FACTORS PREDICTING PROBLEMATIC INTERNET USE AMONG UNIVERSITY STUDENTS IN GREECE: NEW RESULTS OF A SAMPLE SURVEY

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Abstract

The aim of this paper is to investigate the relationships between Problematic Internet Use among University Students in Greece and factors such as Age, Gender, Academic Performance, Location of the Computer (Home, Internet Cafe, University), Time of Internet Use per week, additional dependencies and the change in psychological attitudes of Internet users. Data were gathered from 2358 University Students from all over Greece. The results indicated that factors such as age, gender, academic performance, location of Computer, additional dependencies, changes in psychological attitudes and health, present a statistically significant relationship in a Stepwise Multiple Regression model with dependent variable Problematic Internet Use. Cronbach's alpha and Guttman Split – half reliability coefficients were derived and their range was between 0.67 and 0.82 . The prevalence rate of Internet addiction was 13.1% . Correlation analysis revealed that there were statistically significant correlations at the 0.01 level, between excessive Internet use and other co-existing addictions such as alcoholism, smoking, drinking coffees, playing systematically games and taking substances.

INTRODUCTION

Internet has become an indispensible tool for communication, academic research, information and entertainment. However, the following paradox exists: excessive and problematic or pathological use of the "social" technology of Internet can lead to "antisocial" phenomena such as fewer friends, quarrels with parents and teachers, compulsive behavior and unhealthy psychological attitudes. *Problematic Internet use (PIU) is defined as Internet addiction (IA) plus at risk Internet use (ARIU).* [1-4] According to Young's Diagnostic Test for Internet Addiction (YDTIN) Internet users who meet 5 to 8 diagnostic criteria are "Internet addicted" and users who meet 3-4 diagnostic criteria are "at risk Internet users" (ARIU). Several studies have examined the relationship between Problematic Internet Use (PIU) and characteristics such as gender, age, academic performance, location of computer, excessive use of Internet and psychological attitudes.[5-9]

According to a substantial volume of recent research,[10-15] University students are considered as a group in high risk for PIU for the following reasons: (a) Students have huge blocks of unstructured time, (b) Schools and Universities provide free and unlimited access to Internet, (c) Students at the age of 18 – 22 years are for the first time away from parental control without any monitoring or censoring of what they say or do online, (d) Young students experience new problems of adapting to the University life and finding new friends. For this reason, students seek help by using different applications of the Internet, (e) Students receive full encouragement from faculty and administrators in using the different applications of Internet, (f) Adolescents are more trained to use the different applications of technological inventions and especially the Internet, (g) Students desire to escape University sources of stress resulting from their obligations to pass the exams, to deliver essays and to fulfill their purpose of getting their degrees in the prescribed time with reasonable marks, and (h) Students feel that university life is alienated from social activities and when they finish their studies, the job market with all its uncertainties is a field where they must participate and succeed in getting a job.

In Greece there exists no study concerning the predictors of PIU among University students The aim of this paper is to identify, using Stepwise Multiple Regression Analyses, the most statistically significant predictors

of PIU for University students who are studying in certain Universities at Athens and other cities of mainland Greece. For this purpose, it was investigated whether Greek University students' gender, age, academic performance in the last Semester of their studies, location of the computer where they use Internet, length of time of Internet use per week, additional dependencies such as number of coffees, alcoholic drinks which are drunk per day, taking substances, cigarettes smoked per day, and psychological attitudes and health, are significant predictors of their Problematic Internet Use (PIU). An additional purpose of the sample survey was to measure the prevalence rate of Internet addiction among Greek University students and to investigate, using correlation analyses, the degree of association between different overlapping addictions which a University students may present.

METHODS

Participants

The sample survey was conducted among a random sample of 2358 students, drawn randomly from the University of Athens, Agrricultural University of Athens, Economic and Business University of Athens, Technological Educational Institute (TEI) of Athens, Technological Educational Institute (TEI) of Piraeus, and Technological Educational Institute (TEI) of Epirus in Northern Greece. The sample consisted of 46.1% males and 53.9% females. 34.1% of students were 18 – 20 years old, 36.6% students were 20 – 22 years old, 16.9% students were 22-24 years old and 12.4% were aged more than 24 years old. It is interesting to note that the percentage of married students was 3.1% and the percentage of the divorced students was 3.2%.

The Questionnaire

Students were asked to fill a questionnaire consisting of the following six parts: (a) demographic elements, (b) length of time of Internet use per week, (c) length of time using various applications of the Internet per week, (d) conditions of relations with parents, teachers, friends and fellow students, (e) Young's Diagnostic Test of Internet Addiction and, (f) psychological Attitudes of Internet users and additional dependencies.

Problematic Internet Use Diagnostic Test (PIUDT)

The PIUDT includes the following domains :

a) *Problematic Social Relations Domain (PSOCREL*). This domain consisted of questions in a Liekert type scale from one to seven, concerning the degree of influence of the use of Internet in the daily program of work, studies, relations with parents, teachers, friends, personal health and psychological attitudes (10 items).

b) *Youngs' Diagnostic Test for Internet Addiction (YDTIA*) consisting of 8 items concerning absolute devotion to Internet, tolerance, unsuccessful attempts to reduce the use of Internet, compulsive conditions when attempting to stop increased use, loss of opportunities because of use, lies to parents concerning use of Internet and view of Internet as a way of avoiding problems (8 items).

c) *Problematic use of certain Applications of Internet (PUCAPP),* namely chatrooms, sexpages, advertising pages, games and e – mail (5 items).

d) *Negative Psychological Attitudes (NPA),* namely low self esteem, weak will to work, uncertainty about job security, absence of objectives in life and sense that everything is trivial (6 items).

e) *Excessive Internet Use and Deeper Psychological Problems (EIUDP),* namely hours of Internet use daily, Years of Internet use, feelings of loneliness or being abandoned and deep disappointment from life (10 items).

Table 1 contains the Coefficients of Internal Consistency and Reliability for the five domains of PIUDT.

Table 1. Coefficients of Internet Consistency and Reliability for PIUDT: Cronbach's alpha, Standardized item alpha, Split – half Guttmann Coefficient and Spearman – Brown Coefficient.

Domains of PIUDT	Cronbach's alpha coefficient	Standardized item alpha coefficient	No. of items	Split – half Guttman coefficient	Spearman – Brown coefficient
PSOCREL	0,88	0,87	10	0,84	0,86
YDTIA	0,70	0,72	8	0.69	0,69
PUCAPP	0,70	0,71	5	0,67	0,67
NPA	0,67	0,67	6	0,64	0,64
EIUDP	0,78	0,82	10	0,66	0,69

Methods and Data Analysis

The questionnaire and the Problematic Internet Use Diagnostic Test were filled by 2358 University students attending various undergraduate programs in 6 Universities and Technological Educational Institutes of Greece. The data were analyzed and $p<0.001$ was taken as the level of significance.

RESULTS AND DISCUSSION

A. Results

All the statistical analyses were carried out using the Statistical Package for Social Sciences (SPSS), version 17.0 . The prevalence rate of Internet addiction over all the 2358 students was, according to Young's (8) diagnostic criteria, 13.1% . The prevalence rate of Internet addiction for students at the Technological Educational Institute (TEI) of Athens was 12.1%, whereas the one for students of the Technological Educational Institute (TEI) of Epirus, which is located at a remote and one of the most poor regions of Europe, Epirus, was 13.6% . We found statistically significant Correlation Coefficients between excessive Internet use and other overlapping addictions such as alcoholism, systematic smoking, heavy drinking of coffees, playing systematically games and taking narcotic substances. The results are shown in Table 2.

Table 3. Overlapping Dependencies. Pearson's Correlation Coefficients between excessive Internet use, alcoholism, systematic smoking, heavy drinking of coffees, playing systematically games and taking substances. All the values of the Correlation Coefficients are statistically significant at the 0.01 level, for a two-sided test.

	Excessive Internet use	**Alcoholism**	**Heavy smoking**	**Heavy drinking of coffees**	**Playing Games**
Alcoholism	0,42				
Heavy Smoking	0,42	0,30			
Heavy drink of coffees	0,44	0,56	0,30		
Playing Games	0,20	0,16	0,20	0,17	
Taking substances	0,10	0,10	0,06	0,13	0,24

Stepwise Multiple Regression was applied to determine the factors influencing the total scores of Problematic Internet Use (PIU) of the students and the total scores of the (5) different domains of PIU, namely Problematic Social Relations (PSOCREL), Youngs' Diagnostic Test for Internet Addiction (YDTIA), Problematic use of certain Applications of Internet (PUCAPP), Negative Psychological Attitudes (NPA), and Excessive Internet Use and Deeper Psychological Problems (EIUDP).
The results are shown in Tables 3a and 3b.

Table 3a Stepwise Multiple Regression Analysis with predictors: demographic and psychosocial characteristics and dependent variable: Problematic Internet Use and its (5) domains.

	Problematic Internet Use (PIU)			**Problematic Social Relations (PSOCREL)**			**Youngs' Internet Addiction Diagnostic Test (YIADI)**		
Predictors	*Estimates B*	*t-test*	*Significance of (t)*	*Estimates B*	*t-test*	*Significance of (t)*	*Estimates B*	*t-test*	*Significance of (t)*
Constant	54,26	24,31	p<0,005	6,21	7,74	p<0,001	1,24	13,99	p<0,001
Gender	-1,95	-3,43	p<0,005	-0,06	-0,31	NS*	0,06	3,93	p<0,001
Age	-0,80	-3,28	p<0,005	0,01	-0,03	NS*	0,01	0,95	NS*
Academic Performance	0,72	-1,89	NS*	-0,54	-3,86	p<0,001	0,01	0,84	NS*
Place where Internet is used	-0,06	-0,24	NS*	0,14	-1,46	NS*	-0,028	-0,73	NS*
Length of time of Internet use	2,31	22,75	p<0,004	-0,03	-0,75	NS*	-0,01	-5,73	p<0,001
Additional dependencies	1,90	7,53	p<0,005	-0,01	-0,03	NS*	-0,01	-6,66	p<0,001
Psychological attitudes	2,00	10,71	p<0,004	2,28	33,55	p<0,001	0,11	2,72	p<0,001
Psychological health	2,78	16,87	p<0,005	3,10	49,75	p<0,001	0,01	0,98	p<0,001
Adjusted R^2	0,40			0,78			0,17		
F-test (df_1, df_2)	251,9			2376.5			44,34		

	Problematic Internet Use (PIU)			Problematic Social Relations (PSOCREL)			Youngs' Internet Addiction Diagnostic Test (YIADI)		
Predictors	*Estimates B*	*t-test*	*Significance of (t)*	*Estimates B*	*t-test*	*Significance of (t)*	*Estimates B*	*t-test*	*Significance of (t)*
df_1	1			1			1		
df_2	1789			1790			1690		
Significance of F- test	p<0,001			p<0,001			p<0,001		

note: NS*: non significant , p>0,001

Table 3b. (Continuation of Table 3a) Stepwise Multiple Regression Analysis with predictors: demographic and psychosocial characteristics and dependent variable: Problematic Internet Use and its (5) domains.

	Problematic Use of certain Applications of Internet (PUCAPP)			Negative Psychological Attitudes (NPA)			Excessive Internet Use and Deeper Psychological Problems (EIUDP)		
Predictors	*Estimates B*	*t-test*	*Significance of (t)*	*Estimates B*	*t-test*	*Segnificance of (t)*	*Estimates B*	*t-test*	*Significance of (t)*
Constant	8,81	10,65	p<0,001	10,99	40,57	p<0,001	15,20	10,64	p<0,001
Gender	-1,17	-5,54	p<0,001	0,10	1,50	p<0,001	-1,12	-3,06	p<0,001
Age	0,38	-4,23	p<0,001	0,02	0,61	NS*	-0,51	-3,23	p<0,001
Academic Performance	0,26	1,82	p<0,001	0,07	1,42	NS*	-0,78	3,18	p<0,001
Place where Internet is used	0,19	1,83	p<0,001	-0,15	-4,48	NS*	-0,11	-0,65	NS*
Length of Time of Internet Use	0,53	14,1	p<0,001	-0,06	-4,77	p<0,001	1,99	30,69	p<0,001
Additional Dependencies	1,23	13,06	p<0,001	-0,31	-10,20	p<0,001	1,31	8,09	p<0,001
Psychological Attitudes	-0,03	-0,36	NS*	-0,04	-1,76	p<0,001	-0,20	-1,72	p<0,001
Psychological Health	-0,27	-4,07	p<0,001	0,14	6,68	p<0,001	-0,30	-2.72	p<0,001
Adjusted R^2	0,26			0,12			0,43		
F-test (df_1,df_2)	16,53			47,32			7,39		
df_1	1			1			1		
df_2	1721			1789			1790		
Significance of F-test	p<0,001			p<0,001			p<0,001		

Note: NS*: non significant , p >0,001

B. Discussion

The results indicate that factors such as Gender, Age, Length of time of Internet use, Academic performance, Psychological Attitudes and Psychological health, Location of the computer, and additional dependencies are significant predictors, with p<0.001, of Problematic Internet Use (PIU). The results of the sample survey indicate that male students are Problematic Internet users at a higher percentage than female students. This finding is consistent with the findings of other studies in the literature.[1-4] The possible reasons for this result is that men are at a higher pressure than women to form social relations and to become members of social networks, to form intimate relationships and to develop themselves. This pressure results in a tendency of men to use the Internet in order to succeed in their social relations.[18]

The psychological factor is also a significant predictor of Problematic Internet Use. This is consistent with the theories of Davis,[19] Caplan,[20] Song,[10] and McGlinchey.[2] In accordance with the findings of Young,[17] we found that loss of opportunity to use the Internet results in Impulse Control Disorder and Depression. Some other researchers, such as Shapira et al[12] arrive to the same conclusion. This shows that Internet addiction is a purely psychiatric phenomenon and, as such, it requires a psychiatric treatment, as Davis[19] points out.

A significant predictor of Problematic Internet Use (PIU) is bad academic performance. This result is consistent with the findings of Kubey et al[21] and Young.[17] Problematic Internet Use causes lack of sleep because the user stays awake during late night hours in order to serf through the different web pages. The lack of sleep causes lack of concentration and loss of interest to the lectures of every day. The loss of interest causes reduced reading of the course material and, as a consequence bad marks in the examinations of academic courses. Wang[22] stresses the high degree of association between psychosocial maturity and problematic Internet use.

According to Yang et al.[23] students who use the Internet excessively, exhibit more psychiatric symptoms than students who use the Internet less frequently. Our study found a similar result for Greek University students. According to Table 3b, there is a significant association between excessive Internet use and

psychological attitudes. The relevant coefficient has a value -0.30, the t-test has a value of -2.72 and the p-value is less than 0.001.

Our results are also in accordance with the cognitive behavioral model for Internet addiction developed by Davis.[19] Davis suggested that psychiatric symptoms are necessary and adequate to lead to Internet addiction. A pre-existent psychiatric disorder (e.g. depression) is necessary to be present to develop Internet addiction; and a proximal negative psychological feeling (e.g. low self-esteem) is enough to trigger the symptoms of this addiction disorder. Additionally, Kraut et al.[24] pointed out the coexistence of Problematic Internet Use with depression and loneliness.

According to some studies[25-27] and Shapira et al,[12] the description of the Problematic Internet User is the following: he is a male University student 18-20 years old, with substantial psychiatric co-morbidity, who spends 30-35 hours per week on computer use that is not essential to his work or well being, resulting in significant subjective distress and functional impairment. E-mail, chat rooms, auction houses, gambling casinos, the "blogosphere", and pornography sites are only a few of the Internet venues that have been associated with Problematic Internet Use.

Our Correlation analysis revealed a clear tendency among college students to become addicted to more than one common substance or activity. The results of Table 2 revealed a tendency of an individual to develop more addictive behaviours if he already presents one and there is a statistically significant association between the six addictive behaviors: excessive Internet use, alcoholism, heavy smoking, heavy drinking of coffees, playing games and taking substances.

Current research[28-34] supports our findings. As a final comment, we would like to stress the responsibilities of parents, teachers, the media and the Governmental Departments of Health to take preventive measures such as counselling and social campaigns to restrict the new phenomenon of Internet addiction among young men and women.

References

1. Shapira NA, Lessig MC, Goldsmith TD, et al. Problematic Internet use: proposed classification and diagnostic criteria. *Depression and Anxiety* 2003;17:207-16.
2. McGlinchey JB. Internet usage of college students and relationship to psychopathology and addiction symptomatology. Doctoral dissertation, University of Washington, 2003.
3. Ceyhan E, Ceyhan AA, Gürcan A. The validity and reliability of the Problematic Internet Scale use. *Educational Sciences: Theory* & Practice 2007; 7:387-416.
4. Savaşir I, Şahin NH. (1997) *The evaluation in cognitive behavioral therapy: the scales used frequently.* Ankara: Turkish Psychological Association .
5. DiNicola MD. Pathological Internet use among college students: the prevalence of pathological Internet use and its correlates. Doctoral dissertation, Ohio Univercity, 2004.
6. Morahan-Martin J, Schumacher P. Incidence and correlates of pathological Internet use among college students. *Computers in Human Behavior,* 2000; 16:13-29.
7. Johansson A, Götestam KG. Internet addiction: characteristics of a questionnaire and prevalence in Norwegian youth (12-18 years). *Scandinavian Journal of Psychology* 2004; 45:223-9.
8. Choi YJ. Investigating Koreans' Internet use patterns and motivations and exploring vulnerability of Internet dependency. Doctoral dissertation, The University of Southern Mississippi, 2001.
9. Weitzman GD. Family and individual functioning and computer/Internet addiction. Doctoral dissertation, Albany State University, 2000.
10. Song I. Internet gratifications, depression, self-efficacy, and Internet addiction. Master's thesis, Michigan State University, 2003.
11. Chak K, Leung L. Shyness and locus of control as predictors of Internet addiction and Internet use. *Cyber-Psychology & Behavior* 2004; 7:559-70.
12. Shapira NA, Goldsmith TG, Keck PE Jr, Khosla UM, McElroy SL. Psychiatric features of individuals with problematic internet use. *Journal of Affective Disorders*, 2000;**57**:267-72.
13. Young KS. Internet addiction: The emergence of a new clinical disorder. Paper presented at the 104th annual meeting of the American Psychological Association, August 15, 1996, Toronto, Canada.
14. Young KS. Addictive use of the internet: a case study that breaks the stereotype. *Psychological Reports*, 1996;**79**:899-902.
15. Young KS & Rodgers R. Depression and its relationship with pathological internet use.Poster presented at the 68th annual meeting of the Eastern Psychological Association. April 11, 1997, Washington, DC.
16. Young KS. Internet addiction: The emergence of a new clinical disorder. *CyberPsychology & Behavior*, 1998;**1**:237-44.
17. Young KS. Internet Addiction: A New Clinical Phenomenon and Its Consequences. *American Behavioral Scientist*, 2004;**48**:402-15.

18. Bayractar F., Gun Z. Incidence and correlates of internet usage in North Cyprus. *CyberPsychology & Behavior*, 2007;**19**:191-7.
19. Davis R. A cognitive-behavioral model of pathological internet use. *Computers in Human Behavior*, 2001;**17**:187-195.
20. Caplan SE. Preference for online social interaction: a theory of problematic Internet use and psychosocial well-being. *Communication Research*, 2003;**30**:625-48.
21. Kubey RW, Lavin MJ, Barrows JR. Internet use and collegiate academic performance decrements: Early findings. *Journal of Communication*, 2001;**51**:366-82.
22. Wang W. Internet dependency and psychosocial maturity among college students. *International Journal of Human-Computer Studies* 2001; 55:919-38.
23. Yang C, Choe B, Baity M, et al. SCL-90-R and 16PF profiles of senior high school students with excessive Internet use. *Canadian Journal of Psychiatry* 2005; 50 : 407-14.
24. Kraut R, Patterson M, Lundmark V, Kiesler S, Mukopadhyay T, Scherlis W. Internet paradox: A social technology that reduces social involvement and psychological well being? *American Psychologist* 1998;**53**:1017-1031.
25. Aboujaoude E, Koran LM, Gamel N,MSW, Large MD , Serpe RT. Potential Markers for Problematic Internet Use ; A Telephone Survey of 2,513 Adults. *CNS Spectrums: The International Journal for Neuropsychiatric Medicine 2006;11(10):750-55.*
26. Treuer T, Fabian Z, Furedi J, Internet addiction associated with features of impulse control disorder. is it a real psychiatric disorder? *J. Affect. Disord.* 2001;66:283 .
27. Black DW, Belsare G, Schlosser S. Clinical features, psychiatric comorbidity, and health-related quality of life in persons reporting compulsive computer use behavior. *J. Clin. Psychiatry* 1999; 60:839-44 .
28. Greenberg JL, Lewis SE, Dodd DK. Overlapping Addictions and Self Esteem among College Men and Women. *Addictive Behaviors* 1999;24:565-71.
29. Craig RJ. The role of personality in understanding substance abuse. *Alcoholism Treatment Quarterly* 1995 ;13:17-27 .
30. Phillips CA ,Rolls S,Rouse A ,Griffiths MD. Home video game playing in schoolchildren: A study of incidence and patterns of play. *Journal of Adolescence* 1995;18:687-91.
31. Nathan PE. The addictive personality is the behavior of the addict. *Journal of Consulting and Cclinical Psychology* 1988;56:183-88 .
32. Donegan NH, Rodin J, O'Brien C, Solomon RL. A learning-theory approach to commonalities. *In Levison PK, Gerstein DR , Manloff DR (Eds.).Commonalities in substance abuse and habitual behaviour,* 1983 ,pp 157-235. Lexington, MA: Lexington Books .
33. Nelson-Zlupko L , Kauffman E, Dore MM. Gender Differences in drug addiction and treatment: Implications for social work intervention with substance- abusing women.*Social Work*, 1995;40:45-54 .
34. Rozin P , Stoess C. Is there a general tendency to become addicted? *Addictive Behaviors,*1993;18:81-87