, such as online shopping, searching.

1.11.6 Cognitive Distortion

“Cognitive distortion” was first proposed by Beck (1967) in the depression research, which was defined array of errors in thinking including arbitrary inference, selective abstraction, overgeneralization, magnification and minimization, personalization, absolutistic and dichotomous thinking.

Burns (1999) proposed ten types of cognitive distortion based on Beck’s work, including all-or-nothing thinking, overgeneralization, mental filter, discounting the positive, jumping to conclusions, magnification, emotional reasoning, should statements, labeling, personalization and blame.

Cognitive distortion in this study refers to errors either in interpretation or cognitive processing, which was examined via the cognitive distortion scale adapted by researcher. The short-form cognitive distortion scale has four sub-constructs, externalization of self-worth, magnification and minimization, perfectionism, comparison to others & labeling.

1.11.7 Motivation

Cuirrin (2007) reviewed the previous research and defined motivation as a “set of processes that simulate, guide and sustain human behavior towards accomplishing some goal”. It is a dynamic internal state resulting from the influence of personal and environmental factors. Motivation refers to “the reasons underlying behavior” (Guay, Chanal, Ratelle, Marsh, Larose, and Boivin, 2010).

Motivation in this study refers to the processes that accounts for an individual's intensity, direction and persistence of efforts towards Internet use. It will be assessed by a motivation of Internet use scale adapted by researcher. There are three sub-constructs in motivation of Internet use, entertainment and escape, social recognition and relationship maintenance, information seeking.

1.11.8 Loneliness

Perlman and Peplau (1981) defined loneliness as “the unpleasant experience that occurs when a person's network of social relations is deficient in some important way, either quantitatively or qualitatively”.

de Jong Gierveld (1998) reviewed the previous study and defined loneliness as “a situation experienced by the individual as one where there is an unpleasant or inadmissible lack of (quality of) certain relationships. This includes situations in which the number of existing relationships is smaller than is considered desirable or admissible, as well as situations where the intimacy one wishes for has not been realized. Thus loneliness is seen to involve the manner in which the person perceives, experiences, and evaluates his or her isolation and lack of communication with other people”.

Loneliness in this study is defined as the unpleasant feeling perceived by individual with social network deficits, which was examined by short-form UCLA Loneliness Scale (ULS-8) (Hays and DiMatteo, 1987).

1.11.9 Depression

Depression refers to a wide range of mental health problems characterized by the absence of a positive affect (a loss of interest and enjoyment in ordinary things and experiences), low mood and a range of associated emotional, cognitive, physical

and behavioural symptoms (National Collaborating Centre for Mental Health, 2010)

Depression in this study refers to depressed or sad mood, and decreasing interest in various activities, which could further influence individual's thoughts, behavior, feeling and physical well-being. It was examined by the depression subscale of The Depression Anxiety Stress Scale-21 (DASS-21) which is a self-report measure of depression developed by Lovibond and Lovibond (1995).

1.11.10 Stressful Life Events

Stressful Life Events is defined as stressful stimuli or situations to which everyone is exposed to a greater or lesser extent in the natural course of life (Dohrenwend and Dohrenwend, 1974).

Dohrenwend (2006) defined stressful life events as “occurrences that were likely to bring about readjustment-requiring changes in people's usual activities”.

Stressful life events in this study are array of stressors associated to University students' normal life which may produce stress on them, such as study, examinations. It was examined by a stressful life events scale adapted by researcher. Four sub-constructs were identified in this study, which are transformation on study, interpersonal & intrapersonal hassles, academic performance hassles, negative life events.

1.11.11 University Student

University student refers to the individual who pursue higher degree in university, which usually include the undergraduates and postgraduates.

In this study, university student is referred to the full-time undergraduate students in Universiti Teknologi Malaysia (UTM), usually including the students at the first year to the fourth year.

1.12 Summary

This chapter first introduced the development of Internet, and its advantages to contemporary life. The negative effect brought by the excessive Internet use that may lead to pathological Internet use was further discussed. Background of Massively multiplayer online role-playing games (MMORPG) and social networking site (SNS) regarding to the pathological Internet use in the previous literatures was illustrated in detail. A statement on the prevalence of pathological Internet use (PIU) in Malaysia, more opportunities and easier to develop pathological Internet use among University students, as well as the inconsistent findings and research absent from the previous researches were elaborated to stress the necessities to carry out this study. Objectives, questions and hypothesis were listed to instruct this study. The significance of how this study would benefit the empirical and practical field was explained.

In theoretical framework, this chapter introduced neuropsychological chain model of pathological Internet use from the China Youth Association for Network Development (CYAND, 2005) as its cornerstone to explain the process of development on pathological Internet use. Theories of use and gratification, Davis and Caplan referred as its superstructure to this study. To the conceptual framework, this chapter described the pathological Internet use influenced by multiple- variable system which was summarized to three aspects; include psychological, Internet use, and demographic factors.

The scope, limitation and definition of this study was elaborated in the end of this chapter, which further explained the location, subjects requirement, deficits of this study precisely as well as the key terms and operational definition.

REFERENCES

- Anderson, K. J. (2001). Internet addiction among college student: An exploratory study. *Journal of American College Health*. 50, 21-26.
- Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W. and Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment*. 10, 176–181.
- Azim, D. H. B. F., Zam, N. A. B. M. and Rahman, W. R. A. (2009, 17th -18th June). Internet Addiction Between Malaysian Male and Female undergraduate Human Sciences Students of The International Islamic University Malaysia. The 6th International Postgraduate Research Colloquium. p58-74. Srinakharinwirot University in Bangkok, Thailand.
- Adiele, I. and Olatokun, W. (2014). Prevalence and determinants of Internet addiction among adolescents. *Computers in Human Behavior*, 31, 100–110. doi:10.1016/j.chb.2013.10.028
- Bakken, I. J., Wenzel, H. G., Gøtestam, K. G., Johansson, A. and Øren, A. (2009). Internet addiction among Norwegian adults: A stratified probability sample study. *Scandinavian Journal of Psychology*. 50, 121–127.
- Balakrishnan, V. and Shamim, A. (2013). Malaysian Facebookers: Motives and addictive behaviours unraveled. *Computers in Human Behavior*, 29(4), 1342–1349. doi:10.1016/j.chb.2013.01.010
- Brown, T. A. (2012). *Confirmatory Factor Analysis for Applied Research* (Google eBook) (p. 475). Guilford Press. Retrieved from <http://books.google.com/books?id=QTasbvQCZQcC&pgis=1>

- Byrne, B. M. (2012). *Structural Equation Modeling with Mplus: Basic Concepts, Applications, and Programming (Google eBook)* (p. 430). Routledge.
Retrieved from <http://books.google.com/books?id=Gz7HEM0hBuAC&pgis=1>
- Beard, K. W. and Wolf, E. M. (2001). Modification in the proposed diagnostic criteria for Internet addiction. *Cyberpsychology and Behavior*. 4, 377–383.
- Beck, A. T. (1967). *Depression: Clinical, experimental, and theoretical aspects*. New York: Harper & Row.
- Blizzard Entertainment. (2008). World Of Warcraft ® Reaches New Milestone: 10 Million Subscribers. Retrieved January 21, 2008, from <http://eu.blizzard.com/en-gb/company/press/%20pressreleases.html?id=2443836>. Accessed: 2010-08-17. (Archived by WebCite® at <http://www.webcitation.org/5s2wFZWcx>).
- Bordens, K. S. and Abbott, B. B. (2011). *Research Design and Methods: A Process Approach (8th ed)*. New York: McGraw-Hill.
- Boyd, D.M. and Ellison, N.B. (2008). Social network sites: Definition, history, and scholarship. *J. Comput. Mediat. Comm.* 13, 210-230.
- Brown, T.A., Chorpita, B.F., Korotitsch, W. and Barlow, D.H. (1997). Psychometric Properties of the Depression Anxiety Stress Scales (DASS) in Clinical Samples. *Behaviour Research and Therapy*. 35(1), 79-89.
- Burns, D. D. (1999). *Feeling good: The new mood therapy*. Avon Books, New York.
- Canbaz, S., Tevfik Sunte, A., Peksen, Y., Canbaz, M. A. (2009). Prevalence of the Pathological Internet Use in a Sample of Turkish School. 38 (4), 64-71
- Cao, F. and Su, L. (2007). Internet addiction among Chinese adolescents: Prevalence and psychological features. *Child Care Health & Development*, 33(3), 275–281.
- Cao, F.L., Su, L.Y., Liu, T.Q. and Gao, X.P. (2007). The relationship between impulsivity and Internet addiction in a sample of Chinese adolescents. *European Psychiatry*. 22, 466-471. doi:10.1016/j.eurpsy.2007.05.004
- Caplan, S. E. (2002). Problematic Internet use and psychosocial well-being:

- Development of a theory-based cognitive-behavioral measurement instrument. *Computers in Human Behavior*. 18(5), 553–575. [http://dx.doi.org/10.1016/S0747-5632\(02\)00004-3](http://dx.doi.org/10.1016/S0747-5632(02)00004-3).
- Caplan, S. E. (2003). Preference for online social interaction: A theory of problematic Internet use and psychosocial well-being. *Communication Research*. 30(6), 625–648. <http://dx.doi.org/10.1177/0093650203257842>.
- Caplan, S. E. (2005). A social skill account of problematic Internet use. *Journal of Communication*. 55(4), 721–736.
- Caplan, S. E. (2007). Relations among loneliness, social anxiety, and problematic Internet use. *CyberPsychology & Behavior*. 10(2), 234–242. <http://dx.doi.org/10.1089/cpb.2006.9963>.
- Caplan, S. E. (2010). Theory and measurement of generalized problematic Internet use: A two-step approach. *Computers in Human Behavior*. 26(5), 1089–1097. <http://dx.doi.org/10.1016/j.chb.2010.03.012>.
- Chang, M. K. and Law S. P. M. (2008). Factor structure for Young's Internet Addiction Test: A confirmatory study. *Computers in Human Behavior*. 24(6), 2597–2619. doi:10.1016/j.chb.2008.03.001
- Chappell, D., Eatough, V., Davies, M. N. O. and Griffiths, M. D. (2006). EverQuest —It's Just a Computer Game Right? An Interpretative Phenomenological Analysis of Online Gaming Addiction. *International Journal of Mental Health and Addiction*. 4(3), 205-216.
- Charlton, J. P. and Danforth, I. D. W. (2007). Distinguishing addiction and high engagement in the context of online game playing. *Computers in Human Behavior*. 23, 1531–1548.
- Chan, K. and Fang, W. (2007). Use of the internet and traditional media among young people. *Young Consumers*, 8(4), 244–256. doi:10.1108/17473610710838608
- Cheak, A.P.C.C., Goh, G.G.G. and Chin, T.S. (2012, 15th -16th October). Online Social Networking Addiction: Exploring its Relationship with Social Networking Dependency and Mood Modification among Undergraduates in

- Malaysia. International Conference on Management, Economics and Finance (ICMEF 2012) Proceeding. Hilton Hotel, Kuching, Sarawak, Malaysia. ISBN: 978-967-5705-09-0.
- Chen, S.H., Weng, L.J., Su, Y. J., Wu, H.M. and Yang, P. F. (2003). Development of a Chinese Internet Addiction Scale and Its Psychometric Study. *Chinese Journal of Psychology*. 45(3), 279–294.
- Chou, C. and Hsiao, M. C. (2000). Internet addiction, usage, gratification, and pleasure experience: the Taiwan college students' case. *Computers & Education*. 35, 65–80.
- Chou, C. (2001). Internet abuse and addiction among Taiwan college students: An online interview study. *Cyberpsychol. Behav.* 4(5): 573–585.
- Chou, C., Chou, J. and Tyan, N. N. (1999). An exploratory study of Internet addiction, usage and communication pleasure—The Taiwan's case. *Int. J. Educ. Telecommun.* 5(1): 47–64.
- Chou, C., Condron, L. and Belland, J.C. (2005). A Review of the Research on Internet Addiction. *Educational Psychology Review*. 17(4), 363-387. DOI: 10.1007/s10648-005-8138-1
- Council on Science and Public Health. (2007). *Emotional and Behavioral Effects, Including Addictive Potential, of Video Games* (No. CSAPH Report 12-A-07). Retrieved from <http://www.ama-assn.org/ama1/pub/upload/mm/467/csaph12a07.doc>. Accessed: 2010-02-22. (Archived by WebCite® at <http://www.webcitation.org/5njUtlurL>).
- Cuirrin, M.O. (2007). An Empirical Analysis of the Interrelationship between Motivation and Stress in the Computing Industry. Thesis of Master degree: Waterford Institute of Technology.
- Chang, F.-C., Chiu, C., Lee, C.-M., Chen, P. and Miao, N.-F. (2014). Predictors of the initiation and persistence of Internet addiction among adolescents in Taiwan. *Addictive Behaviors*. doi:10.1016/j.addbeh.2014.05.010
- Dalbudak, E., Evren, C., Aldemir, S. and Evren, B. (2014). The Severity of Internet Addiction Risk and its Relationship with Severity of Borderline Personality

- Features, Childhood Traumas, Dissociative Experiences, Depression and Anxiety symptoms among Turkish University Students. *Psychiatry Research*. doi:10.1016/j.psychres.2014.02.032
- Department of Statistics, Malaysia. (2011). *population distribution and basic demographic characteristics2010.pdf*
- Derbyshire, K. L., Lust, K. A., Schreiber, L. R. N., Odlaug, B. L., Christenson, G. A., Golden, D. J. and Grant, J. E. (2013). Problematic Internet use and associated risks in a college sample. *Comprehensive Psychiatry*, 54(5), 415–22. doi:10.1016/j.comppsy.2012.11.003
- Durkee, T., Kaess, M., Carli, V., Sarchiapone, M., Wasserman, C., Hoven, C. and Wasserman, D. (2013). 1672 – Pathological internet use among european adolescents: psychopathology and self-destructive behaviors. *European Psychiatry*, 28, 1. doi:10.1016/S0924-9338(13)76661-6
- Daria, J. Kuss and Griffiths M.D. (2011). Online Social Networking and Addiction—A Review of the Psychological Literature. *Int. J. Environ. Res. Public Health*. 8, 3528-3552; doi:10.3390/ijerph8093528
- Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. *Computers in Human Behavior*. 17, 187–195.
- Davis, R. A., Flett, G. L. and Besser, A. (2002). Validation of a new scale for measuring problematic Internet use: Implications for pre-employment screening. *CyberPsychology & Behavior*. 5(4), 331–345. <http://dx.doi.org/10.1089/109493102760275581>.
- de Jong Gierveld J. (1998). A review of loneliness: concept and definitions, determinants and consequences. *Reviews in Clinical Gerontology*. 8, 73–80.
- Dohrenwend B. S., Dohrenwend B. P. (Eds). (1974). *Stressful life events: Their nature and effects*. New York: Wiley.
- Dohrenwend, B. P. (2006). Inventorying stressful life events as risk factors for psychopathology: Toward resolution of the problem of intracategory variability. *Psychological Bulletin*, 132(3), 477–95. doi:10.1037/0033-2909.132.3.477

- Du, W.P., Liu, J., Gao, X. P., Li L. J., Li W. H., Li, X., Zhang, Y. and Zhou, S. K. (2011). Functional magnetic resonance imaging of brain of college students with internet addiction. *Journal of Central South University (Medical Science)*. 36(8), 744-749. doi:10.3969/j.issn.1672-7347.2011.08.008
- Ducheneaut, N. and Moore, R. J. (2004). The social side of gaming: A study of interaction patterns in a massively multiplayer online game. Paper presented at the ACM conference on Computer-Supported Cooperative Work (CSCW2004), New York.
- Durkee, T., Kaess, M., Carli, V., Parzer, P., Wasserman, C., Floderus, B., Apter, A., Balazs, J., Barzilay, S., Bobes, J., Brunner, R., Corcoran, P., Cosman, D., Cotter, P., Despalins, R., Graber, N., Guillemin, F., Haring, C., Kahn, J.P., Mandelli, L., Marusic, D., Mészáros, G., Musa, G.J., Postuvan, V., Resch, F., Saiz, P.A., Sisask, M., Varnik, A., Sarchiapone, M., Hoven, C.W. and Wasserman, D. (2012). Prevalence of pathological internet use among adolescents in Europe: demographic and social factors. *Addiction*. 107(12), 2210–2222. doi:10.1111/j.1360-0443.2012.03946.x
- Echeburua, E. and de Corral, P. (2010). Addiction to new technologies and to online social networking in young people: A new challenge. *Adicciones*. 22, 91-95.
- Eldeleklioglu, J. (2008). Gender, romantic relationships, internet use, perceived social support and social skills as the predictors of loneliness. *Egitim Arastirmalari - Eurasian Journal of Educational Research*, 33,127-140.
- Esen, B. K., Aktas, E. and Tuncer, I. (2013). An Analysis of University Students' Internet Use in Relation to Loneliness and Social Self-efficacy. *Procedia - Social and Behavioral Sciences*, 84, 1504–1508. doi:10.1016/j.sbspro.2013.06.780
- Fortson, B.L., Scotti, J.R., Chen, Y.C., Malone, J., Del Ben, K.S. (2007). Internet use, abuse, and dependence among students at a southeastern regional university. *J Am Coll Health*. 56, 137-144.
- Frangos, C. C., Frangos, C. C. and Kiohos, A. P. (2010). Internet addiction among Greek university students: Demographic associations with the phenomenon,

- using the Greek version of Young's internet addiction test. *International Journal of Economic Sciences and Applied Research*, 3(1), 49–74.
- Freeman, K.S. (2012) "Internet Addiction of Online Gaming among College Youth in Malaysia" Athens: ATINER'S Conference Paper Series, No: MED2012-0143.
- Ferraro, G., Caci, B., D'Amico, A. and Di Blasi, M. (2007). Internet addiction disorder: an Italian study. *Cyberpsychology & Behavior : The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society*, 10(2), 170–5. doi:10.1089/cpb.2006.9972
- Gámez-Guadix, M., Villa-George, F.I. and Calvete, E. (2012). Measurement and analysis of the cognitive-behavioral model of generalized problematic Internet use among Mexican adolescents. *Journal of Adolescence*. 35, 1581–1591. <http://dx.doi.org/10.1016/j.adolescence.2012.06.005>
- Gencer, S. L. and Koc, M. (2012). Internet Abuse among Teenagers and Its Relations to Internet Usage Patterns and Demographics. *Educational Technology & Society*, 15 (2), 25–36.
- Goldberg, I. (1996). Internet addiction. Electronic message posted to Research Discussion List. Research @ PsyCom.net World Wide Web, <http://www.cmhc.com/mlists/research/> and <http://www-usr.rider.edu/~suler/psycyber/supportgp.html>
- González, E. and Orgaz, B. (2014). Problematic online experiences among Spanish college students: Associations with Internet use characteristics and clinical symptoms. *Computers in Human Behavior*, 31, 151–158. doi:10.1016/j.chb.2013.10.038
- Goodwin, C. J. (2002). *Research in Psychology: Methods and Design (3rd ed)*. New York: John Wiley and Sons.
- Gortmaker, S. L., Eckenrode, J. and Gore, S. (1982). Stress and the utilization of health services: A time series and cross-sectional analysis. *Journal of Health and Social Behavior*, 23,24-38.
- Griffiths, M. D. (1998). Internet addiction: Does it really exist? In Gackenbach, J.

- (ed.), *Psychology and the Internet: Intrapersonal, Interpersonal, and Transpersonal Implications*, Academic Press, New York.
- Grüsser, S.M., Thalemann, R. and Griffiths, M.D. (2007). Excessive computer game playing: Evidence for addiction and aggression? *Cyberpsychology and Behavior*. 10, 290–292.
- Guan, S.S. and Subrahmanyam, K. (2009). Youth Internet use: Risks and Opportunities. *Curr Opin Psychiatry*. 22(4), 351-356. DOI:10.1097/YCO.0b013e32832bd7e0.
- Guay, F., Chanal, J., Ratelle, C. F., Marsh, H. W., Larose, S. and Boivin, M. (2010). Intrinsic, identified, and controlled types of motivation for school subjects in young elementary school children. *British Journal of Educational Psychology*, 80(4), 711–735.
- Gravetter, F. J. and Forzano, L. B. (2009). *Research Methods for the Behavioral Sciences (3rd)*. United States of America: Wadsworth Cengage Learning.
- Haddadain, F., Abedin, A. and Monirpoor, N. (2010). Appraisal of Personality, Family Structure and Gender in Predicting Problematic use of Internet. *Procedia Social and Behavioral Sciences*. 5, 850-854. doi:10.1016/j.sbspro.2010.07.197.
- Hall, A. S. and Parsons, J. (2001). Internet addiction: College student case study using best practices in cognitive behavior therapy. *Journal of Mental Health Counseling*. 23(4), 312-327.
- Hardie, E. and Tee, M. Y. (2007). Excessive Internet use: The role of personality, loneliness and social support networks in Internet addiction. *Australian Journal of Emerging Technologies and Society*, 5(1), 34–47.
- Harrington, D. (2008). *Confirmatory Factor Analysis (Google eBook)* (p. 136). Oxford University Press. Retrieved from <http://books.google.com/books?id=PPbgH8fzwAUC&pgis=1>
- Hays, R. D. and DiMatteo, M. R. (1987). A short-form measure of loneliness. *Journal of Personality Assessment*, 51,69–81.
- Hechanova, M. R. M. and Czincz, J. (2008). Scoping Study: Psychology and

- Information and Communication Technology in Asia. *Internet Addiction in Asia: Reality or Myth*, 1-51.
- Henry, J.D. and Crawford, J.R. (2005). The Short-form Version of the Depression Anxiety Stress Scales (DASS-21): construct validity and normative data in a large non-clinical sample. *The British Journal Of Clinical Psychology*. 44 (2), 227-39. The British Psychological Society.
- Howitt, D. and Cramer, D. (2008). *Introduction to Research Methods in Psychology (2nd Edition)*. England: Pearson Education Limited.
- Howitt, D. and Cramer, D. (2011). *Introduction to Research Methods in Psychology (3rd ed)*. London: Pearson.
- Hawa binti Rahmat (2004). Internet Addiction, Locus of Control, and Social Isolation among Malaysian Adolescents. Thesis of Master degree. International Islamic University Malaysia.
- Internet Usage World Stats- The Big Picture- Population Statistics (2011). Available <http://www.internetworldstats.com/stats.htm>
- Ji, Y.G., Hwangbo, H., Yi, J.S., Rau, P.L.P., Fang, X.W. and Ling, C. (2010). The influence of cultural differences on the use of social network services and the formation of social capital. *Int. J.Hum-Comput. Int.* 26. 1100-1111.
- Jia, R. and Jia, H.H. (2009). Factorial validity of problematic Internet use scales. *Computers in Human Behavior*. 25(6), 1335–1342.
- Johansson, A. and Götestam, K.G. (2004). ‘Internet addiction: characteristics of a questionnaire and prevalence in Norwegian youth (12-18 years)’, *Scandinavian Journal of Psychology*. 45, pp. 223-229.
- Ju, M.H. (2000). Research on personal characteristics, the behavior of using Internet and Internet addiction for Taiwanese college study. Master thesis. Taiwan.
- Jelenchick, L. a, Becker, T. and Moreno, M. a. (2012). Assessing the psychometric properties of the Internet Addiction Test (IAT) in US college students. *Psychiatry Research*, 196(2-3), 296–301. doi:10.1016/j.psychres.2011.09.007
- Jöreskog, K., Sörbom, D., du Toit, S. and du Toit, M. (1999). LISREL 8: New

- statistical features. Chicago: Scientific Software International.
- Khazaal, Y., Billieux, J., Thorens, G., Khan, R., Louati, Y., Scarlatti, E., ... Zullino, D. (2008). French validation of the internet addiction test. *Cyberpsychology & Behavior : The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society*, 11(6), 703–6. doi:10.1089/cpb.2007.0249
- Korkeila, J., Kaarlas, S., Jääskeläinen, M., Vahlberg, T. and Taiminen, T. (2010). Attached to the web--harmful use of the Internet and its correlates. *European Psychiatry: The Journal of the Association of European Psychiatrists*, 25(4), 236–41. doi:10.1016/j.eurpsy.2009.02.008
- Kalkan, M. (2012). Productiveness of Interpersonal Cognitive Distortions on University Students' Problematic Internet Use. *Children and Youth Services Review*. 34, 1305-1308. doi:10.1016/j.childyouth.2012.03.003
- Kalmus, V. Realo, A. and Siibak, A. (2011). Motives for Internet Use and Their Relationships with Personality Traits and Socio-demographic Factors. *Trame: A Journal of the Humanities & Social Sciences*. 15(4), 385-403. DOI: 10.3176/tr.2011.4.04
- Kaltiala-Heino, R., Lintonen, T. and Rimpela, A. (2004). Internet addiction? Potentially problematic use of the internet in a population of 12–18 year-old adolescents. *Addiction Research and Theory*. 12, 89–96.
- Kandell, J.J. (1998). Internet Addiction on Campus: The vulnerability of College Students. *Cyberpsychology & Behavior*. 1(1), 11-17.
- Katerelos, I. Tsekeris, C., Lavdas, M. and Dimitriou, K. (2011). A Psychosocial Approach to the Use of the Internet and Massive Online Role Playing Games. *Philosophy, Sociology, Psychology and History*. 10 (1), 73-88.
- Khazaal, Y., Billieux, J., Thorens, G., Khan, R., Louati, Y., Scarlatti, E., Theintz, F., Lederrey, J., Linden, M. V. D. and Zullino, D. (2008). French validation of The Internet Addiction Test. *Cyberpsychol Behav*. 2008;11:703-706.
- Kalkan, M. (2012). Predictiveness of interpersonal cognitive distortions on university students' problematic Internet use. *Children and Youth Services Review*, 34(7), 1305–1308. doi:10.1016/j.childyouth.2012.03.003

- King, D. L., & Delfabbro, P. H. (2014). The cognitive psychology of Internet gaming disorder. *Clinical Psychology Review*, 34(4), 298–308. doi:10.1016/j.cpr.2014.03.006
- King, D. L., Delfabbro, P. H., Zwaans, T. and Kaptsis, D. (2013). Clinical features and axis I comorbidity of Australian adolescent pathological Internet and video game users. *The Australian and New Zealand Journal of Psychiatry*, 47(11), 1058–67. doi:10.1177/0004867413491159
- Kuss, D. J. and Griffiths, M. D. (2011). Internet Gaming Addiction : A Systematic Review of Empirical Research. doi:10.1007/s11469-011-9318-5
- Kuss, D. J., Griffiths, M. D. and Binder, J. F. (2013). Internet addiction in students: Prevalence and risk factors. *Computers in Human Behavior*, 29(3), 959–966. doi:10.1016/j.chb.2012.12.024
- Kuss, D. J., van Rooij, A. J., Shorter, G. W., Griffiths, M. D. and van de Mheen, D. (2013). Internet addiction in adolescents: Prevalence and risk factors. *Computers in Human Behavior*, 29(5), 1987–1996. doi:10.1016/j.chb.2013.04.002
- Kim, J. LaRose, R. and Peng, W. (2009). Loneliness as the Cause and the Effect of Problematic Internet Use: The Relationship between Internet Use and Psychological Well-being. *CyberPsychology & Behavior*. 12(4), 451-455. DOI: 10.1089=cpb.2008.0327
- Kim, J. S. and Chun, B. C. (2005). Association of Internet Addiction with Health Promotion Lifestyle Profile and Perceived Health Status in Adolescents. *Journal of Preventive Medicine and Public Health*, 38, 53– 60.
- Kim, K., Ryub, E. J., Chon, M. Y., Yeunb, E. J., Choic, S. Y., Seod, J. S. and Nam B.Y. (2006). Internet addiction in Korean adolescents and its relation to depression and suicidal ideation: A questionnaire survey. *International Journal of Nursing Studies*, 43, 185–192.
- Kim, Y.; Sohn, D.; Choi, S.M. (2011). Cultural difference in motivations for using social network sites: A comparative study of American and Korean college students. *Comput. Hum. Behav.* 27, 365-372.

- Kim, J.H.; Kim, M.S.; Nam, Y. (2010). An analysis of self-construals, motivations, facebook use, and user satisfaction. *Int. J. Hum-Comput. Int.* 26, 1077-1099.
- Kirschner, P.A. and Karpinski, A.C. (2010). Facebook and academic performance. *Comput. Hum. Behav.* 26, 1237-1245.
- Ko, Ch., Yen, Ju., Lin, H. and Yang, M. (2007). Factors predictive for incidence and remission of Internet addiction in young Adolescents: a Prospective Study. *Cyber Psychology*, 10.545-551.
- Ko, C.H., Liu, G.C., Hsiao, S., Yen, J.Y., Yang, M.J., Lin, W.C., Yen, C. F., Chen, C.S. (2009). Brain activities associated with gaming urge of online gaming addiction. *Journal of Psychiatric Research*, 43(7), 739–47. doi:10.1016/j.jpsychires.2008.09.012
- Krejcie, R. V. and Morgan, D. W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*. 30, 607-610.
- Kubey, R. W., Lavin, M. J. and Barrows, J. R. (2001). Internet use and collegiate academic performance decrements: Early findings. *Journal of Communication*. 51, 366–382.
- Kujath, C.L. (2011). Facebook and MySpace: Complement or substitute for face-to-face interaction? *Cyberpsychol. Behav. Soc. Network*. 14, 75-78.
- Kuss, D. J. and Griffiths, M. D. (2011). Internet Gaming Addiction: A Systematic Review of Empirical Research. *Int J Ment Health Addiction*. DOI 10.1007/s11469-011-9318-5.
- Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford Press.
- Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: Guilford.
- Li, H., Wang, J. and Wang, L. (2009). A Survey on the Generalized Problematic Internet Use in Chinese College Students and its Relations to Stressful Life Events and Coping Style. *Int J Ment Health Addiction*. 7(2), 333–346. DOI 10.1007/s11469-008-9162-4

- Little, T. D., Cunningham, W. a., Shahar, G. and Widaman, K. F. (2002). To Parcel or Not to Parcel: Exploring the Question, Weighing the Merits. *Structural Equation Modeling: A Multidisciplinary Journal*, 9(2), 151–173. doi:10.1207/S15328007SEM0902_1
- Lang, A., Potter, R.F. and Bolls, P.D. (2009). *Where psychophysiology meets the media: Taking the effects out of mass communication research*. In Media Effects: Advances in Theory and Research; Bryant, J., Oliver, M.B., Eds.; Routledge Taylor and Francis Group: New York, NY, USA, pp. 185-206.
- Laura Widyanto and Mark Griffiths (2006). ‘Internet Addiction’: A Critical Review. *Int J Ment Health Addict*. 4: 31–51. DOI:10.1007/s11469-006-9009-9. <http://www.austgamingcouncil.org.au/images/pdf/eLibrary/3043.pdf>.
- Lavin, M.J., Yuen, C.N., Weinman, M. and Kozak, K. (2004). Internet dependence in the collegiate population: the role of shyness. *Cyberpsychol Behav*. 7, 379-383.
- Lee, M. S., Ko, Y. H., Song, H. S., Kwon, K. H., Lee, H. S., Nam, M. and Jung, I. K. (2007). Characteristics of Internet use in relation to game genre in Korean adolescents. *CyberPsychology and Behavior*, 10(2), 278-285.
- Leung, L. (2007). Stressful Life Events, Motives for Internet Use, and Social Support Among Digital Kids. *CYBERPSYCHOLOGY & BEHAVIOR*. 10(2), 204-214. DOI: 10.1089/cpb.2006.9967
- Leung, L. W. , 2010-06-21 "Effects of Motives for Internet Use, Aloneness, and Age Identity Gratifications on Online Social Behaviors and Social Support Among Adolescents" *Paper presented at the annual meeting of the International Communication Association, Suntec Singapore International Convention & Exhibition Centre, Suntec City, Singapore Online* <APPLICATION/PDF>. 2012-06-19 from http://www.allacademic.com/meta/p403922_index.html
- Li, D., Zhang, W., Li, X., Zhen, S. and Wang, Y. (2010). Stressful life events and problematic Internet use by adolescent females and males: A mediated

- moderation model. *Computers in Human Behavior*, 26(5), 1199–1207.
[http:// dx.doi.org/10.1016/j.chb.2010.03.031](http://dx.doi.org/10.1016/j.chb.2010.03.031).
- Li, H. and Lin, C-D. (2005). The Measurement of Stressful Events in Chinese College Students. *Psychology in the Schools*. 42(3), 315-323. DOI: 10.1002/pits.20082
- Li, H. H., Wang, J.Q. and Wang, L. (2009). A Survey on the Generalized Problematic Internet Use in Chinese College Students and its Relations to Stressful Life Events and Coping Style. *Int J Ment Health Addiction*. 7(2), 333–346. DOI 10.1007/s11469-008-9162-4.
- Li, H. and Wang, S. (2013). The role of cognitive distortion in online game addiction among Chinese adolescents. *Children and Youth Services Review*, 35(9), 1468–1475. doi:10.1016/j.childyouth.2013.05.021
- Li, S. M. and Chung, T. M. (2006). Internet function and Internet addictive behavior. *Computers in Human Behavior*, 22, 1067–1071.
- Linacre, J.M. (2012). A User's Guide to Winsteps Rasch-Model Computer Programs. ISBN 0-941938-03-4.
- Ling, C. S., Ramadass S., Altaher, A. and Arjuman, N. C. (2011). Malaysian Internet Surfing Addiction (MISA): Factors Affecting the Internet Use and Its Consequences. 2011 International Conference on Computer Applications and Industrial Electronics (ICCAIE 2011).
- Liu, M. and Peng, W. (2009). Cognitive and Psychological Predictors of the Negative outcomes Associated with Playing MMOGs (massively multiplayer online games). *Computer in Human Behavior*. 25, 1306-1311. doi:10.1016/j.chb.2009.06.002
- Lodico, M.G., Spaulding, D.T. and Voegtle, K.H. (2006) *Methods in Educational Research: from theory to practice*. USA: Jossey-Bass A Wiley.
- Lovibond, S.H. and Lovibond, P.F. (1995). Manual for the Depression Anxiety Stress Scales (2nd ed.). Sydney: Psychology Foundation.
- Lu, X. (2011). Parenting Stress and Psychological Distress among Mothers of Children with Autism in Johor Bahru and Hangzhou. Unpublished Master

- dissertation, Universiti Teknologi Malayisa, Johor, Malaysia.
- Lu, X., Watanabe, J., Liu, Q.B., Uji, M., Shono, M. and Kitamura, T. (2011). Internet and Mobile Phone Text-messaging Dependency: Factor Structure and Correlation with Dysphoric mood among Japanese Adults. *Computers in Human Behavior*. 27, 1702-1709.
- Lu, X. and Yeo K. J. (2013). Depression and Internet use in a Sample of Malaysian Undergraduate Students. *Journal of Education and Vocational Research*, 4(10), 317-325.
- Lai, C., Hil, M. P., Mak, K., Watanabe, H., Ang, R. P., Pang, J. S., ... Sych, M. (2013). Psychometric Properties of the Internet Addiction Test in Chinese Adolescents, 1–14.
- Mai, Y.J., Hu, J.P., Yan, Z., Zhen, S.J., Wang, S.J. and Zhang, W. (2012). Structure and function of maladaptive cognitions in Pathological Internet Use among Chinese adolescents. *Computers in Human Behavior*. 28, 2376–2386. <http://dx.doi.org/10.1016/j.chb.2012.07.009>
- Meerkerk, G. J. (2007). Pwned by the internet: explorative research into the causes and consequences of compulsive internet use. Thesis of Doctor degree Rotterdam: IVO. Dissertation. <http://www.ivo.nl/?id=557>.
- Meerkerk, G. J., Van den Eijnden, R. J. J. M. and Van Rooij, A. J. (2006). *Monitor Internet en Jongeren: Compulsief Internetgebruik onder Nederlandse Jongeren [Monitor Internet and Youth: Compulsive Internet Use Among Dutch Youth]* (Factsheet). Rotterdam: IVO. Retrieved from <http://bit.ly/auw1Nc>.
- Meerkerk, G. J., Van den Eijnden, R. J. J. M., Vermulst, A. A. and Garretsen, H. F. L. (2009). The Compulsive Internet Use Scale (CIUS): Some Psychometric Properties. *CyberPsychology & Behavior*, 12(1), 1-6. doi:10.1089/cpb.2008.0181
- Mei, S. L., Ge, L. J., Kou, C. G., Zhang, D., Chen, Y. F., Yu, Y. Q. (2008). Life Events and Adjustment of College Students with Internet Addiction. *CHINESE MENTAL HEALTH JOURNAL*. 22(3), 206-209.

- Michael D. DiNicola (2004). Pathological Internet Use among College Students: The Prevalence of Pathological Internet Use and Its Correlates. Thesis of Doctor degree: Ohio University.
- Morahan-Martin, J. and Schumacher, P. (2000). Incidence and correlates of pathological Internet use among college students. *Comput Human Behav.* 16:13-29.
- Moreno, M.A. Jelenchick, L., Cox, E., Young, H. and Christakis, D. A. (2011). Problematic Internet Use Among US Youth: A Systematic Review. *Arch Pediatr Adolesc Med.* 165(9),797–805. doi:10.1001/archpediatrics.2011.58.
- Morris, Alexandra (2011). *A Web of Distortion: How Internet Use is Related to Cognitive Distortion, Personality Traits, and Relationship Dissatisfaction*, Philadelphia College. http://digitalcommons.pcom.edu/psychology_dissertations/191
- Morrison, C.M. and Gore, H. (2010). The Relationship between Excessive Internet Use and Depression: A Questionnaire-Based Study of 1319 Young People and Adults. *Psychopathology.* 43, 121-126. DOI:10.1159/000277001
- Mai, Y., Hu, J., Yan, Z., Zhen, S., Wang, S. and Zhang, W. (2012). Structure and function of maladaptive cognitions in Pathological Internet Use among Chinese adolescents. *Computers in Human Behavior*, 28(6), 2376–2386. doi:10.1016/j.chb.2012.07.009
- National Collaborating Centre for Mental Health, (2010). *Depression: The Treatment and Management of Depression in Adults (updated edition)*. The British Psychological Society and The Royal College of Psychiatrists: Great Britain.
- Ng, C. G., Isa, S. M., Hashim, A. H., Pillai, S. K. and Harbajan Singh, M. K. (2012). Validity of the Malay Version of the Internet Addiction Test: A Study on a Group of Medical Students in Malaysia. *Asia-Pacific Journal of Public Health / Asia-Pacific Academic Consortium for Public Health.* doi:10.1177/1010539512447808
- Ng, B. D. and Wiemer-Hastings, P. (2005). Addiction to the Internet and Online

- Gaming. *CyberPsychology & Behavior*, 8(2), 110–113. doi:10.1089/cpb.2005.8.110
- Ni, X.L., Yan, H., Chen, S. and Liu, Z. (2009). Factors influencing Internet addiction in a sample of freshmen university students in China. *Cyberpsychol Behav* 12, 327-330.
- Niemz, K., Griffiths, M. and Banyard, P. (2005). Prevalence of Pathological Internet Use among University Students and Correlations with Self-esteem, the General Health Questionnaire (GHQ), and Disinhibition. *Cyberpsychol Behav.* 8, 562-570.
- Naval Bajpai. (2011). *Business Research Methods*. India: Pearson.
- Odacı, H. (2012). Risk-taking behavior and academic self-efficacy as variables accounting for problematic internet use in adolescent university students, *Children and Youth Services Review*. <http://dx.doi.org/10.1016/j.chilyouth.2012.09.011>
- Odacı, H. and Çelik, Ç. B. (2013). Who are problematic internet users? An investigation of the correlations between problematic internet use and shyness, loneliness, narcissism, aggression and self-perception. *Computers in Human Behavior*, 29(6), 2382–2387. doi:10.1016/j.chb.2013.05.02
- Odacı, H. and Kalkan, M. (2010). Problematic Internet use, loneliness and dating anxiety among young adult university students. *Computers & Education*, 55(3), 1091–1097. doi:10.1016/j.compedu.2010.05.006
- Orsal, O., Orsal, O., Unsal, A. and Ozalp, S. S. (2013). Evaluation of Internet Addiction and Depression among University Students. *Procedia - Social and Behavioral Sciences*, 82, 445–454. doi:10.1016/j.sbspro.2013.06.291
- Özdemir, Y., Kuzucu, Y. and Ak, Ş. (2014). Depression, loneliness and Internet addiction: How important is low self-control? *Computers in Human Behavior*, 34, 284–290. doi:10.1016/j.chb.2014.02.009
- Panayides, P. and Walker, M. J. (2012). Evaluation of the Psychometric Properties of the Internet Addiction Test (IAT) in a Sample of Cypriot High School Students: The Rasch Measurement Perspective. *Europe's Journal of*

Psychology. 8(3), 327–351, doi:10.5964/ejop.v8i3.474

- Park, H.S., Kim, S.H., Bang, S.A., Yoon, E.J., Cho, S.S. and Kim, S.E. (2010). Altered regional cerebral glucose metabolism in Internet game over users: A F-18-fluorodeoxyglucose Positron Emission Tomography study. *CNS Spectr.* 15, 159-166.
- Park, S. K., Kim, J. Y. and Cho, C. B. (2008). Prevalence of internet addiction and correlations with family factors among South Korean adolescents. *Journal of Adolescents*. 43 (172), 895-909.
- Parsons, J. M. (2005) An examination of massively multiplayer online role-playing games as a facilitator of internet addiction. Thesis for Doctor degree: University of Iowa. <http://ir.uiowa.edu/etd/98>.
- Pawlikowski, M. and Brand, M. (2011). Excessive Internet gaming and decision making: Do excessive World of Warcraft players have problems in decision making under risky conditions? *Psychiatry Research*. 188, 428–433.
- Pay-Ling Harn, Pei-Li Wu, Sue-Huei Chen and Yu-Wen Chang. (2007). A Study of the Internet Addiction Model for Northern Taiwanese High School Students. *Bulletin of Educational Psychology*. 38 (3), 355-373
- Peng, W. and Liu, M. (2010). Online gaming dependency: A preliminary study in China. *CyberPsychology, Behavior, and Social Networking*, 13(3), 329–333. [http:// dx.doi.org/10.1089/cyber.2009.0082](http://dx.doi.org/10.1089/cyber.2009.0082).
- Perlman, D. and Peplau, L. A. (1981). “Toward a Social Psychology of Loneliness.” In R. Duak & R. Gihour (Eds.), *Personal Relationships in Disorder*. London: Academic Press, 1981.
- Raacke, J. and Bonds-Raacke, J. (2008). MySpace and Facebook: Applying the uses and gratifications theory to exploring friend-networking sites. *CyberPsychology & Behavior*, 11(2), 169-174.
- Rahmat, H. (2004). Internet Addiction, Locus of Control, and Social Isolation among Malaysian Adolescents. Thesis of Master degree. International Islamic University Malaysia.
- Riva, G., Teruzzi, T. and Anolli, L. (2003). The Use of the Internet in Psychological

- Research: Comparison of Online and Offline Questionnaires. *Cyberpsychol Behav.* 6(1), 73-80.
- Rosenfield, B. M. (2004). *The relationship between cognitive distortions and psychological disorders across diagnostic axes*. Unpublished doctoral dissertation, Philadelphia College of Osteopathic Medicine.
- Ross, S. E. Niebling, B. C. and Heckert, T. M. (1999). Sources of Stress among College Students. *College Student Journal.* 33(2), p312.
- Rotsztein, B. (2003, April 10). Problem Internet use and locus of control among college students: Preliminary findings. The 35th Annual Conference of the New England Educational Research Organization Portsmouth, New Hampshire.
- Rubin, A. M. (1994). Media uses and effects: A uses and gratifications perspective. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (pp. 417–436). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Ruggiero, T. E. (2000). Uses and Gratifications Theory in the 21st Century. *Mass Communication & Society.* 3(1), 3-37.
- Rumpf, H.-J., Vermulst, A. A., Bischof, A., Kastirke, N., Gürtler, D., Bischof, G., ... Meyer, C. (2013). Occurrence of Internet Addiction in a General Population Sample: A Latent Class Analysis. *European Addiction Research*, 20(4), 159–166. doi:10.1159/000354321
- Senormancı, O., Saraçlı, O., Atasoy, N., Senormancı, G., Koptürk, F. and Atik, L. (2014). Relationship of Internet addiction with cognitive style, personality, and depression in university students. *Comprehensive Psychiatry*. doi:10.1016/j.comppsy.2014.04.025
- Song, H., Zmyslinski-Seelig, A., Kim, J., Drent, A., Victor, A., Omori, K. and Allen, M. (2014). Does Facebook make you lonely?: A meta analysis. *Computers in Human Behavior*, 36, 446–452. doi:10.1016/j.chb.2014.04.011
- Stavropoulos, V., Alexandraki, K. and Motti-Stefanidi, F. (2013). Recognizing internet addiction: prevalence and relationship to academic achievement in adolescents enrolled in urban and rural Greek high schools. *Journal of*

- Adolescence*, 36(3), 565–76. doi:10.1016/j.adolescence.2013.03.008
- Salmans, Sandra (1997). *Depression: Questions You Have – Answers You Need*. People's Medical Society. ISBN 978-1-882606-14-6.
- Sato, T. (2006). Internet Addiction among Students: Prevalence and psychological problems in Japan. *Japan Medical Association Journal*. 49(7*8), 279-283
- Serin, N.B. (2011). An Examination of Predictor Variables for Problematic Internet Use. *The Turkish Online Journal of Educational Technology*. 10(3), 54-62.
- Shaughnessy, J.J., Zechmeister, E.B. and Zechmeister, J.S. (2006). *Research methods in psychology (7th ed)* New York: McGraw-Hill.
- Siomos, K.E., Dafouli, E.D., Braimiotis, D.A., Mouzas, O.D., Angelopoulos, N.V., (2008), 'Internet Addiction among Greek adolescent Students', *CyberPsychology & Behavior*, 11, pp. 653-657.
- Soh, P. C-H., Chew, K.W., Veeri, C.A. and Ang, P.H. (2011). Ethnic-based Digital Divide and Internet Use Among Malaysian Students. *Akademika*. 81(1), 93-100.
- Soule, L., Shell, W. and Kleen, B. (2003). Exploring Internet addiction: Demographic characteristics and stereotypes of heavy internet users. *The Journal of Computer Information Systems*, 44(1), 64-73.
- Spraggins, A. (2009). Problematic use of online social networking sites for college students: prevalence, predictors, and association with well-being. Thesis of Doctor degree. University of Florida. <http://ufdc.ufl.edu/UFE0024085/00001>
- Subrahmanyam, K., Reich, S.M., Waechter, N. and Espinoza, G. (2008) Online and offline social networks: Use of social networking sites by emerging adults. *J. Appl. Dev. Psychol.* 29, 420-433.
- Schermelleh-engel, K., Moosbrugger, H. and Müller, H. (2003). Evaluating the Fit of Structural Equation Models: Tests of Significance and Descriptive Goodness-of-Fit Measures, 8(2), 23–74.
- Schmitt, T. a. (2011). Current Methodological Considerations in Exploratory and Confirmatory Factor Analysis. *Journal of Psychoeducational Assessment*,

29(4), 304–321. doi:10.1177/0734282911406653

- Schumacker, R. E. and Lomax, R. G. (2012). *A Beginner's Guide to Structural Equation Modeling: Third Edition (Google eBook)* (p. 536). Routledge. Retrieved from <http://books.google.com/books?id=30KkFDyUvEoC&pgis=1>
- Tang, J., Yu, Y., Du, Y., Ma, Y., Zhang, D. and Wang, J. (2014). Prevalence of internet addiction and its association with stressful life events and psychological symptoms among adolescent internet users. *Addictive Behaviors*, 39(3), 744–7. doi:10.1016/j.addbeh.2013.12.010
- Teo, T.S.H. (2001). Demographic and Motivation Variables Associated with Internet Usage Activities. *Internet Research: Electronic Networking Applications and Policy*. 11 (2), 125-137. ISSN: 1066-2243.
- The Nielsen Company. Global Faces and Networked Places; The Nielsen Company: New York, NY, USA, 2009; Available online: http://blog.nielsen.com/nielsenwire/wp-content/uploads/2009/03/nielsen_globalfaces_mar09.pdf
- Thissen, D. W. H. (2001). Test scoring. Hillsdale, NJ: Lawrence Erlbaum.
- Thomee, S., Eklo, F. M., Gustafsson, E., Nilsson, R. and Hagberg, M. (2007). Prevalence of perceived stress, symptoms of depression and sleep disturbances in relation to information and communication technology (ICT) use among young adults: an explorative prospective study. *Computers in Human Behavior*, 23, 1300–1321.
- Tsai, H.F., Cheng, S. H., Yeh, T.L., Shih, C. C., Chen, K.C., Yang, Y. C. and Yang, Y.K. (2009). The Risk Factors of Internet Addiction -a Survey of University Freshman. *Psychiatry Research*. 167, 294-299.
- Uhl, J. K. (2007). *The relationship between cognitive distortions and psychological and behavioral factors in a family medicine outpatient sample*. Unpublished doctoral dissertation, Philadelphia College of Osteopathic Medicine.
- Van den Eijnden, R.J.J.M, Meerkerk G-J, Vermulst, A.A., Spijkerman, R. and Engels, R.C. (2008). Online communication, compulsive internet use, and

- psychosocial well being among adolescents: a longitudinal study. *Dev Psychol.* 44, 655–665.
- Van Rooij, A. J., Schoenmakers, T. M., Van de Eijnden, R. J. J. M. and Van de Mheen, D. (2010). Compulsive Internet Use: The Role of Online Gaming and Other Internet Applications. *The Journal of Adolescent Health*, 47(1), 51-57. doi:10.1016/j.jadohealth.2009.12.021
- Wan, C. (2009). Gratifications & loneliness as predictors of campus-SNS websites addiction & usage pattern among Chinese college students. M.S. Thesis, Chinese University of Hong Kong: Hong Kong, China.
- Whaley, D. (2007). *The relationship between distorted thinking of parents and their adult offspring*. Unpublished doctoral dissertation, Philadelphia College of Osteopathic Medicine.
- Whang, L.S., Lee, S. and Chang, G. (2003). Internet Over-Users' Psychological Profiles: A Behavior Sampling Analysis on Internet Addiction. *Cyberpsychology & Behavior*. 6(2), 143-150.
- Widyanto, L. and McMurrin, M. (2004). The psychometric properties of the Internet Addiction Test. *CyberPsychology & Behavior*, 7(4), 443-450.
- Wilson, K., Fornasier, S. and White, K. M. (2010). Psychological predictors of young adults' use of social networking sites. *Cyberpsychology, Behavior and Social Networking*, 13(2), 173–7. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/20528274>
- Wise, K., Alhabash, S. and Park, H. (2010). Emotional responses during social information seeking on Facebook. *Cyberpsychol. Behav. Soc. Network.* 13, 555-562.
- Wu, C-H. and Yao, G. (2008). Psychometric Analysis of the Short-form UCLA Loneliness Scale (ULS-8) in Taiwanese Undergraduate Students. *Personality and Individual Differences*. 44, 1762-1771.
- Whitely, B. E. (2002). *Principles of Research in Behavioral Science (2nd ed)*. United States of America: McGraw-Hill Higher Education.
- Walker, J. T. and Maddan, S. (2012). *Statistics in Criminology and Criminal Justice*

- (p. 590). Jones & Bartlett Publishers. Retrieved from <http://books.google.com/books?id=S3JzW3jSUCoC&pgis=1>
- Widyanto, L., Griffiths, M. D. and Brunsten, V. (2011). A psychometric comparison of the Internet Addiction Test, the Internet-Related Problem Scale, and self-diagnosis. *Cyberpsychology, Behavior and Social Networking*, 14(3), 141–9. doi:10.1089/cyber.2010.0151
- Widyanto, L. and McMurrin, M. (2004). The psychometric properties of the internet addiction test. *CyberPsychology & Behavior*, 7, 443–450. Retrieved from <http://online.liebertpub.com/doi/abs/10.1089/cpb.2004.7.443>
- Woods, C.M. and Edwards, M. C. (2007). *Handbook of Statistics: Epidemiology and Medical Statistics (Google eBook)*. (D. C. Rao, C.R., Miller.J.P.& Rao, Ed.) (Vol. 2007, p. 870). Elsevier. Retrieved from <http://books.google.com/books?id=M0c58Rw3bEsC&pgis=1>
- Yang, C. K., Choe, B. M., Baity, M., Lee, J. H. and Cho, J. S. (2005). SCL-90-R and 16PF profiles of senior high school students with excessive Internet use. *Can J Psychiatry*, 50 (7): 407-414.
- Yao, B., Han, W., Zeng, L. and Guo, X. (2013). Freshman year mental health symptoms and level of adaptation as predictors of Internet addiction: a retrospective nested case-control study of male Chinese college students. *Psychiatry Research*, 210(2), 541–7. doi:10.1016/j.psychres.2013.07.023.
- Yao, M. Z. and Zhong, Z. (2014). Loneliness, social contacts and Internet addiction: A cross-lagged panel study. *Computers in Human Behavior*, 30, 164–170. doi:10.1016/j.chb.2013.08.007
- Yang, S. C. and Tung, C. J. (2007). Comparison of Internet addicts and non-addicts in Taiwanese high school. *Computers in Human Behavior*, 2379–2396.
- Yadav, P., Banwari, G., Parmar, C. and Maniar, R. (2013). Internet addiction and its correlates among high school students: a preliminary study from Ahmedabad, India. *Asian Journal of Psychiatry*, 6(6), 500–5. doi:10.1016/j.ajp.2013.06.004
- Yates, T. M. Gregor, M.A. and Haviland, M.G. (2012). Child Maltreatment,

- Alexithymia, and Problematic Internet Use in Young Adulthood. *Cyberpsychol Behav Soc Netw.* 15(4), 219-215. doi: 10.1089/cyber.2011.0427.
- Yen, J. Y., Ko, C. H., Yen, C. F., Wu, H. Y. and Yang, M. J. (2007). The comorbid psychiatric symptoms of Internet addiction: Attention deficit and hyperactivity disorder (ADHD), depression, social phobia, and hostility. *Journal of Adolescent Health*, 41(1), 93–98.
- Yong, S.Q. (2011). A Study of Internet Addiction among Students of Sekolah Menengah Jenis Kebangsaan Pei Yuan, Kampar. Thesis of Bachelor degree. Universiti Tunku Abdul Rahman. <http://eprints.utar.edu.my/274/1/PY-2011-0802518.pdf>
- Young, K. (1998). Internet addition: the emergence of a new clinical disorder. *Cyber Psychology and Behavior*, 1(3), 237–244.
- Young, K. S. and Nabuco de Abreu, C. (Eds.) (2011). *Internet Addiction: A Handbook and Guide to Evaluation and Treatment*. The United States of American: John Wiley & Sons, Inc.
- Young, K.S., (2004), ‘Internet Addiction: A New Clinical Phenomenon and Its Consequences’, *American Behavioral Scientist*, 48, pp. 402-415.
- Yovanoff, P. T. G. (2007). Scaling Early Reading Alternate Assessments with Statewide Measures. *Council for Exceptional Children*, vol. 73(2), pp. 184-201.
- Yurica, C. (2002). *Inventory of cognitive distortions: development and validation of psychometric test for the measurement of cognitive distortions*. Unpublished doctoral dissertation, Philadelphia College of Osteopathic Medicine, Philadelphia, Pennsylvania.
- Yurica C. L. and DiTomasso R. (2001). Inventory of cognitive distortion: development and validation of a psychometric test for the measurement of cognitive distortions. Ph.D Thesis, Philadelphia College of Osteopathic Medicine.
- Yu, J. J., Kim, H. and Hay, I. (2013). Understanding adolescents’ problematic

Internet use from a social/cognitive and addiction research framework.
Computers in Human Behavior, 29(6), 2682–2689.
doi:10.1016/j.chb.2013.06.045

Yu, S., Hsu, W., Yu, M. and Hsu, H. (2012). Is the use of Social Networking Sites Correlated with Internet Addiction? Facebook Use among Taiwanese College Students. *World Academy of Science, Engineering and Technology* 68, 1659–1661