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Factors Influencing Internet Addiction Tendency among Middle School Students in Gyeong-buk Area

Won Oak Oh, RN, PhD[1]

Purpose. This study was conducted to understand the degree of internet addiction tendency and to find out the factors influencing this addiction tendency among middle school students in Gyeong-buk area.

Methods. A total of 450 middle school students in the Daegu and Gyeong-buk area were surveyed in this study. Data collection was conducted through the use of questionnaires.

Results. Internet addiction among middle school students was relatively low (Average user). In the overall ratio distribution, however, students who were classified as either addicted or at risk of addiction accounted for a high percentage, 27%. A positive correlation was found between Internet addiction and Internet expectation, depression and parent control over Internet use. A negative correlation was found between Internet addiction and interpersonal relationship, parent support and self-control. Multiple regression analysis revealed that the most powerful predictor of Internet addiction tendency was depression.

Conclusion. Through the above results, it would be necessary to develop an Internet addiction prevention program for adolescents taking into account for the psychological factors such as depression and Internet use habits. In the future study, the need assessment will be useful for developing this prevention program.

Key Words: Internet Addiction, Adolescents

INTRODUCTION

Background and Significance

Today, the internet's presence in our society is as pervasive as automobiles. It is noteworthy that Korea ranks sixth in the world in terms of Internet users. In fact, during the past six years, the number of internet users registered an unprecedented growth rate of a hundred fold.

In particular, Internet is the representative term of adolescents. This could be natural since this group of teenagers is easily attracted to this medium. According to a recent study, Internet use among teenagers reached 90.6%, which was much higher than among people in their 30s. The study also suggested that college students were becoming more avid users of the Internet. (Korea Network Information Center, 2002). Therefore, it would be nearly impossible to discuss the culture of adolescents without considering the Internet factor.

Adolescents are indiscriminately exposed to the Internet although they do not have the ability to judge its positive and negative aspects. Media reports about the growing side effects of Internet use, easy access to pornography, and even scurrilous notices advertising criminal activities have caused much psychological panic among parents. (Lee, Lee, Kim, & Oh, 2000). In fact,

1. Assistant Professor, Department of Nursing, College of Medicine, Dongguk University
Corresponding author: Won Oak Oh, RN, PhD, Department of Nursing, College of Medicine, Dongguk University
707 Sukjang-dong, Gyeong-ju, Gyeong-Buk 780-714, South Korea
Tel: 82-54-770-2619 Fax : 82-54-770-2616 E-mail : ohwo@dongguk.ac.kr
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these social concerns have become global issues. The time has come for society to come up seriously with ways to deal with Internet use and addiction among adolescents.

In the 1990s, a number of studies were made on subjects ranging from computers, games, and Internet addiction. Goldberg (1996) first used the term Internet Addiction Disorder (IAD) and clarified further its definition as the pathological, obsessive use of the Internet including tolerance and withdrawal as a standard for diagnosis. With Internet addiction as an impulse control disorder, Young (1996a) first proposed eight types of diagnosis standards by invoking the standards set for diagnosing pathological gambling. In Korea, Kim & Hong (1998) defined Internet addiction as the use of the Internet to such an extent as to cause emotional problems and dependent behavior similar to those of drug addiction.

In Korea, a wide range of studies on Internet addiction was conducted as well. Prevalent among these studies focused on the status of the addiction, with middle school students identified as the Internet's highest users(Kim, N. S., 2002; Lim, 2002; Park, 2002a). In short, middle school students are a high-risk group that is prone to Internet addiction.

Recently, several studies on the factors related to Internet addiction are actively being carried out. The results showed that there was a positive correlation between the Internet addiction and the factors related to using an Internet such as the habit of Internet use or the Internet expectations which the degree of expectations as a result of experiences using the Internet among the adolescents (Lee et al, 2000; Lee, S. B., 2001; Oh, 2002). Also, in many studies, there was a highly positive correlation between the Internet addiction and depression in personal and psychological factors(Lee, 2000; Lee, S. B., 2001; Park, 2002a; Young & Rogers, 1997). Other personal and psychological factors such as self-control of daily life, interpersonal relationship, loneliness in friendship and poor self-efficacy were also noted (Fearing, 1997; Goldberg, 1996; Park, 2002a; Song, 1998; Yoon, 1998).

It was widely accepted that the family environmental factors have an immense impact on the health of adolescents. If family or parental support is low or the parent and child relationship is negative and there is a high tendency for parents to monitor the Internet use of their children, then there was a higher tendency of Internet addiction of the adolescents (Lim, 2002; Oh, 2002; Park, 2002; Park, 2002b).

In short, the time has come for us to deal with the issue of Internet addiction when touching upon discussions regarding the mental health of adolescents - the leaders of the next generation. Studies to date, however, merely have tackled individual discussions such as the status or related variables of Internet Addiction. Theses studies have not taken into account of their personal, psychological and family factors in a comprehensive manner.

Therefore this research was attempted to examine the relative significance of the associating factors to Internet addiction tendency, classifying variables into demographics, Internet use-related factors, family-related factors, and personal and psychological factors (Figure 1). The results of this study will be provided the basic information that can contribute to develop the prevention program of Internet addiction for adolescents.

Objectives

The purpose of this study is to identify the factors of Internet addiction tendency among adolescents, particularly middle school students. Specifically, this study aimed to:

1) Examine the degree of Internet addiction tendency among middle school students.

2) Understand the correlation between the degree of Internet addiction tendency and the related variables.

3) Identify the factors affecting the Internet addiction tendency among middle school students.

Definition of term

Internet Addiction is an impulse-control disorder without using intoxication characterized by behaviors of dependency, tolerance, withdrawal and physical, academic/occupational, family, and social problems (Young, 1998). For this study, the operational definition of Internet addiction was a subject's rating of Young's Internet Addiction Scale that is standardized in Korean culture by Lee et al.(2000).

METHODS

Design

This study is a cross-sectional descriptive survey to identify the factors which influence the Internet addiction tendency in middle school students.

Sample

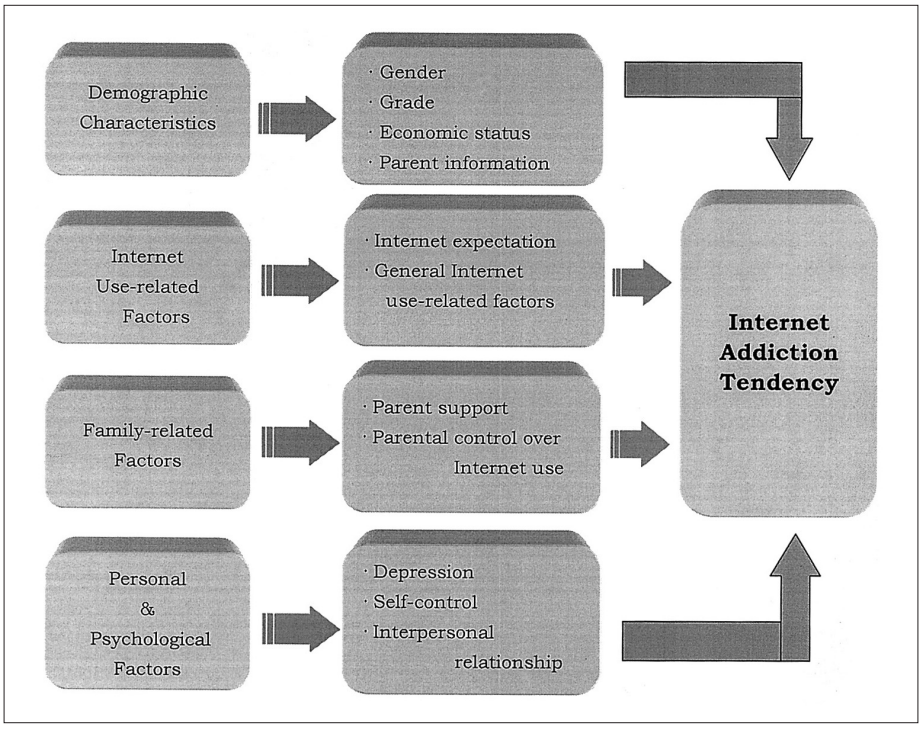

Figure 1. Conceptual framework of the study.

The target population of this research was Korean middle school students. The accessible population was a group of students in five middle schools situated in the Daegu and Gyeong-buk areas. The sample selection was 450 middle school students who understood the objective of this study and who gave their consent to participate.

Instruments

Internet addiction tendency

Internet Addiction Scale developed by Young(1996b) at the center for on-line addiction and standardized by Lee et al.(2000) was used to measure the degree of Internet addiction tendency. This tool measures compulsive actions, economic difficulties, academic stagnation, disability in daily life, interpersonal problems and emotional changes related to the use of Internet. It contains 20 questions, with the range from 0 to 5 points(6 likert scale). According to the standards presented by Young(1998), a person who scores 20 - 49 points is an average user, 50 - 79 points at risk of becoming addicted, and 80 points or more an Internet addict. In this study, a higher score indicates a higher tendency of Internet addiction. The reliability of this tool in this study was Chronbach α= .90.

Internet expectation

Internet expectation involved measuring the expectations as a result of experiences using the Internet. This study used a modified form of the "Internet expectation measure" developed by Lee et al. (2000). This study had a total of 12 questions on resolving conflict, attaining self-confidence, promoting personal relations, and attaining information. The score ranged from 1-4 points, and a higher score indicates a higher the level of Internet expectations. The reliability of this tool in this study was Chronbach α= .81.

Parental support

The 4-item questionnaire developed by Lim (2002) was used to measure the degree of perception of parental support among students. Scores ranged from 1 to 4 points. Higher scores indicate stronger perceived level of parent support. The reliability of this tool in this study was Chronbach α= .76.

Parental control over Internet use

This study used the 8-item questionnaire developed by Lee et al. (2000) to measure the degree exerted by parents in the monitoring and control of Internet use by students. Scores ranged from 1 to 4 points, with higher scores indicating more parental control over Internet use. The reliability of this tool in this study was Chronbach α= .72.

Depression

A modified form of the Center for Epidemiological Depression Scale (CES-D), the Korean version of the depression measurement composed of 15 questions, was used to examine the degree of depression. Scores ranged from 1 to 4 points. A higher score indicates a higher perceived level of depression. The reliability of this tool in this study was Chronbach α= .88.

Self-control

A modified Self-Control Rating Scale employed by Gottfredson and Hirschi (1990) and translated by Kim(1998) was used to examine the degree of self-control exerted by the students. This scale comprised a total of 20 questions, with 10 questions reflecting the degree of pursuing long-term satisfaction and the remaining 10 questions reflecting the degree of pursuing immediate satisfaction. The reliability of this tool in this study was Chronbach α= .84.

Interpersonal relationship

A 10-item questionnaire developed by Kim, J. Y. (2002) was used to measure the interpersonal relationship of the students. The scores ranged from 1 to 4 points, with higher points suggesting better interpersonal relationship; as the points declined, students showed a tendency to lacking self-confidence in front of other people and avoid contact with others. The reliability of this tool in this study was Chronbach α= .84.

Questionnaire on demographic and general internet use characteristics

A structured 21-item questionnaire was used to study the demographic and general Internet use-related characteristics of the samples.

Data Collection Procedure

The period of data collection for this study was from October 2002 to April 2003. To compile relevant data and expound on the scope of the study, the researcher visited the principals of the five designated middle schools in the Daegu and Gyeong-buk areas. Upon receiving permission from the principal, the researcher explained the objective of the study to the health teachers and students. Afterwards, the researcher instructed them to answer the questionnaires directly. Excluding 34 invalid questionnaires out of 484 distributed questionnaires, 450 questionnaires were used in the final analysis.

Data Analysis

Data were analyzed using the SAS program. The demographics and Internet use-related characteristics were analyzed using descriptive statistics. The difference of Internet addiction tendency according to characteristics of demographics and Internet use-related were analyzed using the t-test, ANOVA, and Duncan's multiple comparison tests. The linear relationship Internet addiction tendency between these related factors were examined using Multiple Regression Analysis.

RESULTS

Demographic and Internet use-related Characteristics

Of the 450 students, boys and girls accounted for 53.3% and 46.7%, respectively (Table 1). First year students totaled 32.2%, second year students 35.6%, and third year students 32.2%. Students spent their free time mostly alone (50.6%). The main location of Internet use was at home (84.4%). On the other hand, 44% and 37.6% of students used the computer and Internet, respectively, for less than 10 hours a week. Time frame of Internet use was at its highest from 7:00 pm to 10:00 pm (56.4%). The number of Internet clubs with membership of at least ten students stood at 50.9%. The percentage of students who have never visited a pornography site was 48.2%, and students who visited such sites at least once stood at 51.8%. As for self-awareness of Internet addiction, 38.4% of students answered "some what" or "very much" aware.

Degree of Internet Addiction Tendency

As shown in table 2, the mean of Internet addiction tendency among middle school students was 41.38, showing a relatively low. These results corresponded to the "average user" according to the Internet addiction classification standard of Young (1998). The specific frequency distribution showed that out of the 450 respondents, 72.7% were "average users," 25.6% were "at risk of addiction," and 1.8% were "addicted" (Table 2).

As a result of studying the difference of the degree of Internet addiction tendency according to demographic and general Internet use-related characteristics, male students (M=42.69) showed a greater addiction tendency than female students (M=39.86), as seen in Table 3 (t=2.03, p=.043). As for ways of spending free time, there was a greater tendency towards Internet addiction among students who usually spent time alone (M=44.08)

than students who spent time with their families (M=41.03) and friends (M=35.78) (F=12.01, p=.000). According to the average time of computer use per week, students who used the computer for over 20 hours

Table 1. Demographic and Internet-use related Characteristics (N=450)

Characteristics		Frequency	%	Mean (SD)
Gender	Boys	240	53.3	
	Girls	210	46.7	
Grade	1st year	145	32.2	
	2nd year	160	35.6	
	3rd year	145	32.2	
Economic status	Upper class	85	18.9	
	Middle class	328	72.9	
	Lower class	37	8.2	
Father's age	< 40 yrs	38	12.9	
	41 - 45 yrs	246	54.7	
	46 - 50 yrs	127	28.2	43.9 (6.4)
	> 51 yrs	19	4.2	
Mother's age	< 35 yrs	15	3.3	
	36 - 40 yrs	178	39.6	40.9 (5.4)
	41 - 45 yrs	215	47.8	
	46 yrs	42	9.3	
Ways of spending free time	Alone	228	50.6	
	With family	107	23.8	
	With friends	115	25.6	
Main location of Internet use	At home	380	84.4	
	School	12	2.7	
	Friend's home	10	2.2	
	PC-room	48	10.7	
Time of computer use/week	<10 hrs	198	44.0	
	10 - 20 hrs	189	42.0	
	> 20 hrs	63	14.0	
Time of Internet use/week	< 10 hrs	169	37.6	
	10 - 20 hrs	191	42.4	
	>20 hrs	90	20.0	
Time frame of Internet use	3 pm - 7 pm	154	34.2	
	7 pm - 10 pm	254	56.4	
	10 pm - 3 am	39	8.7	
	3 am - 7 am	3	0.7	
Motive of Internet use	Fun	245	54.4	
	To get new information	75	16.7	
	To make friends	34	7.6	
	To relieve stress	54	12.0	
	Not to fall behind the trend	15	3.3	
	Others	27	6.0	
Number of Internet club Membership	None	29	6.4	
	1 - 2 sites	46	10.2	
	3 - 5 sites	82	18.2	
	6 - 9 sites	64	14.2	
	Above 10sites	229	50.9	
Number of visiting to pornography sites	None	217	48.2	
	1 - 3 times	124	27.6	
	4 - 6 times	24	51.3	
	7 - 9 times	8	1.8	
	Above 10 times	77	17.1	
Self-awareness of Internet addiction	Not at all	111	24.7	
	Not much	166	36.9	
	Some what	145	32.2	
	Very much	28	6.2	

(M=46.56) registered a higher score towards Internet addiction tendency compared to 10 - 20 hours (M=43.76) or below 10 hours (M=37.44) (F=14.01, p=.009). Similarly, as for the average time of Internet use per week, students who used the Internet for over 20 hours (M=46.78) registered a higher score towards Internet addiction tendency compared to 10 - 20 hours (M=42.98) or below 10 hours (M=36.68) (F=16.60, p=.000). With regards to the time frame of Internet use, students who used the Internet from 10:00 pm to 3:00 am (M=49.96) or 3:00 am to 7:00 am (M=46.11) showed a greater tendency towards Internet addiction than those who used the Internet from 3:00 pm to 7:00 pm (M=40.78) or 7:00 pm to 10:00 pm (M=41.29) (F=5.28, p=.000). Students who joined more than 10 Internet clubs (M=44.16) showed a greater inclination towards Internet addiction compared to students who joined less than 10 clubs (F=5.35, p=.000). In addition, students demonstrated a greater tendency towards Internet addiction if they visited pornography sites more than 10 times (M=46.46) or 4-6 times (M=48.13) compared to students who never visited such sites (M=38.98), and those who visited 1-3 times (M=41.25), or 7-9 times (M=38.86) (F=5.15, p=.001). As for the level of self-awareness of Internet addiction, the degree of Internet addiction tendency was measured in the order of "very much" (M=58.03), "somewhat" (M=45.92), "not much" (M=40.73), and "not at all" (M=32.15).

Table 2. Degree and Classification of Internet Addiction Tendency (N=450)

	Mean	SD	Freq (%)	N
Internet Addiction Tendency	41.38	14.84	-	-
Average	34.18	8.57	72.7	327
At risk of addiction	58.55	7.42	25.6	115
Addicted	88.03	8.19	1.8	8

Correlation among Research Variables

The correlation among research variables is illustrated in Table 4. The correlations between the degree of ten-

Table 3. Difference of Internet Addiction Tendency According to Subject Characteristics (N=450)

Characteristics	Categories	Mean	t or F	p-value
Gender	Male	42.69	2.03	0.043*
	Female	39.86		
Ways of spending free time	alone	44.08_a		
	with family	41.03_b	12.01	0.000*
	with friend	35.78_c		
Time of computer use/week	< 10 hrs	37.44_a		
	10 - 20 hrs	43.76_b	14.01	0.009*
	> 20 hrs	46.56_c		
	Time of Internet use/week	< 10 hrs	36.68_a	
	10 - 20 hrs	42.98_b	16.60	0.000*
	> 20 hrs	46.78_c		
Time frame of internet use	3 pm - 7 pm	40.48_a		
	7 pm - 10 pm	41.29_a	5.28	0.000*
	10 pm - 3 Am	49.96_b		
	3A m - 7 Am	46.11_b		
Number of Internet club	membership	None	39.51_a	
	1 - 2	41.27_a		
	3 - 5	36.03_a	5.35	0.001*
	6 - 9	39.17_a		
	> 10	44.16_b		
Number of visiting to pornography sites	None	38.98_b		
	1 - 3	41.25_b		
	4 - 6	48.13_a	5.15	0.000*
	7 - 9	38.86_b		
	> 10	46.46_a		
Self-awareness of Internet addiction	Not at all	32.15_a	38.33	0.000*
	Not much	40.77_b		
	Some what	45.92_c		
	Very much	58.03_d		

* : Means with different subscripts differ significantly at $p < 0.5$ by the Duncans multiple comparison test

dency towards Internet addiction and the following factors were statistically significant: Internet expectation (r=0.420, *p*=.000), depression (r=0.436, *p*=.000), interpersonal relationship(r= - 0.302, *p*=.000), parent support (r= - 0.212, *p*=.000), self-control (r= - .347, *p*=.000), and parental control over Internet use (r=0.228, *p*=.000).

Predictors of Internet addiction tendency

Table 5 revealed the result of the multiple regression analysis to identify the predicting variables to Internet addiction tendency. The dependent variable was Internet addiction tendency, whereas, the independent variables included Internet expectation, parental support, parental control over Internet use, depression, self-control, interpersonal relationship, gender, ways of spending free time, average time of computer and Internet use per week, time frame of Internet use, number of Internet club memberships, number of visiting to pornography sites, and self-awareness of Internet addiction demonstrating a significant relationship. Among the independent variables, demographic and Internet-use related characteristics were treated as dummy variable before carrying out the multiple regression analysis.

Since the correlations among the independent variables were significant, the multicollinearity test was carried out before the regression analysis. As a result of this process, the tolerance of the estimated value of all the independent variables' parameter was over 0.1 (0.189 - 0.900). The VIF(Variance Inflation Factor) value also was between 1.17 - 2.08, under 5. The Durbin-Watson value that examines the normal distribution of residuals meeting the assumption of the model to be analyzed was 1.9; thus meeting the requirements. Even in Cook's D examination, which was conducted to confirm the influence of the observed value, all 450 students registered a score below 0.1. Thus, all observed values were included and analyzed.

As a result of analysis the influences on Internet addic-

Table 4. Correlation coefficients between Internet addiction tendency and related variables (N=450)

	IE	Dep	IPR	PS	SC	PCIU
IE	-					
Dep	0.171*	-				
IPR	- 0.072	- 0.350*	-			
PS	- 0.025	- 0.291*	0.222*	-		
SC	- 0.078	- 0.411*	0.137*	0.307*	-	
PCIU	- 0.027	0.052	0.024	0.181*	- 0.352*	-
IAT	0.420*	0.436*	- 0.302*	- 0.212*	- 0.347*	0.228*

IE : Internet Expectation
Dep : Depression
IPR : Interpersonal Relationship
PS : Parent Support
SC : Self-Control
PCIU : Parent Control over Internet Use
IAT : Internet Addiction Tendency
* $p < .01$

Table 5. Multiple Regression Analysis on Factors Influencing Internet Addiction Tendency (N=450)

Variables	β	R^2	Com.R^2	F	*p*-value
Depression	0.50	0.19	0.19	102.37	0.000
Internet expectation	0.75	0.12	0.31	79.24	0.000
Self-awareness ofInternet addiction (very much)	17.39	0.05	0.36	31.08	0.000
Parent control over internet use	- 5.14	0.04	0.40	29.68	0.000
Self-awareness of Internet addiction (some what)	9.86	0.03	0.43	19.47	0.000
Self-awareness of Internet addiction (not much)	6.18	0.03	0.46	23.98	0.000
Self-control	- 0.43	0.02	0.48	16.12	0.000
Time frame of Internet use (10pm-3Am)	6.93	0.01	0.49	10.24	0.002
Interpersonal relationship	- 0.42	0.01	0.50	11.15	0.001
Number of visiting to pornography sites (4-6time)	5.84	0.01	0.51	4.01	0.029
Time of Internet use/week (10-20hrs)	4.30	0.01	0.52	4.59	0.033
Time of Internet use/week (>20hrs)	4.70	0.01	0.53	8.60	0.006

tion tendency among students, depression showed a positive relationship and emerged as the most powerful factor -at 19%, followed by Internet expectation with a positive relationship of 12%, self-awareness of Internet addiction(very much) with a positive relationship of 5%, and parent control over Internet use at 4%. Self-awareness of Internet addiction (somewhat) and (not much) each registered 3%, self control 2%, and other factors including time frame of Internet use (10:00 pm - 3:00 am), interpersonal relationship, number of visiting to pornography sites (4 - 6 times), average time of Internet use per week(10 - 20 hours), and average time of Internet use per week (>20 hours) 5%. Thus, 53% of the total was explained via the above variables.

DISCUSSION

In this study, the mean score of the tendency towards Internet addiction among middle school student was relatively low. In the overall ratio distribution, however, students at risk of addiction and those who were addicted accounted for approximately one-fourth or 27.4%-relatively high statistical figures that cannot be overlooked. The following findings were discussed when comparing results of research that examined adolescents with the same scales used in this study: In the study of Oh (2002), adolescents at risk of addiction and those who were addicted accounted for 62.1% of the total number of respondents. This showed a much higher level of addiction than this study. This was because this particular study targeted students in small to medium cities while Oh's study examined students in the metropolitan area. Therefore, there should be an examination on the degree of Internet addiction and the corresponding traits of students according to domicile and type of city in future studies.

A wide difference between the ratio indicating the actual addiction group as measured by Young's tool, which was merely 1.8%, and the ratio of students who were self-confessed Internet addicts, which turned out to be 38.4%, was found. Such difference can be explained by the apparently rigid standards used by Young's index in screening the test group (Shim, 2003). Therefore, although the students perceive themselves as would-be addicts or actual addicts, they may not be classified as such under the real test using Young's tool. Therefore, it is necessary to review the validation of Young's tool and to develop a measuring tool that is more suitable to the cultural situation of Korea.

There is a higher tendency for adolescents, as compared to adults, to form new habits and to become Internet addicts due to their ability to adapt quickly to new information and technology. (Lee et al., 2000). Therefore intervention in the education level is necessary to enable students to learn the proper habits of using the Internet. Likewise, for a deeper understanding of Internet addicts, efforts should be geared towards research that will examine the variances in Internet addiction based on habits of Internet use and individual traits of the users.

Regarding the differences in tendencies of Internet addiction based on demographic and characteristics of Internet use, male students were more likely to become addicted than female students. These findings were the same with those in previous studies. (Lee et al., 2000; Oh, 2002; Park, 2002a). With regards to the difference between males and females, male students were more familiar with computers as "machines" and were therefore more exposed to the Internet (Lee, G. Y., 2001).

However, the results of several studies on Internet addiction based on the gender of each age group showed a completely different outcome. For instance, in the study of Kim, J. Y. (2002) that examined elementary school students, there was no difference between male and female children. In studies conducted on adults, there were no differences between males and females. In addition, some studies showed that as the age of women increased, their addictive tendency also increased more significantly compared to men. (Brenner, 1997; Kim, S. W., 2002; Song, 1988). Therefore, the age group should also be factored in when discussing the addictive nature according to gender.

In terms of ways of using free time, there was a greater tendency for Internet addiction among students who spent time alone than with family members or friends. These were the same findings revealed in the study conducted by Park (2002). Park's study pointed out that the extent of Internet use showed a negative correlation with the parent-child relationship and friendship. In short, the higher the degree of Internet addiction, the more time the adolescent spent alone. This result may lead to a hypothesis that such adolescents are deprived of proper interpersonal relationship and effective communicative ability in real world.

The results of this study demonstrated that there was a higher tendency towards Internet addiction among mid-

dle school students who used the computer or the Internet for long hours. However, it would be more meaningful to analyze how students used the Internet rather than merely compare hours of Internet use. Furthermore, the results showed that students who visited pornographic sites or used the Internet at night tended to have a higher degree of Internet addiction tendency. Such results should be taken into consideration when developing strategies to prevent Internet addiction for adolescents.

As a result of examining the factors influencing Internet addiction among middle school students, 53% of the Internet addiction tendency was significantly explained by the variables such as depression, self-control, interpersonal relationship, parental control of Internet use, and time of Internet use per week. Through this result, students suffering from overall depression and low self-control were found to possess poor interpersonal relationship; hence showing the tendency to find one's identity and stability in a "fabricated world" such as the Internet.

In particular, depression was found to be the most influencing factor in predicting whether the student will become addicted to the Internet; the higher the degree of depression, the higher the tendency towards Internet addiction. In short, people who are not content with reality tend to become addicted to the Internet, achieving pseudo self-actualization in an imaginary world (Suler, 1996). Kiesler, Siegal, and McGuire (1984) mentioned that people who suffered from depression were more attracted to imaginary space where they could hide their non-linguistic actions. The study concluded that depressed people found communication more appealing through computers. In other words, adolescents who are very depressed undergo difficulties in forming good interpersonal relations. Thus, these adolescents hide their identities in the PC or the Internet, creating imaginary or dual identities for themselves. Although depression can be said to increase the predisposition towards Internet addiction, Young and Rogers (1997) reported that being addicted to the pathological Internet use could possibly lead to social isolation and depression since the adolescent's increasing computer use prevents him or her from meeting people. When taking this into account, the degree of addiction may therefore aggravate the level of depression and, in turn, form a vicious cycle.

Moreover, it has been examined that increased expectation level of the Internet could facilitate the prediction of tendency towards addiction. Therefore, in future research, there should be studies on the type of Internet expectation to anticipate rather than merely compare the quantitative aspect of Internet expectation.

In addition, since the negative recognition of parents regarding Internet use of their children may lead to anxiety and loss of confidence in their children's education, it is necessary to conduct continuing research that will set up education guidelines on Internet use for parents. In fact, Kim, S. C. (2002) demonstrated that in the case of adolescents who were addicted to the Internet, parents showed much interest in their children's Internet use although they were unable to give proper guidance.

Against this backdrop, this study would like to propose the following study to prevent Internet addiction. First of all, Internet addiction among adolescents should be approached from a multilateral context. In short, we should be prepared to deal with the Internet addiction issue of adolescents in the context of the personal characteristics of the adolescents, their families, schools, and society. For this purpose, a first attempt would be to provide an addiction prevention program by health teacher who is the first health provider at school. Although rehabilitation or treatment program for addicted students is important, it is also necessary to carry out preventive interventions via a systematic education program to adolescents who are prone to Internet addiction. Furthermore, since there is a common understanding that adolescents use the Internet mostly at home, it is simultaneously necessary to develop the education program for parents. This program will be contributed them to become a positive and effective consumers of Internet.

CONCLUSION

This research was undertaken to examine the degree of Internet addiction tendency and to analyze the factors affecting those Internet addiction tendency among middle school students.

This study found that a relatively high ratio of middle school students indicated a strong propensity to be addicted to the Internet. Therefore, it is very important to develop an educational program that will help prevent these students from being seriously addicted to the Internet.

Also, depression was the most powerful predictor of Internet addiction tendency of adolescents. This result

suggests that psychological factor such as depression should be carefully considered in relation to Internet addiction, especially when dealing with adolescents. Thus, it may be useful to measure the degree of depression in relation to the degree of Internet addiction in order to understand their relationship better. However, since it has yet to be established whether depression is the cause or outcome of Internet addiction, the future study should be attempted to research on this matter.

Adolescents who lacked self-control or engaged in undesirable habits related to Internet such as using Internet at midnight or connecting to lewd sites were showed a stronger Internet addiction tendency. Hence, it will be useful to include educational contents that promote self-control and build positive habits in connection with the Internet. Also, it is significant that there will be a need assessment study for investigating the contents that adolescents desire to know about Internet addiction.

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