

The Internet: An Assessment of Student Perceptions

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INTRODUCTION

The Internet, a vast global connection of computers, has changed the way society works and plays. The Internet provides access to a vast array of information, services, and products to an estimated on-line community of 30 million people (Rosenbaum, 1996) and is accessible in over 150 nations worldwide (Sussman and Pollack, 1995). This phenomena is extremely dynamic in nature and continues to impact our culture in unpredictable ways.

The business world has undergone many changes because of information technology, and the impact of the Internet may one of the biggest yet. "Now that computing is astouhdingly inexpensive and computers inhabit every part of our lives, we stand at the brink of another revolution. This will involve unprecedentedly inexpensive communication; all the computers will join together to communicate with us and for us. Interconnected globally, they will form a network, which is being called the information highway. A direct precursor is the present Internet..." (Gates, 1995). Current business periodicals and journals are replete with descriptions of applications of the various components that define the Internet.

Companies such as General Motors, WalMart, and Kelloggs have been conducting business electronically with its suppliers and customers using electronic data interchange (EDI) to the tune of \$500 billion annually (Verity, 1996). However, conducting on-line commerce via the Internet, offers the opportunity to cut costs and improve efficiency even more drastically. Many companies are looking for ways to tie their internal networks to this vast global

network, and the management of this Intranet is opening up new avenues for the role of information technology in business (Horwitt, 1996; Weston and Nash, 1996).

Large, multinational companies are not the only ones benefitting from the Internet. A small business recently went public through its world wide web (WWW) home page by offering and selling 900,000 shares of stock without paying underwriters or brokers; furthermore, the S.E.C. has given permission for the company to maintain a permanent trading site on its WWW home page (Hannon, 1996). Investors will communicate with one another via electronic mail to negotiate stock transactions.

According to some, the Internet will ?drive the US economy into the next century? (Ransdell, 1996). Executives tend to agree that the Internet and Internet knowledge will be an important key to career advancement in the future. A survey developed by Robert Half International and administered to 150 executives from the 1,000 largest companies showed that 61% of executives believe that a strong understanding of how to use the Internet would make employees more marketable. Additionally, 76% believed Internet expertise would advance their careers five years from now (Inside DPMA, 1996). If this is indeed correct, educational institutions need to begin evaluating the need for including coverage of the various components of the Internet in their curricula. From observation, it appears that students have a good understanding of the Internet, especially the World Wide Web. Student labs are packed with Internet Surfers who are looking for that exciting site their friends have yet to find. Thus, surfing may

be beneficial to students in terms of future success in the business world.

To begin this evaluation, this study assesses students' knowledge about various Internet components, as well as their comfort level completing certain task on the Internet. Additionally, the source of Internet knowledge is identified in this study. Any time curricula is modified, a baseline for evaluation must be established. This study helps identify that baseline.

RESEARCH INSTRUMENT

A questionnaire was used for data collection. The questionnaire consisted of five sections. Section one contained general computer related questions, such as "Have you heard of the information superhighway?" and "Do you own a PC?" Section two identified students' level of familiarity with various aspects of the Internet. This section utilized a seven point scale ranging from "Never Heard of" to "Use Daily." Students were asked to describe their familiarity level with items such as commercial Internet access providers, the World Wide Web, and Internet tools such as Telnet, Finger, and Usenet newsgroups.

In section three, students were asked to identify their sources of knowledge concerning the Internet. The choices included: 1) classes, 2) textbooks, 3) friends/colleagues, 4) work, 5) family, 6) newspapers, and 7) TV shows/movies. A seven point scale was used to measure the source of knowledge with labels ranging from "Strongly Disagree" to "Strongly Agree." The same seven point Likert scale was used in section four to measure the level of comfort performing certain functions on the Internet. Students were asked to indicate their comfort level when: 1) downloading data from the Internet, 2) printing from the Internet, 3) sending electronic mail, 4) forwarding electronic mail, 5) using FTP (file transfer protocol), 6) using gopher, 7) participating in electronic discussion groups, and 8) surfing the Internet. The final section contained demographic questions such as major, classification, age, gender, and ethnic background. A similar questionnaire was used by Jones and Berry (1995) to assess student knowledge about information technology.

STUDENT DEMOGRAPHICS

A purposive, convenience sampling technique was utilized to survey students at a comprehensive, southern university. Classes were randomly chosen from the university's five colleges: Business Administration, Education, Pure and Applied Sciences, Liberal Arts, and Pharmacy and Health Sciences. A pre-test was conducted in one of the classes to evaluate the appropriateness and validity of the questionnaire.

A total of 312 questionnaires were analyzed. Respondents included approximately 43% males and 57% females. Forty-eight percent of the respondents were from Business Administration, 6% from Education, 19% from Liberal Arts, 6% from Pure and Applied Sciences, and 22% from Pharmacy and Health Sciences. Approximately 10% were classified as freshmen, 34% as sophomores, 28% as juniors, 25% as seniors and 3% as graduate students.

Fifty-one percent of students participating owned their own computer. Only 11% indicated they subscribe to an on-line ser-

vice and approximately half (51%) had a university computer account. Forty-three percent indicated they had been using a computer for more than four years. Additionally, 28% of the students had taken four or more classes that required the use of a computer. A low 8% had taken no classes that required the use of a computer. A majority had heard the term "information superhighway" (77%). Seventy-eight percent recommended that a class about the Internet be offered for credit while another 11% suggested non-credit seminars.

FAMILIARITY WITH THE INTERNET

Despite observations of students 'net surfing in labs, they were not very familiar with most of the terms used to describe the various aspects of the Internet (see Table 1). Mean scores ranged from a high of 3.23 to a low of 1.39; indicating that they had either never heard of these components or had only used them a little. The term Internet was the one with which students reported being the most familiar. However the mean of 3.23 indicates they don't use it as much. Electronic mail was the term they were next most familiar with. This is not surprising because electronic

Table 1
Familiarity with Internet

Variable	Mean*	St. Dev
Internet	3.23	1.85
Email	3.17	1.9
American On Line	2.49	1.3
Netscape	2.45	1.87
World Wide Web	2.42	1.75
Telnet	2.28	1.76
Prodigy	2.13	1.12
http:\	2.09	1.71
Gopher	1.95	1.43
CompuServe	1.9	0.98
Yahoo	1.9	1.67
Finger	1.73	1.6
FTP	1.64	1.41
Usenet newsgroups	1.59	1.24
GIF	1.57	1.39
URL	1.42	1.2
Peg	1.39	1.12

mail is the most commonly used Internet tool and was around long before the explosion of the Internet. However, the mean of 3.17 indicates these respondents do not use it frequently.

SOURCES OF INTERNET KNOWLEDGE

Since there is very little coverage of the Internet in the curricula at most universities, an attempt was made to determine where students gained Internet knowledge (Table 2). The source that was rated the highest was Newspapers/Magazines, which was followed closely by Friends/Colleagues (5.56) and TV shows/Movies (5.5). The lowest rated source of information was textbooks (3.57) which was followed closely by Work (3.61) and Family (3.66). Classes (4.7) was in the middle. In a previous study, Jones and Berry (1995) found students learn most about information technology from newspapers/magazines and friends/colleagues as well.

Table 2
Sources of Internet Knowledge

Variable	Mean*	St. Dev.
Newspapers	5.57	1.76
Friends/Colleagues	5.56	1.84
TV Shows/Movies	5.5	1.78
Classes	4.7	2.11
Family3.66	2.33	
Work3.61	2.32	
Textbooks	3.57	2.16

Table 3
Comfort level

Variable	Mean *	St. Dev.
Sending Email	4.11	2.31
Printing	3.87	2.23
Surfing	3.79	2.22
Forwarding mail	3.7	2.2
Downloading	3.63	2.16
Group discussions	3.35	2.08
Gophering	3.0	2.0
FTP?ing	2.93	1.91

COMFORT LEVEL OF USING THE INTERNET

Section four of the questionnaire attempted to measure respondent's comfort with completing various tasks using the Internet (Table 3). The highest mean value was for sending electronic mail; not surprising since e-mail was also the most often used Internet tool. The lowest mean value was for using Gopher, the text-based menu system for surfing the Internet. Because most computers are capable of accessing the World Wide Web which has a graphical interface, Gopher and other text-based systems may not be used at all. The range of values in this section were higher than the familiarity level section, suggesting that students successfully use the Internet, but are not fully aware of the tools and techniques available to them. This is probably true since most of what they have learned has not come from a class or other structured learning environment; thus, most of the learning has most likely been accomplished by trial and error.

Table 4
factor Analysis of Dependent Variables

FACTOR Indicator	Factor Loading*	Cronbach?s Alpha**
On-Line Services		.7067
America On Line	.78220	
Compuserve	.66785	
Prodigy	.71128	
Advanced Internet Tools		.9120
Telnet	.55110	
Finger	.62695	
FTP.62406		
GIF.74826		
Gopher	.55993	
PEG.83521		
URL.80692		
Usenet Groups	.62935	
Basic Internet Tools		.8948
Netscape	.80471	
HTTP	.58464	
WWW	.69082	
Yahoo	.71174	
Social Learning		.6760
Newspapers	.80298	
TV.84219		
Classroom Learning		.7162
Class.83150		
Textbooks	.85271	
Comfort Level		.9354
Downloading	.70545	
Printing	.76649	
Forwarding mail	.80736	
FTP?ing	.76499	
Gophering	.75258	
Sending mail	.75693	
Discussion groups	.80103	
Surfing Internet	.73572	

* Items with less than 0.50 loadings were eliminated from subsequent analysis (Hair, et al. 1992)

INFLUENCE OF BACKGROUND AND EXPERIENCE

Multivariate analysis of variance was used to investigate whether use of the Internet is influenced by years of computer use, number of classes taken, ownership of a PC, or subscription to an on-line service. First, however, the questionnaire items were factor analyzed to reduce the number of variables to a more manageable number. The resulting factors and their indicators are shown in Table 4.

FACTOR Indicator	Factor Loading*	Cronbach's Alpha**
On-Line Services		.7067
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ity can not exist in the absence of reliability. Reliability is a measure of internal consistency of construct measures and provides an indication as to the degree the items measure the underlying construct. Simply, it is the accuracy or precision of the research instrument (Kerlinger, 1986). Cronbach's alpha (Cronbach, 1951) serves as a reliability coefficient and should be at least .70 to indicate reliable measures (Nunnally and Bernstein, 1994). Therefore, the construct identified as social learning was not considered in subsequent analysis.

Multivariate analysis of variance was used to test the relationships among the remaining five factors and years of computer use, number of classes taken, whether or not a PC was owned, and whether or not a student subscribed to an on-line service. Results are shown in Table 5.

Dependent Variable	Overall F	P	R'	Independent Variable	Univariate F	P
On-Line Services	5.83	.0001	.228	Number of Classes	2.53	.0208
				On-Line Subscription	16.14	.0001
Adv. Internet Tools	3.84	.0001	.162	Number of Classes	5.93	.0001
				On-Line Subscription	1.83	.1420
WEB Tools	4.77	.0001	.194	Number of Classes	6.27	.0001
				On-Line Subscription	6.13	.0005
Classroom Learning	1.30	.2003	.060	Number of Classes	1.92	.0782
				On-Line Subscription	2.50	.0608
Comfort Level	4.07	.0001	.170	Number of Classes	5.47	.0001
				On-Line Subscription	3.13	.0259

Wilks? Criterion for the test of overall effect indicates that the number of years using a computer and whether or not a student owns a PC has no statistically significant effect on any of the dependent factors at $\alpha = .05$. However, Wilks? Criterion does indicate the number of classes a student has taken and whether or not a student subscribes to an on-line service are significantly related to at least one of the dependent variables. The univariate F and p-values for these variables are also shown in Table 5. As shown, subscription to on-line services does not seem to have an impact on students' perceptions about the advanced Internet tools or classroom learning. However, the number of classes a student has taken appears to have an effect on all of the dependent variables identified in this study. These results are encouraging for educators that have begun to include coverage of the Internet in their courses.

Students that subscribe to an on-line service obviously have a much higher use/familiarity level with on-line services. They also tend to be more familiar with the communication tools, advanced Internet tools, and have a higher comfort level completing Internet tasks. Since most on-line services are Internet access providers, these results are not surprising at all. However, it was surprising that years of computer use and whether or not a person owns a computer had no statistical overall effect on the dependent variables. It was expected that more experienced users and computer owners would be more inclined to use these tools. One possible explanation for the lack of support for this idea is that on-line services and user-friendly search engines have made this network so accessible, regardless of computer expertise, that experience has no bearing. Furthermore, with the explosion of access to the

In addition to reducing the number of variables, factor analysis is also a recommended means of verifying construct validity (Kerlinger, 1986). Construct validity is the degree to which the instrument measures the construct that it was developed to represent. As indicated in Table 4, 6 factors emerged from the analysis. Factor loadings below .50 were not included in subsequent analysis because of their low correlation with other indicators representing the factor (Hair et al., 1992). Additionally, construct valid-

Internet through school labs and computers in the workplace, owning a PC may also be a negligible influence on its use.

CONCLUSIONS AND RECOMMENDATIONS

Carol Cartwright (1995) suggested that students who once said "I want my MTV" have now become students who demand "I want my World Wide Web." Computer labs are crowded with students surfing the Internet to gain access to major libraries of the world, newspapers, databases, books, on-line advertisements, and numerous services. The amount of available information is awesome, and at the same time, overwhelming. Faculty must learn to become managers of this vast array of information to transform students into successful, technology literate citizens and employees.

The descriptive results suggest Internet familiarity and comfort levels are not that high. It is possible that what is being learned is occurring in a haphazard manner. For example, students are more familiar with the basic Internet concepts as compared to the advanced Internet tools. Students, faculty, and staff are able to use the Internet but have not recognized, or found, all of the tools available to them. Perhaps Internet classes should be developed so students can reap benefits of the Internet.

Students are undoubtedly using the Internet at an unprecedented rate. As new services become available, students scramble to gain access. Businesses, as well, have realized the importance of the Internet and the impact that it is going to have on the way they do business, and on society as a whole. The Internet must be taught in courses so that learning will not be a haphazard experience. Formal, structured classes must be developed and offered. Only 20 of the 312 respondents of this survey suggested there should not be an Internet class offered at the university level. The challenge will be to use the Internet in such a way that a positive difference is made to education as it becomes as common a supplement as the library and bookstore are now.

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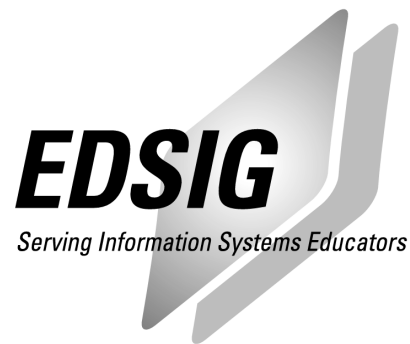
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