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Consequences of Internet Use in College Students

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Abstract

In fall 2002, nursing students enrolled in HSCS 4140, Healthcare Research, conducted a research project to explore how much time college students spend on the Internet and the consequences of its use. For this study, a descriptive, survey research design was used. A convenience sampling method was used to recruit 1255 Georgia College & State University students from 55 classes who completed an on-line survey. Results from the study showed that several categories of students were high users of the Internet including freshmen, undeclared majors, students who rated themselves as having "excellent" Internet ability, and students who used the Internet for communication with family and friends. These same students were found to have significantly more negative behavioral consequences than their counterparts. Moreover, findings from the study demonstrated a correlation between increased time spent on the Internet and negative behavioral consequences including Internet addiction.

The Internet is an integral part of college students' lives as 86% of college students have used the Internet compared to 59% of the general population. It is estimated that 92% of college students have computer access (Perry, Perry, & Hosack, 1998). Students use the Internet more than campus libraries and also use it to communicate with professors, classmates, and friends (Pew Internet Project, 2002).

However, little is known about the consequences of Internet use in college students. Because college students have easy access, are required to use the Internet for academic reasons, and are the most-wired group, this population is particularly vulnerable for

experiencing consequences from Internet use. Thus, the purposes of the research project were to explore how much time college students spend on the Internet and the consequences for college students who use the Internet.

Theoretical Framework

Rogers' (1995) model for the study of consequences of innovations was used in this study (Figure 1). The original model predicted a direct relationship between the innovativeness of an individual (adopter category) and the consequences resulting from the adoption of a particular innovation. Time and social norm variables were added to the model by the research group because of findings from the literature which indicated that these variables could affect consequences of Internet use (Beard, 2002; Clark, 2002; Griffiths, 2000; Pew Internet Project, 2002; Wang, 2001). Using the model, the research group anticipated that the college students' innovativeness (adopter category), the intensity and duration of Internet use (time), and the social norms of college students could predict the physical, behavioral, economic, and psychosocial consequences of Internet use in college students.

Figure 1

Adapted Model for the Study of Consequences of Internet Use

Review of Literature

Adopter Categories

College students are considered to be early adopters of innovations, especially the Internet. They were among the first to use the Internet for activities including communication and recreation (Pew Internet Project, 2002). Madden (2000) found that early adopters get satisfaction from a product and that they value it even though it can be of limited use. Similarly, many college students view the Internet as an efficient tool that helps to generate information and enhance communication skills (Guihot, 2001).

Time and Social Norms

Pew Internet Project (2002) discovered that college students are heavy users of the Internet compared to other

populations. Anderson (2002) found that college students averaged 99 minutes per day on-line. Odell, Korgen, Schumacher and Delucchi (2000) discovered that students living on campus who own their own computers used the Internet twice as much as those who used campus facilities or friends' computers. Odell et al. found that academic major and study habits influenced the frequency and length of time that college students spent online.

Social norms associated with Internet use can be positive or negative. The Internet provides positive social experiences by allowing students to venture out into new friendships and expand their education on a global level. However, negative social norms are appearing in research studies. Wang (2001) stated that some students' relationships with their friends had been affected because of the Internet use. Maignan (1997) stated that some people use the Internet to avoid direct human interactions or to escape the realities of daily life. This interference with activities suggests that negative social norms are evident in situations where college students engage in Internet activities for long periods of time.

Consequences

Holmes (2002) identified that Internet use could be pathological with significant psychosocial, behavioral, physical and economic impairment. Currently, research on consequences of Internet usage among college students is limited and has led to much debate on the positive and negative impact of Internet use. On the positive side, Weiser (2001) found that the Internet allows people to broaden their socialization through joining groups and developing relationships but on the negative side, Internet users can become socially isolated which can contribute to Internet addiction.

Methods

This study used a descriptive, survey research design to evaluate adopter categories, time, social norms, and consequences of Internet use by college students. A convenience sample of 1255 students from 55 selected courses at Georgia College & State University (GC&SU) was used for this study. Inclusion criteria were current undergraduate and graduate students on the Milledgeville campus who had ability to use the Internet. The

research setting was an online questionnaire which was located on the University's WebCT site.

Instrumentation

The data for this study were collected using researcher-developed demographic data collection tool and the Internet Consequences Scale (ICONS). In total, there were 91 items on the survey. The demographic data collection tool collected information on gender, age, race, income, previous education, current year in college, frequent uses of the Internet, the location from which the subject usually accessed the Internet, primary reason for Internet use, adopter category, time, and social norms.

Consequences were measured by the ICONS (Clark, Frith, & Demi, 2003), which was developed from an analysis of the research literature on Internet use. The ICONS consisted of four subscales: physical consequences, behavioral consequences, economic/legal issues, and psychosocial consequences. Each of the subscales used a 5-point Likert-type scale. An overall score on the ICONS was calculated by summing the four subscales. Higher scores were related to positive consequences and lower scores represented negative consequences. The ICONS tool demonstrated acceptable internal consistency in the sample with alpha coefficients for the subscales as follows: physical subscale 0.76, behavioral subscale 0.92, economic subscale .68, and psychosocial subscale 0.84.

Procedures for Data Collection

Data for the study were collected from October 7th to October 21st. Data collection began by obtaining a list of graduate and undergraduate courses on the GC&SU campus. An e-mail was sent to professors to obtain permission to visit their classes to recruit participants for the study. Students received a handout with instructions for completing the survey. Participants were to go to <http://fdsa.gcsu.edu:6060/djclark/Internet/default.htm> to complete the consent form. There was a link directly from this site to WebCT where they were able to access and complete the survey.

Results and Discussion

Demographic Characteristics

The sample consisted of 300 students at Georgia College & State University (23.9% return rate). The sample was predominately Caucasian and female. Other demographic characteristics are presented in Table 1. Most of the sample participants were single and were juniors with an average age of 21.8 years. The School of Health Sciences was the most commonly represented academic school in the sample. Nearly two-thirds of the sample selected descriptions of behaviors that categorized them as “early majority” adopters of innovations.

Table 1
Demographic Characteristics of the Sample

Characteristics	Categories	n	%
Ethnicity	African American	22	7.3
	Asian or Pacific Islander	4	1.3
	Caucasian	258	86.0
	Hispanic	2	0.7
	Other	11	3.7
	Missing	3	1.0
	Gender	Male	61
Female		237	79.0
Missing		2	0.7
Marital Status	Divorced	10	3.3
	Married	28	9.3
	Single	250	86.0
	Missing	2	0.2
Age Group	17-20	161	53.7
	21-25	101	33.7

	26-30	11	3.7
	31-35	16	5.3
	36+	5	1.7
	Missing	6	2.0
Major	Arts & Sciences	97	32.3
	Business	19	6.4
	Education	51	17.2
	Health Sciences	118	39.2
	Undeclared	15	4.9
Ability to use the Internet	Poor	13	4.3
	Good	195	65.0
	Excellent	90	30.0
	Missing	2	0.7
Income	<\$10,000 /yr	35	11.7
	\$10,000-\$20,000/yr	17	5.7
	\$20,001-\$30,000/yr	16	5.3
	\$30,001-\$40,000/yr	12	4.0
	\$40,001-\$50,000/yr	16	5.3
	\$50,001-\$60,000/yr	23	7.7
	\$60,001-\$70,000/yr	16	5.3
	>\$70,001 /yr	65	21.7
	Didn't know or want to answer	97	32.3
	Missing	3	1.0
Completed Education Level	High School/GED	204	67.7
	Technical Degree	3	1.0
	Associate Degree	66	22.5
	Bachelor's Degree	20	7.0
	Graduate Degree	5	1.7
	Missing	2	0.7
Current Year in College	Freshman	60	20.0
	Sophomore	54	18.0
	Junior	111	37.0
	Senior	67	22.4
	Graduate	7	2.3
	Missing	1	0.3

Adapter Category	Laggard	22	7.3
	Late Majority	38	12.3
	Early Majority	194	64.7
	Early Adopters	22	7.3
	Innovators	24	7.7

Students in the sample reported having used the Internet for nearly six years and spent 8 hours per week on the Internet. Students' use of the Internet was supported by family and friends as shown by positive social norm scores. Family social norms scale had a mean of 7.79 ($R = 2-10$), and friends social norms scale had a mean of 8.34 ($R = 2-10$).

Time on the Internet

Students were grouped according to demographic characteristics in order to compare time on the Internet. No significant differences in time on the Internet were found for the following demographic characteristics: gender, marital status, adopter category, age, completed educational level, and income.

Time on the Internet was compared for students who used the Internet for communication to those who used it for information. A statistical difference was found, $t(297) = 3.916, p = .01$, indicating that students who used the Internet for communication reported being on-line significantly more than those who used it for information. This is an interesting finding for college students who might have been expected to use the Internet more for academic reasons, rather than social ones. But it is supportive of Weiser (2001) who found that individuals often use the Internet to socialize and broaden their network of friends.

A significant difference was found for time on the Internet among the self-reported categories of ability to use the Internet, $F(2, 295) = 8.113, p = .000$. Students, who rated themselves with an excellent ability used the Internet 3.68 hours per week more than those students who rated themselves with a good ability. This finding is not surprising--those with perceived expertise are high users of the Internet.

Statistical differences among freshmen and other categories of college students were found, $F(4, 293) = 5.656, p = .000$ for time on the Internet. Freshmen spent significantly more hours on

the Internet than sophomores, juniors, or seniors. Freshmen spent 12.5 hours on the Internet whereas all other students spent approximately 7 hours online. Freshmen differences could be attributable to enrollment in freshmen seminar, a required course that involves Internet use. Freshmen are usually living away from home for the first time and may use the Internet as a less expensive and more convenient way to maintain contact with family. A final explanation is that freshmen were exposed to the Internet at a young age and may use the Internet as a routine way of communicating with family and friends.

Time on the Internet was also significantly different for students in different academic schools, $F(4,943) = 4.072, p = .003$. Undeclared majors spent more hours on the Internet ($M = 14.2$) than students in declared majors ($M = 6.7$ to 9.9). The foremost difference involved the undeclared majors and majors in the School of Health Sciences. This finding may reflect a difference in time required for practice-based disciplines like nursing that leave little time for the Internet. Or the finding may simply reflect that undeclared majors are less focused on academics and more on the social aspects of college life.

Table 2
Comparison of Hours per Week on the Internet by Demographic Characteristics

Groups	Demographic Characteristics	Hours /week on Internet	
		<i>M</i>	<i>SD</i>
Primary Use of Internet	Communication	11.7	8.9
	Informational	7.43	7.1
Ability to Use Internet	Poor	6.3	6.1
	Good	7.3	6.9
	Excellence	11.1	8.8
Current Year in college	Freshman	12.6	11.0
	Sophomore	7.7	7.0
	Junior	7.9	6.7
	Senior	6.3	5.2
	Graduate	7.3	8.3

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Academic School	School of Arts and Sciences	8.6	7.6
	School of Business	9.9	8.2
	School of Education	8.7	7.0
	School of Health Sciences	6.7	6.3
	Undeclared	14.2	10.8

Behavioral Consequences

The ICONS, designed to quantify the physical, behavioral, economic, and psychosocial consequences of Internet, served as a measure of consequences of Internet use. Table 3 presents the descriptive statistics from ICONS. Questions on the ICONS portion of the survey were constructed such that the higher the score, the more positive the consequences. Participants' mean scores on all subscales and total scale were higher (more positive) than the possible neutral score.

Comparisons among student groups were made for each of the ICONS subscales. No significant differences were found for physical, economic, or psychosocial consequences subscales. However, behavioral consequences were significantly different among comparison groups. The behavioral consequences subscale measured a tendency toward dependence on the Internet (see Table 4).

Table 4.
Examples of Behavioral Consequences Items from ICONS

Topic	Question
Salience	When I am not online, doing my favorite Internet activities, I am thinking about doing it or planning the next time I can do it (them).
Mood Modification	When I am doing my favorite Internet activities online, I feel elated or get a "high" feeling.
Tolerance	Recently, I have been increasing the amount of time I spend online doing my favorite Internet activities.

Conflict I have thought in the past that it is not normal to spend as much time online with people as I do.

Descriptive Statistics from the Internet Consequences Scale

Scale	Sample		Scale Information			
	M	SD	Actual Range	Items	M	Possible Range
Physical	25.60	4.8	12-35	7	21	7-35
Behavioral	61.16	10.4	23-75	15	45	15-75
Economic	29.11	3.9	19-43	9	27	9-45
Psychosocial	48.82	5.4	33-75	16	48	16-80
Total ICONS	136.60	12.9	75-167	38	114	38-190

Table 3

Withdrawal When I decrease the amount of time doing my favorite Internet activities online I feel less satisfied.

Relapse When I stop doing the favorite Internet activities that interfere with my life, I usually return to them and repeat them.

When participants' scores on the behavioral subscale were compared based on current year in college, major, primary purpose for using the Internet and ability to use the Internet, significant differences were found. In each of these comparisons, the groups who had spent significantly more time online than their comparison groups had lower scores on the behavioral subscale of ICONS. A Pearson correlation demonstrated a negative relationship between hours per week on the Internet and behavioral consequences of Internet use, $r = .474$, $p = .000$. This indicates a correlation between greater amounts of time spent on the Internet use and negative behavioral consequences including Internet addiction.

Findings from the current study support results from the literature. Griffiths (2000) suggested that the Internet's increased accessibility might lead to excessive use and increased problems. Maignan (1997) and Wang (2001) found that when college

students engaged in online activities for long periods of time, it interfered with daily activities. Wang also found that some students' relationships with their friends had been affected because of the Internet use and that their friends would say that the Internet had caused conflicts with their relationships or their grades. Beard (2002) noted that heavy Internet users spend less time with people and more time alone in front of a computer.

Model to Predict Consequences of Internet Use

A multiple regression was performed for the independent variables, adopter category, hours per week on the Internet, and social norms on the dependent variable, total ICONS score. The regression equation was significant, $F(3, 281) = 13.09, p = .000$ and predicted 13% of the variance in consequences of Internet use in the undergraduate sample. Analysis revealed that consequences of Internet use could be predicted based on time spent on the Internet, total social norms score, and adopter category, indicating that the adapted model for the study of consequences of Internet use was accurate. However, only a small amount of variance was explained with the model. Of these variables, time spent on the Internet was the most predictive. Further research is needed to identify other factors that contribute to positive and negative consequences of Internet use.

Limitations

There were several limitations to the study including sampling and instrumentation. Because this study was conducted on one campus and convenience sampling was used, the generalizability of the findings to other college students may be limited. The ICONS instrument was found to have acceptable internal reliability, but its test-retest reliability had not been established. The instrument was only accessible via the Internet and may have led to a bias toward those who were experienced with computer and the Internet.

Implications

This study indicates a correlation between negative consequences and increased Internet use. As the Internet becomes a more integral part of everyday life, teachers, parents and university

administrators need to evaluate methods to encourage students to use the Internet effectively and in limited amounts. Freshman orientation, that includes discussion of possible negative consequences of using the Internet, could help reduce the incidence of negative outcomes related to an increased amount of time spent on the Internet.

Summary

The Internet has become an integral part of daily life for many college students and will continue to be used. Thus, understanding Internet consequences is an important area of research that should continue. This study demonstrated a correlation between increased time spent on the Internet and negative behavioral consequences. However, further research is needed to determine the level of use at which negative consequences become significant.

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