Internet Addiction Mediates the Relationships Among Internet Skill and Gratification of Using Internet with Social Isolation Among Malaysian Youths: The Moderating Roles of Gender and Race

Toktam Namayandeh Joorabchi & Mohammad Saber Afshariyan
Azad University Mashhad, Iran

Ramin Armat
Azad University Tabriz, Iran

ABSTRACT

Excessive use of the Internet in recent years has caused different social problems. One of the most important consequences of excessive Internet usage is Internet addiction among students which directly affects their academic performance personal relationships with others, leading to social isolation. This study attempts to identify the relationships among gratification of using the Internet, Internet skill, Internet addiction, and social isolation among university students. In addition, the mediating role of Internet addiction between gratification of using the Internet and Internet skill with social isolation, and the role of race and gender were examined. A total of 440 university students in the age range of 18 to 40 years from the University of Putra Malaysia (UPM) participated in the study. Students completed a self-rank questionnaire measuring their Internet dependency. Structural Equation Modeling estimated that Internet addiction had moderating effects on gratification of using the Internet and social isolation. The moderation of race and gender on the model was not supported. In addition, females were more addicted and consequently more isolated from the society in comparison to males, though there were differences for Malay and non-Malay students.

Keywords: *Internet usage; Gratification of Internet usage; Internet Skill; Internet addiction; Social isolation; Race; Gender; Malaysia*

INTRODUCTION

Among there are many advantages of the Internet, it has some unfavorable and sometimes harmful effects which we can refer to Internet addiction. According to Robertson et al., (2018), Internet addiction is also labeled as pathological Internet use, problematic Internet use and compulsive Internet use. Young (1998) also defined five kinds of Internet addiction as follows: 1) computer addiction (games), 2) Internet addiction in general, 3) addiction to online shopping and gambling, 4) addiction to online pornography, and finally the most recent type of addiction, 5) social media addiction, which refers to extreme and unrestrained use of social media. Internet addicts might abandon social and interpersonal interactions (Kheirkhah et al., 2010). Internet addiction can cause social isolation which can be explained in terms of finite social interactions between a person and other individuals. Such interactions are among the main measures of a person's social isolation. More significantly, a person's finite social network might be the consequence of different limitations (in a time-geographic sense) on his/ her daily activities. As a result, social isolation can be clarified through space-time activity analysis contingent on time geography (Byrne, 1999). For instance, in an earlier study those participants who had high scores on the loneliness test rated lower on face-to-face communication but higher for their frequency of online interactions (James, 2012).

In recent years, we note that nearly 53.6% of the world's population has an Internet connection and among the world population (7,772,333,760), there are 4,574,150,134 Internet users (Clement,

2020). In 2020, Malaysia's population was 32,365,999 people and there were 26,353,017 Internet users in June 2019, with 81.4% penetration (Internet World Stats, 2020). In Malaysia men (59.0%) outnumbered women (41.0%) in the distribution of Internet users. The Department of Statistics Malaysia Official Portal (DOSM), indicates that the sex ratio of the Malaysian population was 1.1, while the survey showed that sex ratio of Internet users was 1.4. The distribution of Internet users by gender recorded a fixed trend throughout the year (Malaysian Communications and Multimedia Commission, 2018).

Internet use might increase the quality of social relationships as special applications make it easier to communicate with others. For instance, Fjeld et al., (2015) suggested notions for more tabletop technology to better back contemplation in public contacts. They visualized tabletops that could inspire cooperation and engage users in socially related activities, like political knowledge and civil participation. Chan et al., (2017) emphasized cooperation in domestic areas, targeting to increase, rather than replace, the parent-child communication and their close relationship. The purpose is to assist parents think about the words they use in communicating with their children, giving them the chance to adapt their attitude while educating the children about rules and manners. Nevertheless, different studies have demonstrated that utilizing the Internet for amusement or communicating with strangers is negatively associated with the quality of social relationships. For instance, the low cost of online communication regardless of physical distance might inspire people to differentially enhance their communication with fragile ties or strangers. More use of the Internet to communicate with more fragile ties (especially, meeting new people and hanging out in groups composed of strangers) was linked to the growing number of depression cases in comparison with the base rate. On the contrary, more online communication with friends and family was linked with decreases in depression (Sutcliffe et al., 2011). Furthermore, in a longitudinal study, Blais, Craig, Pepler & Connolly (2008) followed teens over the course of a year and claimed that using the Internet for amusement negatively influenced the quality of both best-friend and romantic relationships by the passage of time.

On the other hand, poor relationships might enhance compulsive or uncontrolled Internet use. Communication theories propose that people might utilize media content to escape their offline life or feelings. Besides, the people who spent more time on social media showed a decrease in their emotional well-being, leading to the view that social media caused the user to experience negative feelings and moods (Christensen, 2018; Zillmann, 1988). Christensen (2018) demonstrated the negative influences of social media on relationships, namely that it disturbs the user from participating in face-to-face communication with other people or activities. Further, it was found that social media use makes the user more nervous, annoyed, restless, envious, judged, ignored, or desiring to escape in their relationships. Escapism is explained as a mental retreat for people feeling troubled or uneasy in the real world (Vorderer et al., 2004). Mood management theory (Zillmann, 1988) predicts that people look for media amusement to get in or hold a positive mood. Experiencing negative influence within a relationship may inspire relationship partners to utilize the Internet to flee from this unsatisfactory condition and to get into a better mood (Kerkhof et al., 2011). These outcomes suggest that the problematic part for close relationships is uncontrolled and compulsive use of the Internet, not the frequency of the Internet use or the mixture of frequency and uncontrolled and compulsive Internet use. While using the Internet for private reasons, partners may use the Internet together or use the Internet for communicating with each other, which explains the finding that continuous Internet usage for private reasons is positively associated with relationship quality (Kerkhof et al., 2011).

Tokunaga and Rains (2010) showed that uncontrollable Internet usage is associated positively with time spent on the Internet (the average correlation is 0.39, based on a recent meta-analysis). Besides, the partners of compulsive Internet users might easily assume that the Internet is utilized to search for or participate in alternative relationships or activities. Empirical studies support this suggestion (Kerkhof et al., 2011). Thus, the current study attempts to offer a better understanding

of the use of Internet by concentrating on the relations between gratification of using the Internet and social isolation with mediation effects of Internet addiction together with the analysis of the race and gender in this model as a mediator.

LITERATURE REVIEW

Gender and Social Isolation and Internet Addiction

Internet Addiction (IA) has been defined as a clinically relevant phenomenon which might influence both men and women (Anderson et al., 2017; Liang et al., 2016). The global ubiquity of Internet addiction was projected to reach 6.0% (95% CI: 5.1–6.9) based on a meta-analysis from 31 countries spanning different global areas (Cheng & Li, 2014). Several publications have shown that males have higher prevalence estimates of IA (Mei et al., 2016; Tsitsika et al., 2014). This result is consistent with previous researches (Chen et al., 2001; Yang et al., 2005). Also, Minutillo et al., (2016) found a clear gender-related imbalance with females being less prone to exhibiting most addiction behaviors. The stereotypic profile of an "Internet addict" as a young, computer-savvy male is similar to earlier research suggesting that males mostly used and felt comfortable with information technologies (Furman et al., 2007; Kheirkhah et al., 2010; Yen et al., 2007).

Sally (2006), via the Chi-square test, found that the level of Internet addiction was independent of gender which was significant at the 0.05 level. A comparative study of gender representation demonstrated that female students significantly outnumbered male students, not only in moderate user groups but also in excessive user groups. Earlier research has shown that males are more likely to be addicted to the Internet, but according to Sally (2006), females had a higher score than males. Further, Ko, Yen, & Yen (2005) found the occurrence rates and correlations of adolescent Internet addiction have differed based on gender and age. Bakken, Wenzel, Götestam, Johansson, & Øren (2009) noted that the proportion of Internet users was slightly higher among men (89.1%) compared to women (85.3%). Youthful age, being male, being single, living in a city, being in an unsatisfactory financial situation, and having a higher education level, were all positively linked with "problematic Internet use"; while, age, gender, the educational level, and the financial situation remained significant. In the study by Yen, Ko, Yen, Chang, & Cheng (2009), older boys had the highest rate of Internet addiction among the four groups (older boys, younger boys, older girls, younger girls), followed by younger boys. No difference in the rate of Internet addiction was found between older and younger girls.

Oguz & Cakir (2014) found that participants' opinions on loneliness and Internet addiction differed based on the gender variable. It was observed that male teacher participants were lonelier compared to female teacher participants. Similarly, it was observed that the participants' ideas on the levels of Internet addiction differed in the same way. Male teacher participants were more addicted to Internet than female teacher participants. Other earlier studies support this conclusion (Cuhadar, 2012; Odaci & Kalkan, 2010).

Internet Addiction

The following terms: Internet Addiction, Excessive Internet Use, Internet Addiction Disorder, Compulsive Internet Use, Pathological Internet Use and Problematic Internet Use have all been used to clarify more or less the same notion, that is, that an individual can be so involved in their online use that he/she neglects other aspects of life (Widyanto & Griffiths, 2006). It has also been characterized by extreme or poorly controlled preoccupations, desires or behaviors concerning computer usage and Internet access that lead to damage or extreme anxiety (Shaw & Black, 2008). An Italian study showed that 5.4% of students had Internet addiction (Pallanti et al., 2006). Another study reported that the occurrence rate of Internet addiction was 2.4% among Chinese high school students, and adolescents with Internet addiction had various psychological qualities in comparison

with those who used the Internet less often (Cao & Su, 2007). The results of a study in Italy showed that young users were more at risk of Internet addiction compared to adults (Cho & Lee, 2004).

Social Isolation

Some studies have shown that loneliness and depression have increased seriously within the past decade in countries with high use of social media (Pittman & Reich, 2016). There is no doubt that intensive social media use and higher rates of depression and loneliness are related (Kerkhof et al., 2011). Lonely individuals may be drawn online due to the enhanced potential for friendship, the changed social interaction patterns online, and to adjust negative moods linked with loneliness. Online, social presence and closeness levels can be controlled; users can be unseen while they watch the interactivity of others and can control the amount and timing of their interactivity (Morahan-Martin & Schumacher, 2003). Internet usage separates individuals from the real world and prevents them from having the sense of belonging and connection with real world contacts. As a result, loneliness can be a consequence of extreme Internet usage because users spend time online, and they often invest in weak and artificial online relationships, at the expense of real life relationships. Besides, online communication boosts technological alienation, which creates obstacles between participants, even for those knowing each other in other settings. The implied belief of those supporting this hypothesis is that online relationships are superficial in comparison with those in real life (Morahan-Martin & Schumacher, 2003). The Internet is a perfect social environment for lonely people to interconnect with others. It is not only an extremely expanded social network, but it also gives modified social interaction patterns online that might be specifically fascinating to those who are lonely. Online anonymity, hiding, and lack of physical presence let users control social interaction. They can select not only with whom and when to communicate, but also, they have time to write messages. Internet communication eases uninhibitedness, self-disclosure, closeness, and raised self-presentation, as well as presented a context for the practice and growth of social skills (Morahan-Martin & Schumacher, 2003).

Internet Skill and Internet Addiction

Sally (2006) claimed that there is no systematic link between one's level of Internet addiction and his/her Internet experience (media literacy). Nevertheless, the results of a study done by Wegmann & Brand (2015) focused on the role of Internet literacy in regulating the use of Social Networking Sites (SNS). Their findings indicated that users with higher self-regulation abilities were less exposed for IA–SNS. Possibly, they are better capable of controlling their online behavior. The influence of underlying psychopathological signs on self-regulation shows that people who feel relaxed in social conditions or have depressive signs have more problems in regulating their SNS use. This might then result in negative consequences from extreme SNS use. Also, the correlation analysis results from the study indicated that the individual estimation of one's competence and responsibility in producing new content might increase the possibility of IA–SNS (Wegmann et al., 2015).

Leung and Lee (2012) found a relationship between Internet literacy and IA. They noted that the capability in dealing with information overload and a vast knowledge about Internet uses and functions were linked with loss of control and the preference of being online. It seems that the users felt more relaxed with computers than direct interaction with people in real life. A strong engagement in SNS could increase the probability of Internet addiction (SIA–SNS). If people make use of SNS for commenting or creating content and get a positive answer repeatedly, they will end up wasting time online and experiencing negative outcomes (Davis, 2001). Thus, the reinforcement of the production and interactivity of new content could lead to an extreme use of SNS.

Uses and Gratification Theory

Some lonely individuals might make use of the Internet as an escape like reducing stress and alleviating negative emotions which are linked with loneliness (Booth, 2000). The Internet has a disadvantage for the lonely users as well. In spite of the possible positive effect of Internet use for those who are lonely, they seem to be more at risk than others who develop problems in their lives from Internet use like school, work, social disruption (Morahan-Martin & Schumacher, 2000; Young, 1998). Young (2011) mentioned the signs of Internet addiction as the follows: increasing the time to get the primary levels of content, confronting dysphonic feelings while curtailing its usage, staying online longer than intended, exposing important relationships or educational/vocational chances to risk due to activities, and lying to important others to hide the extent of inclusion and using it as a way of getting away from problems or alleviating a dysphonic feeling.

Uses and Gratifications Theory (U&G) proposes that one's underlying desires and needs drives his/her communicative behavior. Thus, an early study posits that people are not considered as being equally or uniformly purposeful, active and motivated in their use of media to fulfill underlying desires and needs. Individual factors, expectations towards the media, the nature of use and their satisfaction mediate results of use, both intended, like the content of special needs, and unintended like addiction. (Katz et al., 1974). The U&G model suggests that an individual's psychological and social conditions affect one's needs (visible in communication bases), which consequently affect choice and use of communication. Although background factors and motives affect media effects, U&G proposes that a more complete picture of the effects of media includes factors like social and psychological features, media use bases, and media use working together.

The conceptual framework arising from the literature that will guide this study is illustrated in Figure 1 below.
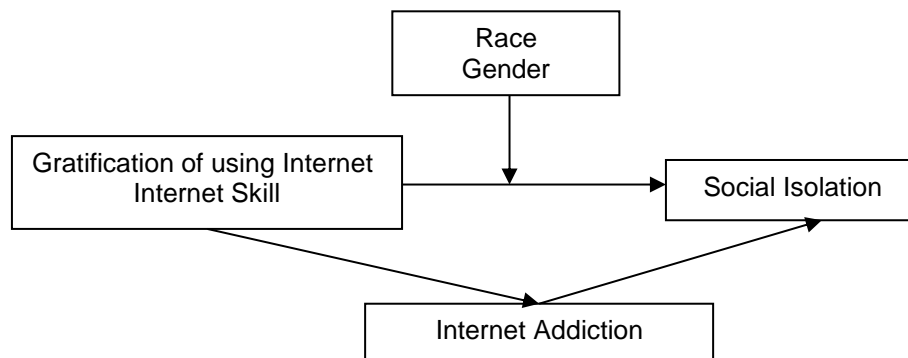

***Figure 1*:** Conceptual Framework of Study

METHODOLOGY

Participants

By using stratified random sampling, 440 students (male students: $n= 143$, 32.3 %, female students: $n= 297$, 67.7 %) were selected for this study. The participants were students at the University Putra Malaysia distributed as follows:
- Malay: $n=294$, 66.8 %, Chinese: $n=111$, 25 %, and Indian: $n=17$, 3.9%)
- undergraduate: $n= 349$, 79.3%, postgraduate: $n= 91$, 20.7%).

- The age inclusion criteria was between 18 to 40 years old based on the definition of the youth in Malaysia (Deros et al., 2008). There were ten respondents who were older than 40 years and they were omitted from the analysis
- age range for the respondents was between 18 to 40 (M= 21.89, SD= 3.20). In addition,
- the sample included Muslim (*n*= 303, 68.9%), Buddhist (*n*= 85, 19.1%), Christian (*n*= 34, 7.5%), and Hindu (*n*= 18, 3.9%) participants.

Procedure

Permission to collect data from students was obtained from the University of Putra Malaysia (UPM). All students were informed about the aims of the study, and they were assured that their information would be kept confidential, and they could withdraw from the research at any time. They had to be Internet users, as well as UPM students. The sample size was calculated based on the population of each faculty. For example, the faculty of agriculture had 1285 undergraduate students and 483 postgraduates, so 24 undergraduate and 9 postgraduate students were selected from this faculty, therefore 33 questionnaires were completed. Of 480 questionnaires distributed among students, 40 questionnaires were unusable, and 440 questionnaires were used for this study.

Measures

Internet use gratification was measured by 23 items, divided into 5 separate dimensions namely: cognitive with 6 items (M= 4.18), personal integration with 5 items (M=3.61), escape, (M= 3.91) social integration (M= 3.79), and affective (M= 3.78) with 4 items. Items were measured using 5-point Likert scale, ranging from "*strongly agree*" to "*strongly disagree*" (Sharon, 2000). Test scores were from 23 to 115. If a participant had a high score in Internet use gratification, it meant that he/she had the maximum pleasure using the Internet. To assess the reliability and validity of the research tools, Convergent validity (AVE) and Construct Reliability (CR) were used. Convergent validity (AVE) was 0.650; and Construct Reliability (CR) was 0.90. Therefore, the Internet use gratification scale was reliable.

Internet skill was measured by one item, on a 5-point Likert scale. Respondents were asked to identify their skills ranging from 1= *"not skillful at all"* to 5= *"very skillful"*. Internet skill was operationalized as an interval measurement. Score range for Internet skill was from 1 to 5. If a student got a high score, it meant that he/she was very skillful in using the Internet. Internet addiction was measured by 19 items on a 5-point Likert scale ranging from "*not at all*" to "*always*", being measured by interval scale. Internet addiction measurements mostly included "stay online more than intended", "lose your sleep", "grade decrease at school", "feel moody and depressed when you are offline". The range of scores for this dimension was from 19 to 95. If a student had a high score in the Internet addiction dimension, it meant that he/she had a high risk of addiction to the Internet. Convergent validity (AVE)[1] was 0.931, and Construct Reliability[2] was 0.976.

For measuring social isolation, 19 items were used on a 5-point Likert scale ranging from "*strongly agree*" to "*strongly disagree*". The range of scores for social isolation was 19 to 95. If a participant got a high score in this dimension, it meant that he/she was very isolated from the society. Most of

---

[1] Composite reliability (CR), is a reliability indicator like Cronbach's Alpha, however, in Cronbach's Alpha factor loadings are assumed to be equal for all items, while in CR, the varying factor loadings of the items are taken into consideration. CR values of 0.7 and above are generally acceptable (Dakduk, S., González, Á., & Portalanza, A. (2019). *Learn about structural equation modeling in smartPLS with data from the customer behavior in electronic commerce study in Ecuador (2017)*. SAGE Publications, Limited.

[2] Average of variance extracted (AVE) is an indicator of convergent validity measuring the variance captured by a construct associated with the amount of variance caused by measurement error. Generally, AVE of at least 0.5 or higher is demanded ibid.

the items asked about "pretend to be someone else", "prefer to communicate online", "share intimate online", and "anonymity". For this dimension AVE was 0.95, and CR was 0.98.

The following four items - race, gender, educational level, and religion described the personal features of the respondents.

Data Analysis

The data were analyzed using descriptive statistics and inferential statistics by applying Structural Equation Modeling (SEM) and use of the Statistical Package for Social Science (SPSS) for determining the relationship among variables. Descriptive analysis was employed to determine the gratification of using the Internet, social isolation and Internet addiction. Inferential analysis and Structural Equation Modeling employed the regression analysis technique for the mediating effects of Internet addiction in relationship with gratification of Internet usage, Internet skills, and social isolation. In addition, the effects of moderator variables such as race and gender were also measured in this model. Tarka (2018), explains the advantages of SEM as follows: It provides advanced and quick computational solutions such as carrying out similar experimental plans and meticulously confirming the correlations among the variables and examining the available relationships of cause and effect. As SEM can provide models for complicated relationships and variables, the size of the sample is a significant point (Tarka, 2018). In addition, SEM techniques merely consider linear relationships among the variables through creating bivariate scatterplots. If two variables have quadratic relationships, power transformation can be created. Another point is that multicollinearity of the indirect variables can be an issue. Most programs examine the determinant of a section of covariance matrix, or the whole covariance matrix. A very small determinant might represent extreme multicollinearity.

FINDINGS

For measuring the reliability of the instrument, a questionnaire was distributed among 30 students in a pilot test to measure social isolation and Internet addiction. The results of the Cronbach Alpha test shows that the reliability of the instrument was higher than 0.7. The α for the following dimensions are as follows: for Internet addiction dimension α = 0.94, for gratification dimension α=0.91 and for social isolation α=0.94.

Before analyzing the data, all the data were tested for normality. The results of the normality test showed that the data was normal. As shown in Table 1, the correlation coefficient between Internet addiction and social isolation for female students were higher than male students, whereas the correlation coefficient between Internet skill and social isolation for male students were higher than female students.

Table 1: Pearson Correlation for studied variables between male and female students

Variables	1	2	3	4
Internet addiction	1			
Social isolation	**0.430**** (0.490) **	1		
Internet skill	**-0.074** (-0.123)	**-0.127* (-0.099)**	1	
Gratification	**0.319**** (0.329)**	**0.254**** (0.191) *	**-0.094** (-0.172) *	1
Mean	**56.80** (51.47)	**50.77** (47.73)	**2.35** (2.45)	**3.85** (3.85)
SD	**13.76** (13.20)	**12.57** (12.13)	**0.78** (0.76)	**0.54** (0.50)
Actual range	**19-95** (19-87)	**19-95** (19-87)	**1-5** (1-5)	**23-115** (23-114)

Results for males are shown in bold text in the table. *p<0.05, **p<0.01.

Measurement Model

The measurement model used to study the variables provided acceptable results. The goodness of fit is shown as follows: (CMIN/DF= 184.116, *df* =49, p <0.05, RMSEA=0.079, CFI = 0.977, GFI = 0.927, IFI = 0.977). RMSEA in the range of 0.05 to 0.10 was considered an indication of fair fit and values above 0.10 indicated poor fit (MacCallum et al., 1996). An RMSEA of between 0.08 to 0.10 provides a mediocre fit and below 0.08 shows a good fit (MacCallum et al., 1996).

Structural Model

The structural model included Internet use gratification, Internet skill, and Internet addiction as an exogenous variable, and social isolation as an endogenous variable. Internet addiction had a positive influence on social isolation (*β*=0.412, p<0.05), Internet skill had no significant impact on social isolation (*β=-0.066*, p=0.126), and the influence of gratification of using Internet and social isolation was not statistically significant (*β*=0.071, p=142). The variables explained 21% of the variance of social isolation.

P<0.05; Gratification of using Internet (GR) Dimensions; affective (GR_Af), cognitive (GR_Cog), escape (GR_Es), social integration (GR_SI) and personal integration (GR_PI). Social integration (SI) dimensions online communication (OC), anonymity and Share limited secret (SLS). Internet addiction dimensions interrupted performance in life (IPL), stay longer time (SLT), interrupted performance in school (IPS)
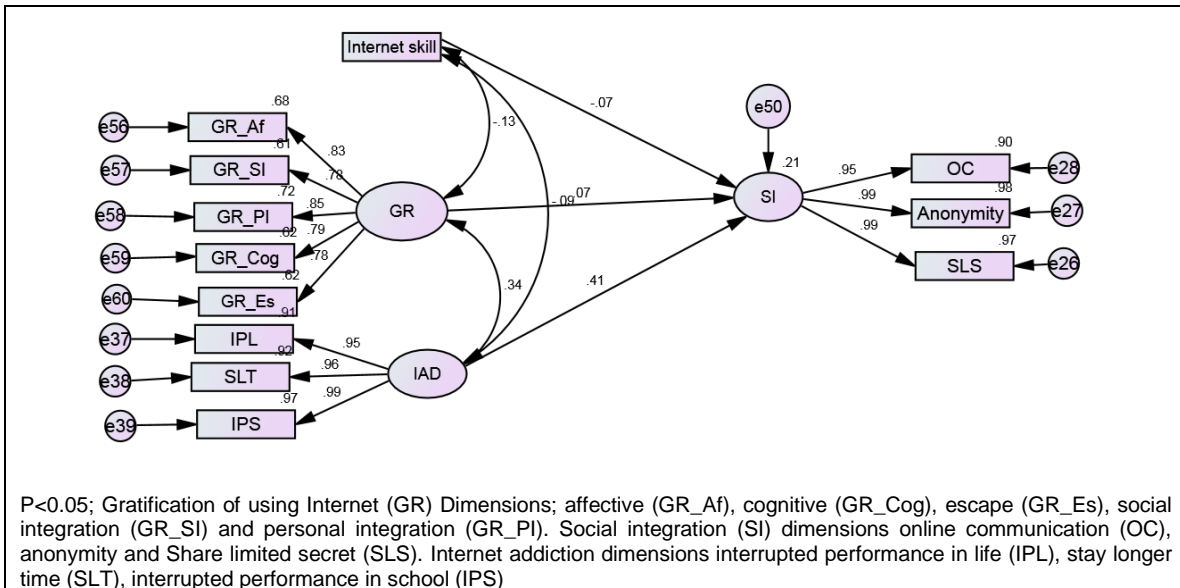
Figure 2: Path analysis of the variables

Mediation Test of Internet Addiction

The mediation test of IA included gratification of using Internet and Internet skill as exogenous variables and Internet addiction and social isolation as endogenous variables. Based on Baron & Kenny (1986) there are three steps to show that a mediator (Internet addiction) mediates the relationship between the exogenous variable (gratification of using Internet and Internet skill) and endogenous variable (social isolation). In first step, we had to demonstrate that the variable (gratification of using Internet and Internet skill) was significantly related to the moderator (Internet addiction). The next step, the exogenous variable (gratification of using Internet and Internet addiction) had to be significantly related to the endogenous variable (social isolation). In the final step, Internet addiction (mediator) had to be significantly related to the endogenous variable (social isolation). If the relationship between the exogenous variable and the endogenous variable was zero when the mediator was included, full mediation was established. However, if the relationship

between the exogenous variable (gratification of using the Internet) and the endogenous variable (social isolation) was reduced when the mediator was included, partial mediation was established.

Due to the fact that the Chi-square of full mediation model is lower than that of indirect model, [the indirect model is (CMIN/DF= 147.941, *df* =50, p <0.05, RMSEA=0.067, CFI = 0.983, GFI = 0.945, IFI = 0.983) and full mediation model is (CMIN/DF= 141.764, *df* =48, p <0.05, RMSEA=0.067, CFI = 0.984, GFI = 0.946, IFI = 0.984)], the mediation effect was accepted. Internet addiction mediates the gratification of using the Internet, Internet skill and social isolation. The influence of gratification of using the Internet on Internet addiction was (*β*=0.347, p<0.05) with 34% prediction. In addition, the effects of gratification on using the Internet on social isolation were statistically significant and positive with 8% prediction. The influence of Internet skill and social isolation was not significant and there was no statistically significant relationship between Internet skill and Internet addiction (*β*=-0.038, p>0.05). Forty percent of influence on social isolation was associated with Internet addiction. Internet addiction partially mediated the relationship between gratification of using the Internet and social isolation as shown in Table 2.

Table 2: *Standard Regression Weights*

Items		Mediation model	Direct model	Indirect model
Gratification---->	Internet addiction	0.347***		0.346***
Internet skill---->	Internet addiction	-0.038		-0.080
Internet addiction ---->	Social isolation	0.405**		
Gratification ---->	Social isolation	0.089***	0.229***	
Internet skill---->	Social isolation	-0.064	-0.080	

P<0.05

Moderation Test for Gender

A comparison between "the unconstrained model" and "the measurement residuals model" showed that the unconstrained model [(Δχ2 = 223.407, *df* =98, p <0.05, RMSEA=0.054, CFI = 0.978, GFI =0.917, IFI = 0.978) and the measurement model (Δχ2 = 241.241, *df* =127, p <0.05, RMSEA=0.045, CFI= 0.980, GFI= 0.909, IFI= 0.980)] were significant. Therefore, the unconstrained model performed better than the measurement model indicating that there were differences between males and females in terms of using the Internet and social isolation and Internet addiction. The findings showed that there was a significant relationship between gratification of using the Internet and social isolation for male students (*β=0.*127, *p*<0.05), however, no statistically meaningful relationship was found between Internet use gratification and social isolation for female students (*β=-0.037*, p>0.05) as shown in Table 3.

Table 3: *Regression Weights: (Gender Variant Model)*

Items		B	SE	β	C.R.	P
Internet addiction ---->	Social isolation	**.756**	**.129**	**.483**	**5.882**	*******
		.523	.085	.357	6.184	***
Gratification ---->	Social isolation	**-.010**	**.022**	**-.037**	**-.434**	**.664**
		.034	.016	.127	2.111	.035
Internet skill---->	Social isolation	**-.050**	**.074**	**-.051**	**-.672**	**.502**
		-.068	.049	-.073	-1.380	.168

P<0.05; Results for female students are shown in bold text

Moderation Test for Race

For measuring the moderation effects of race the participants were divided into two groups Malays (n=294) and non-Malays including (Indian and Chinese, n=146). The moderating effects of race on the path relationship between gratification of using the Internet and Internet skill on Internet addiction and social isolation were not supported. However, there were differences in the value of the standard regression weight for Malay and non-Malay students in the relationship between Internet addiction and social isolation as shown in Table 4.

Table 4: Standard Regression Weights: (Race Variant Model)

Items		**B**	**SE**	**β**	C.R.	P
Internet addiction ---->	Social isolation	**.608**	**.087**	**.408**	**6.967**	*******
		.595	.110	.428	5.422	***
Gratification ------->	Social isolation	**.015**	**.017**	**.053**	**.872**	**.383**
		.020	.020	.083	1.010	.312
Internet skill---->	Social isolation	**-.070**	**.052**	**-.071**	**-1.326**	**.185**
		-.013	.067	-.015	-.197	.844

Results for Malays are shown in bold text in the table

DISCUSSION AND CONCLUSION

The current investigation had the following main findings:

- The relationship between gratification of using the Internet and Internet addiction was positive and significant, and it was higher among female students than male students
- The correlation between gratification of using the Internet and social isolation was positive and significant and it was higher in male students
- The association between Internet use gratification and Internet skill was significant among female students
- Gratification of using the Internet was the same between male and female participants
- The influence of Internet use gratification on social isolation was not statistically significant, while it had a statistically positive influence on Internet addiction (34%), while the effects of Internet use gratification on social isolation was 8%.
- There was a significant relationship between gratification of using the Internet and social isolation just for male students and the path relationship was not significant for female students.
- The moderating effects of race on the path relationship between gratification of using the Internet and Internet skill on Internet addiction and social isolation were not supported.

Internet addiction as a concern has recently become prevalent due to the growing use of the Internet. With the developments in information technology, more online facilities are provided for users. Despite the advantages of using the Internet, potential problems should be given careful attention. The term "Internet addiction" is used to express uncontrollable and damaging use of the Internet (Sally, 2006). Internet addiction can result in isolation and loneliness. Block (2008) noted that Internet addiction can cause compulsive-impulsive disorders, such as checking e-mails frequently or always thinking that the phone is vibrating. Negative consequences of Internet addiction include lying, poor achievements and social isolation (Pamela, 2008). In some countries like South Korea, Internet addiction is considered a more alarming public health problem, with 30% of South Koreans under 18, or nearly 2.4 million people, being at the risk of Internet addiction (Martin, 2007). The findings of this study indicate that respondents were addicted to the Internet.

The top mean scores were associated with the statements that are symptoms of addiction to the Internet, such as "stay on-line longer than you intended," "just a few more minutes wants to use Internet". Furthermore, Internet addiction proved to be higher among male students compared to female students. According to Wong (2010), Internet addiction had already turned into a crisis in many of the developed countries at the time of that study. Wong suggested that this illness was spreading among youngsters in Malaysia and the situation would gradually worsen. Wong recommended that the Health Ministry of Malaysia could benefit from the intervention of psychologists to plan Internet rehabilitation programs. In the current study the correlation between Internet addiction and social isolation was positive and significant and it was more common among female students than male students. Internet addiction had a positive influence on social isolation with 41% prediction. The findings of the current study were similar to that of Sally (2006). Sally found that female students significantly outnumbered male students in both moderate and excessive user groups. Furthermore, Internet addiction partially mediated Internet use gratification, Internet skill and social isolation. Internet addiction influenced social isolation up to 40%.

The participants in this current study proved to be isolated from the society. The results also revealed that social isolation was different among male and female students, while male students were more isolated than female students. These findings are similar to that of a study conducted by Cuhadar, 2012; Odaci & Kalkan, 2010; Oguz & Cakir (2014). However, the results of the present study contrast with those of previous research suggesting that males predominantly utilize and feel more comfortable with information technologies (Bakken et al., 2009; Furman et al., 2007; Kheirkhah et al., 2010; Yen et al., 2009; Yen et al., 2007).

Just under half of the students in the study classified their Internet skill in the category of skillful, similar to the findings of previous studies (Bond, 2010; Gaulke, 2011; Van Dijk, 2005). However, the correlation between Internet skill and Internet addiction was not significant for the Internet-skillful group. In addition, the correlation between Internet skill and social isolation was significant among male students. Male students, compared to female students, were more Internet-literate. Internet skill had no significant impact on social isolation, and the influence of Internet skill and social isolation was not significant. There was no statistically significant relationship between Internet skill and Internet addiction.

Regarding the sub-dimensions of Internet use gratification, Cognitive, Escape and Social Integration had the highest mean scores. The findings indicate that students wanted to find information on the Internet and their cognitive needs were fulfilled, confirming earlier research (Morahan-Martin & Schumacher, 2000).

LIMITATIONS OF THE STUDY

The participants of the study were limited to university students between 18 and 40 years old, therefore, the results cannot be generalized to other universities in Malaysia or to university students in other countries. Further research replicating the present study with larger and different samples for measuring social isolation and Internet addiction among students in the school system and youth populations.

RECOMMENDATION

To understand all aspects of Internet usage and social isolation among students in the education system and how this impacts performance, a mixed method approach is suggested for other interested researchers. Other researchers can apply both quantitative and qualitative methods for better understanding and finding solutions for problems that takes account of the perspective of the participants. It is vital to get a better understanding of the underlying factors in Internet addiction

disorder, involving how personality characteristics, family dynamics, psychosocial factors, and communication skills affect the way students utilize the Internet.

REFERENCES

Anderson, E. L., Steen, E., & Stavropoulos, V. (2017). Internet use and Problematic Internet Use: A systematic review of longitudinal research trends in adolescence and emergent adulthood. *International Journal of Adolescence and Youth,* vol. 22, no. 4, pp. 430-454.

Bakken, I. J., Wenzel, H. G., Götestam, K. G., Johansson, A., & Øren, A. (2009). Internet addiction among Norwegian adults: A stratified probability sample study. *Scandinavian Journal of Psychology,* vol. 50, pp. 121–127.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology,* vol. 51, no. 6, pp. 1173.

Blais, J. J., Craig, W. M., Pepler, D., & Connolly, J. (2008). Adolescents online: The importance of Internet activity choices to salient relationships. *Journal of Youth and Adolescence,* vol. 37, pp. 522–536.

Bond, C. S. (2010). Surfing or still drowning? Student nurses' Internet skills. *Nurse Education Today,* vol. 30, no. 5, pp. 485-488.

Booth, R. (2000). Loneliness as a component of psychiatric disorders. *Medscape Mental Health,* vol. 5, no. 2.

Byrne, D. (1999). *Social Exclusion.* Open University Press.

Cao, F., & Su, L. (2007). Internet addiction among Chinese adolescents: prevalence and psychological features. *Child Care Health Dev,* vol. 33, pp. 275-281. https://doi.org/ [17439441] [doi:10.1111/j.1365-2214.2006.00715.x]

Chan, M.-Y., Lin, Y.-H., Lin, L.-F., Lin, T.-W., Hsu, W.-C., Chang, C.-y., Liu, R., Chang, K.-Y., Lin, M.-h., & Hsu, J. Y.-j. (2017). WAKEY: Assisting Parent-child Communication for Better Morning Routines. CSCW '17. Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing, Portland, Oregon, USA, 25 February – 01 March 2017, New York.

Chen, K., Chen, I., & Paul, H. (2001). Explaining online behavioral differences: an Internet dependency perspective. *The Journal of Computer Information Systems,* vol. 41, no. 3, pp. 59-63.

Cheng, C., & Li, A. Y.-l. (2014). Internet addiction prevalence and quality of (real) life: A meta-analysis of 31 nations across seven world regions. *Cyberpsychology, Behavior, and Social Networking,* vol. 17, no. 2, pp. 755-760.

Cho, Y., & Lee, H. (2004). A study on a model for internet addiction of adolescents. *Taehan Kanho Hakhoe Chi,* vol. 34, pp. 541-551. https://doi.org/[15314311]

Christensen, S. P. (2018). Social media use and its impact on relationships and emotions. All Theses and Dissertations. 6927. BYU Scholars Archive https://scholarsarchive.byu.edu/etd/6927

Clement, J. (Jan 7, 2020). *Percentage of global population accessing the internet from 2005 to 2019, by market maturity.* Retrieved 3/21/2020 from https://www.statista.com/statistics/209096/share-of-internet-users-in-the-total-world-population-since-2006/

Cuhadar, C. (2012). Exploration of problematic ýnternet use and social interaction anxiety among Turkish pre-service teachers. *Computers and Education,* vol. 59, pp. 173–181.

Dakduk, S., González, Á., & Portalanza, A. (2019). *Learn about structural equation modeling in smartPLS with data from the customer behavior in electronic commerce study in Ecuador (2017).* SAGE Publications, Limited.

Davis, R. A. (2001). A cognitive-behavioral model of pathological Internet use. *Computers in human behavior,* vol. 17, no. 2, pp. 187-195.

Deros, B., Daruis, D., & Nor, M. (2008). Fundamental sitting anthropometric and differences among Malaysian Malays, Chinese and Indians. Advanced Manufacturing Research Group Seminar 01. Selangor Malaysia

Fjeld, M., Woźniak, P., Cowls, J., & Nardi, B. (February, 2015). Ad hoc encounters with big data: Engaging citizens in conversations around tabletops. *First Monday Open Journal on the Internet,* vol. 20, no. 2.

Furman, W., Shaffer, L., Connolly, J., Furman, W., & Konarksi, R. (2007). The roles of peers in the emergence of heterosexual romantic relationships in adolescence. *Child Development,* vol. 17, pp.1395-1408. https://doi.org/www.du.edu/psychology/relationshipcenter/emergence.pdf

Gaulke, K. R. (2011). *Motivation factors of current and first-time online donors* Capellsa University]. Minneapolis, USA. www.ebay.com

Gregory, C. (2019). *Internet Addiction Disorder: Signs, symptoms, diagnosis, and treatments for those who may be addicted to the Web on their PC or smart phone.* Retrieved 3/21/2020 from https://www.psycom.net/iadcriteria.html

Internet World Stats. (2020). *Internet World Stats: Usage and Population statistics.* Retrieved 3/20/2020 from https://www.internetworldstats.com/asia.htm

James, G. (2012). *Social network may be driving loneliness.* http://www.theaustralian.com.au/news/health-science/social-network-may-be-driving-loneliness/story-e6frg8y6-1226354280628?nk=d386887cf44e17130574c4acb1b11c6e

Katz, E., Blumer, J. G., & Gurevitch, M. (1974). Utilization of mass communication by the individual. In Blumer, J.G.and Katz, E (Eds). In *Current perspectives on gratification research* (pp. 19-32). Sage.

Kerkhof, P., Finkenauer, C., & Muusses, L. D. (2011). Relational consequences of compulsive Internet use: A longitudinal study among newlyweds. *Human Communication Research,* vol. 37, no. 2, pp. 147-173.

Kheirkhah, F., Juibary, A. G., & Gouran, A. (2010). Internet Addiction, Prevalence and Epidemiological Features in Mazandaran Province, Northern Iran. *Iranian Red Crescent Medical Journal (IRCMJ),* vol. 12, no. 2, pp. 133-137.

Ko, C., Yen, J., Chen, C., Chen, S., Wu, K., & Yen, C. (2006). Tridimensional personality of adolescents with Internet addiction and substance use experience. *Can. J. Psychiatry,* vol. 51, pp.887-894

Ko, C., Yen, J., & Yen, C. (2005). Gender differences in addiction to playing online games and related factors among Taiwanese adolescents. *J. Nerv. Ment. Dis,* vol. 193, pp. 273-277.

Leung, L., & Lee, P. S. (2012). Impact of internet literacy, internet addiction symptoms, and internet activities on academic performance. *Social Science Computer Review,* vol. 30, no. 4, pp. 403-418.

Liang, L., Zhou, D., Yuan, C., Shao, A., & Bian, Y. (2016). Gender differences in the relationship between internet addiction and depression: A cross-lagged study in Chinese adolescents. *Computers in Human Behavior,* vol. 63, pp. 463-470.

MacCallum, R. C., Browne, M. W., & Sugawara, H., M. (1996). Power Analysis and Determination of Sample Size for Covariance Structure Modeling. *Psychological Methods,* vol. 1, no. 2, pp. 130-149.

Malaysian Communications and Multimedia Commission. (2018). *Internet Users Survey 2018.* Malaysian Communications and Multimedia Commission. http://www.mcmc.gov.my

Martin, F. (2007). *In Korea, a boot camp cure for web obsession.* Retrieved 9/30/2014 from http://www.nytimes.com/2007/11/18/technology/18rehab.html?pagewanted=all&_r=0

Mei, S., Yau, Y. H., Chai, J., Guo, J., & Potenza, M. N. (2016). Problematic Internet use, well-being, self-esteem and self-control: Data from a high-school survey in China. *Addictive behaviors,* vol. 61, pp. 74-79.

Minutillo, A., Pacifici, R., Scaravelli, G., De Luca, R., Palmi, I., Mortali, C., Mastrobattista, L., & Berretta, P. (2016). Gender disparity in addiction: an Italian epidemiological sketch. *Annali dell'Istituto superiore di sanità,* vol. 52, no. 2, pp. 176-183.

Morahan-Martin, J., & Schumacher, P. (2000). Incidence and correlates of pathological Internet use amongcolleg e students. *Computers in Human Behavior,* vol. 16, pp. 2–13.

Morahan-Martin, J., & Schumacher, P. (2003). Loneliness and social uses of the Internet. *Computers in human behavior,* vol. 19, no. 6, pp. 659-671.

Odaci, H., & Kalkan, M. (2010). Problematic internet use, loneliness and dating anxiety among young adult university students. *Computers and Education,* vol. 55, pp. 1091–1097.

Oguz, E., & Cakir, O. (2014). Relationship between the Levels of Loneliness and Internet Addiction. *Anthropologist,* vol. 18, no. 1, pp. 183-189.

Pallanti, S., Bernardi, S., & Quercioli, L. (2006). The Shorter PROMIS Questionnaire and the Internet Addiction Scale in the assessment of multiple addictions in a high-school population: prevalence and related disability. *CNS Spectr, 11,* 966-974. https://doi.org/[17146410]

Pamela, C. (2008). *Technology causes social isolation.* Retrieved 9/30/2014 from http://theburr.com/archives/Fall_08/story7.html

Pittman, M., & Reich, B. (2016). Social media and loneliness: Why an Instagram picture may be worth more than a thousand Twitter words. *Computers in Human Behavior,* vol. 62, pp. 155-167.

Robertson, T. W., Yan, Z., & Rapoza, K. A. (2018). Is resilience a protective factor of internet addiction? *Computers in Human Behavior,* vol. 78, pp. 255-260.

Saisan, J., Smith, M., Segal, R., & Segal, J. (2009). *Internet addiction: Signs, symptoms, treatment, and self-help.* http://helpguide.org/mental/internet_cybersex addiction.htm.

Sally, L. P. M. (2006). *Prediction of internet addiction for undergraduates in Hong Kong* Hong Kong Baptist University, Hong Kong.

Sharon, A. A. (2000). *Uses and gratification and internet profiles: A factor analysis part 7.* Arkansas state university.

Shaw, M., & Black, D. W. (2008, 2008/05/01). Internet Addiction. *CNS Drugs,* vol. 22, no. 5, pp. 353-365. https://doi.org/10.2165/00023210-200822050-00001

Sutcliffe, A., Dunbar, R., Binder, J., & Arrow, H. (2011). Relationships and the social brain: Integrating psychological and evolutionary perspectives. *British J. Psychology,* vol. 103, no. 2, pp. 149–168.

Tarka, P. (2018). An overview of structural equation modeling: its beginnings, historical development, usefulness and controversies in the social sciences. *Quality & quantity,* vol. 52, no. 1, pp. 313-354.

Tokunaga, R. S., & Rains, S. A. (2010). An evaluation of two characterizations of the relationships between problematic Internet use, time spent using the Internet, and psychosocial problems. *Human Communication Research,* vol. 36, no. 4, pp. 512-545.

Tsitsika, A., Janikian, M., Schoenmakers, T. M., Tzavela, E. C., Olafsson, K., Wójcik, S., Macarie, G. F., Tzavara, C., Consortium, E. N. A., & Richardson, C. (2014). Internet addictive behavior in adolescence: a cross-sectional study in seven European countries. *Cyberpsychology, Behavior, and Social Networking,* vol. 17, no. 8, pp. 528-535.

Van Dijk, J. (2005). *The deepening divide. Inequality in the information society.* Sage Publications.

Vorderer, P., Klimmt, C., & Ritterfeld, U. (2004). Enjoyment: At the heart of media entertainment. *Communication Theory,* vol. 14, pp. 388–408.

Wegmann, E., Stodt, B., & Brand, M. (2015). Addictive use of social networking sites can be explained by the interaction of Internet use expectancies, Internet literacy, and psychopathological symptoms. *Journal of Behavioral Addictions,* vol. 4, pp.155–162. https://doi.org/10.1556/2006.4.2015.021

Widyanto, L., & Griffiths, M. (2006). 'Internet addiction': a critical review. *International Journal of Mental Health and Addiction,* vol. 4, no. 1, pp. 31-51.

Wong, E. (2010). *Malaysia needs internet addiction rehab scheme.* Retrieved 1/10/2014 from http://thestar.com.my/news/story.asp?sec=focus&file=/2010/5/10/focus/622579

Yang, C. K., Choe, B. M., Baity, M., Lee, J. H., & Cho, J. S. (2005). SCL-90-R and 16PF profiles of senior high school students with excessive Internet use. *Can J Psychiatry,* vol. 50, no. 7, pp. 407-414.

Yen, C., Hsu, C., Liu, S., & Huang, C. (2007). Comparisons of substance use disorders and correlates between aboriginal and non-aboriginal adolescents living in a mountain region in southern Taiwan. Addict. *Behav,* vol. 32, pp. 358–364.

Yen, C., Yang, Y., & Chong, M. (2006). Correlates of methamphetamine use for Taiwanese adolescents. *Psychiatry Clin. Neurosci,* vol. 60, pp. 160–167.

Yen, C. F., Ko, C. H., Yen, J. Y., Chang, Y. P., & Cheng, C. P. (2009). Multi-dimensional discriminative factors for Internet addiction among adolescents regarding gender and age. *Psychiatry and clinical neurosciences,* vol. 63, no. 3, pp. 357-364.

Yen, J., Yen, C., Chen, C., Chen, S., & Ko, C. (2007). Family factors of internet addiction and substance use experience in Taiwanese adolescents. *Cyberpsychol Behav,* vol. 10, pp. 323-329. https://doi.org/[17594255] [doi:10.1089/cpb.2006.9948]

Young, K. (1998). Internet addiction: the emergence of a new clinical disorder. *CyberPsychology & Behavior,* vol.1, pp. 237-244.

Young, K. S. (2011). Clinical assessment of Internet-addicted clients in Internet Addiction. In *A Handbook and Guide to Evaluation and Treatment, eds K. S. Young & C. Nabuco de Abreu, Wiley, Hoboken* (pp. pp. 19–34).

Zillmann, D. (1988). Mood management through communication choices. *American Behavioral Scientist,* vol. 31, pp.327–340.

_____