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ATTITUDES ABOUT THE INTERNET: IMPLICATIONS FOR USE IN EDUCATION

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ABSTRACT

This study identified beliefs and attitudes about the Internet in relation to different populations of higher education students. A pair of surveys were used to better understand positive and negative attitudes students harbor concerning the WWW and related Internet technologies. The responses were used to both validate what are the most salient positive and negative aspects of the Internet and to reveal differences in attitude toward these aspects based on demographic variables. The results are discussed with respect to the affective dimensions that shape the use of Internet-related technologies and the need for further research into the impact of the Internet on higher education.

INTRODUCTION

The initial years of the twenty-first century has seen the continued maturing of Internet technology and increasing integration into all aspects of student life at most colleges and universities across the country. One educational technology magazine rated "virtual learning" as the number one technology issue in education in 2001 [1]. The Chronicle of Higher Education had over 70 articles in 2001 devoted to distance learning or other Internet technology related issues (e.g., Carlson [2]). In addition to the integration of the Internet into the learning environment, Internet technologies are also beginning to pervade all other aspects

of students' lives. E-business and e-commerce technologies have developed a significant foothold on campuses, allowing students to register for courses, perform library searches, and pay tuition bills using the Internet [3]. More and more, the experience that students have on campus mirrors the kinds of interactions the general public experiences with the Internet, possibly even at a more intensive level.

While much has been made of the positive aspects of the Internet, there is no reason to believe that all interactions that students have with it are positive. As the Internet has become more fully integrated into all aspects of students lives, then possibly both positive and negative aspects of the Internet have influenced students' ability to function effectively in the higher education environment [4, 5]. There is a need to better understand the affective dimensions of students' use of the Internet because of the trends that it has become "part and parcel" of students' lives. These affective dimensions can clearly influence behaviors with regard to (effective) use of the Internet [6-8]. Previous research by Davis has shown that affective dimensions of behavior can influence acceptance and usage patterns of information technologies [9]. Similarly, Carr has noted that affective response to Internet technologies may play a role in the drop-out rate from distance education courses [10].

Previous research has also shown that differing affective responses to Internet and related information technologies may be related to demographic variables such as gender and age [7, 8, 11]. These demographic variables may, in turn, be linked to previous experiences (or lack thereof) with information technology. With larger public institutions drawing more and more returning adult students, the age distribution of the student body has broadened considerably [12]. In addition, students holding down other jobs are more likely to consider the advantages of the time flexibility of distance education courses which provide for asynchronous content access and communication. There is a need to look at demographic variables that take into account a broad age range, in addition to gender and ethnic diversity. Also of interest will be looking at whether there are differences based on current student status.

This current research attempts to identify and define those affective dimensions that may impact a students' ability to effectively make use of Internet-based tools and resources. Demographic variables of age, gender, and ethnicity can be used to further understand these affective responses patterns. A better understanding of students' affective responses to Internet technologies can help faculty and policymakers better design and implement interfaces to campus-based portals. Given that user attitudes, beliefs, and perceived benefits interact with interface design elements to influence usage patterns of information technologies [9], it becomes critical to be aware of these issues while developing interfaces.

A starting point for examining subjective beliefs about Internet-based technologies is to capture the most salient aspects in the minds of a population that includes both current and future students. While one approach would be to use

existing literature or personal experience to generate a pool of statements related to beliefs (e.g., Duggan [6]), the relative immaturity of research on beliefs and attitudes concerning the Internet suggested a different approach might be better. Instead, as a starting point, an open-ended solicitation from a wide variety of people was used to remove many of the biases of what would constitute an important issue. This method is more likely to produce a more complete list than if one or two researchers generated a list of items. An initial survey distributed to a large diverse population asked the respondents to provide positive and negative aspects about the Internet and related Internet communication technologies. The open-ended responses given in this survey guided the development of 26 issue statements (13 positive and 13 negative) about the Internet. A second survey given to a second group of individuals solicited responses to these issues. Using this method, a more comprehensive list was generated to use for the second portion of this study codifying affective responses to Internet technology. This study then further evaluates how well the identified items capture the most salient affective issues surrounding the use of the Internet.

METHODOLOGY

Survey Design

Affective issues surrounding the Internet were identified and evaluated in a two stage process. The first survey identified positive and negative beliefs and attitudes about the Internet while a second survey was used to: 1) validate the selection and organization of the items identified in the first survey; and 2) explore the relationship of the identified items with demographic variables. Both the first and second survey were part of a larger survey that assessed beliefs in areas besides the Internet.

As part of the first survey, respondents were asked to list (i.e., free response) five positive and five negative aspects of the Internet. Subordinate groupings were formed from the responses to the first survey and the aspects that dominated each of these groupings formed the basis for the 13 positive and 13 negative items generated for use in the second survey. In the second survey respondents were given two sets of 13 items listing positive or negative aspects of the Internet. Individuals were asked to respond to these items one at a time with a score on a 9-point Likert-type scale from 0 (not at all important) to 8 (extremely important) for the positive items and from 0 (not a problem at all) to 8 (extremely a problem) for the negative items.

Survey Sample

For both surveys, each student of an undergraduate psychology course was asked as part of a course assignment to solicit 10 individuals to complete the

survey. The data for the first survey was collected during the month of November 2000. The second survey was administered in April 2001 using a similar sampling method.

RESULTS

Response Sample

Of the 380 respondents to the first survey, 207 (60.5 percent) indicated they were male and 135 (39.5 percent) female. Most respondents were Caucasian, with only 14 percent choosing another ethnic category. Thirty-five percent of the respondents were between 18 and 21 years of age, 38 percent between 22 and 40 years, and the remainder over 40 years (see Figure 1). These age ranges roughly paralleled the level of education of the respondents, with 26.3 percent not having completed at least one year of college and another 30.1 percent having completed at least an undergraduate degree. Of the 219 respondents to the second survey, 122 (55.7 percent) indicated they were male and 97 (44.3 percent) female. For this survey, only 7.3 percent chose an ethnic category other than Caucasian. The age

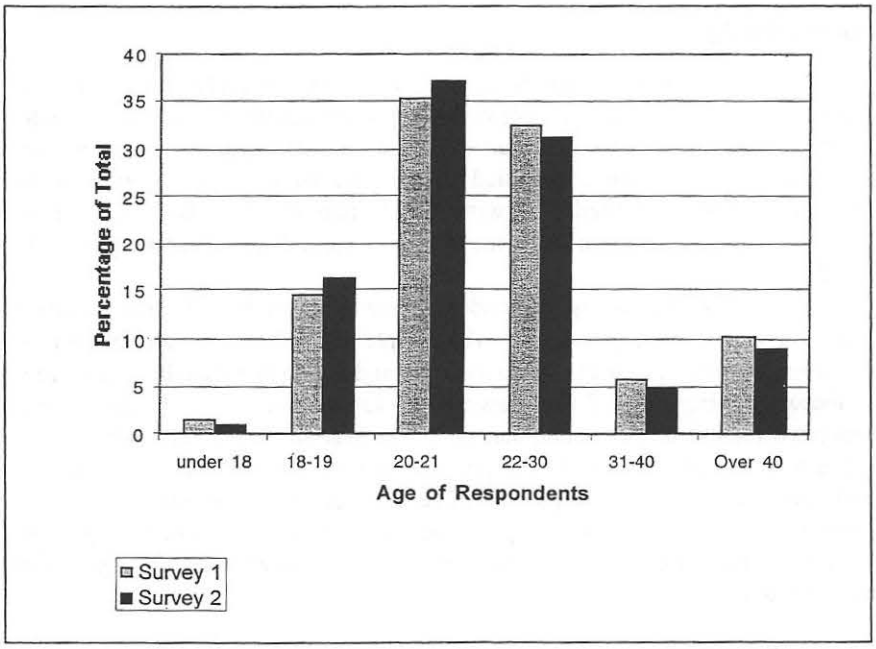

Figure 1. Histogram showing the age distribution of respondents. Bar height represents the percentage total for that category within its respective survey pool.

distribution was again weighted toward college age with 55 percent between the ages of 18 and 21, 36 percent between 22 and 40 years, and the remainder over 40 years.

Of those responding to the second survey, 71.7 percent were full-time students while 28.3 percent were not. The full-time student population was 61.1 percent male and 38.9 percent female while the non-students were 41.0 percent male and 59 percent female. The student population was also younger ($M = 20.9$, $S.D. = 2.8$) than the non-student population ($M = 33.4$, $S.D. = 12.4$) with a tighter dispersion of ages.

Survey One Responses

Of those returned, 342 (90 percent) listed one or more positive aspects while 336 (88 percent) listed one or more negative aspects of the Internet. Positive and negative free responses were interpreted by the first author and initially grouped in logical categories. A review of these initial categories led to a second round to groupings forming the subordinate categories, shown in Table 1.

Negative Aspects

The groupings shown in Table 1 reveal the common concerns that define the subordinate categories. Of most interest may be those items listed as negative aspects of the Internet. A total of 49 percent of the respondents reported Technology Performance/Cost as a negative aspect of the Internet. Within this category, the speed of moving information over the Internet was the dominant theme (32 percent). Cost of connecting to the Internet and the related issue of access to the Internet combined to form a substantive (14 percent) secondary issue in this category.

A larger number of respondents (76 percent) indicated that a negative aspect of the Internet related to Information Performance. This category was dominated by a parallel theme of either too much or unreliable information (51 percent). In addition to these information issues was the negative aspect of advertising (7 percent). Combining for 10 percent of the respondents were items related directly to the other information overload issues—navigation confusion and the inability to find information.

A total of 62 percent of the respondents indicated Social/Safety issues were a concern. These personal issues largely centered on a variety of security issues relating to how secure personal information was and viruses. Also noted by 21 percent of the respondents was the issue of pornography. Also of a personal nature was the Mental/Physical Health category. Finally, 15 percent of the respondents indicated an item in this category, with a majority (11 percent) noting the addictive nature of the Internet.

Table 1. Groupings of the Free Response Answers in Frequency (f) and Percentage of Total Responses (%).

Negative	f	%	Positive	f	%
Technology performance/cost	**164**	**49**	**Technology performance/cost**	**211**	**62**
Too much traffic/slow	108	32	Easy to use	142	42
No computer, access, or phone line	23	7	Speed	55	16
Cost	23	7	Saves time	7	2
Sites down; broken links	4	1	Free or cheap	7	2
Computer locks up	3	1			
Busy signals	3	1	**Information performance**	**144**	**42**
			E-mail	71	21
Information performance	**255**	**76**	Communicate with friends, family and people around the world	37	11
Unreliable information	87	26			
Too much information	83	25	News	21	6
Advertisements; pop-up windows	22	7	Research	8	2
Confusing to navigate	19	6	Instant messaging	4	1
Can't find information	15	4	Up-to-date information	3	1
Junk e-mail	11	3			
Bad search engines	11	3			
Poorly designed web pages	5	1			
Lack of customer service	2	1	**Commerce/Entertainment**	**72**	**21**
			Online business	15	4
Social/Safety	**208**	**62**	Shopping	47	14
Security issues	106	32	Music	4	1
Pornography	71	21	Games	3	1
Cookies	12	4	Sports	3	1
Viruses	11	3			
Information that is bad for children	4	1	**Social/Safety**	**34**	**10**
People want to censor	4	1	Pornography	20	6
			Privacy/Use at home	11	3
Mental/Physical health	**52**	**15**	Free expression	3	1
Time spent online; addictive	36	11			
Impersonal; No socialization with others	13	4	**Mental/Physical Health**	**32**	**9**
Strain on eyes	3	1	Fun to use	32	9
Other	**25**	**7**	**Other**	**26**	**8**
Other	7	7	Other	26	8

Positive Aspects

These aspects of the Internet were dominated by the ease and speed of communication along with the flexibility to communicate around the world at any time of the day or night. Sixty-two percent of the respondents noted positive

Technology performance/cost items while 42 percent noted positive Information performance items. These positive items almost directly mirrored their negative counterparts, though at different frequencies. A new positive category however, Commerce/Entertainment, was created. This category was dominated by shopping (14 percent) and online business possibilities (4 percent). Together, these items relate to the information and technology issues. Positive social/safety and health issues were also noted, though at a lower rate than their negative counterparts.

In the response categories seen in Table 1, analyses of variance failed to show any substantial differences in response patterns based on demographic categories of ethnicity, age, or gender. An analysis based on the educational level of the respondents, a significant difference in Negative Social Aspects responses was seen when those respondents who had not completed at least one year of college were separated from the remaining population.

Survey Two Responses

The subordinate groupings and the aspects that dominated each of these groupings formed the basis for the 13 positive and 13 negative items generated for use in the second survey. These items are listed in Table 2, ranked from high to low on the mean response score. There was no clear correspondence between the frequency that these items were mentioned in the first survey (see Table 1) and the strength of response elicited in the second survey, for either the positive or negative items. For example, the top three positive aspects from the first survey (Easy to use, e-mail, and Speed) ranked fourth, fifth, and sixth, respectively, in the second survey. Similarly, the aspect of Privacy was only mentioned by 3 percent of the respondents on the first survey but was ranked two on the second survey. The negative aspects showed similar trends, with many of the top ranked items on the second survey lagging well behind in frequency of occurrence in the first survey. For example, the top ranked negative item in the second survey, Viruses, was only listed by 3 percent of the respondents in the first survey. The second ranked item in the second survey, Junk e-mail, also elicited 3 percent on the first. Finally, the second ranked aspect on the first survey, Security, was ranked ninth on the second survey.

A factor analysis was performed on the response patterns to the positive and negative items to see whether there was correspondence with the subordinate groups defined in the first survey. For the positive items, three factors were identified. Using a varimax rotation, five items loaded in the first factor with a coefficient of 0.46 or better (e-mail, Instant messaging, e-business, News, Communications). Four items loaded on the second factor with a coefficient of 0.43 or better (Speed, Searching, Information, Communications). Finally, one item loaded on the third factor at 0.58, No censorship. For negative items, two factors were identified. Using a varimax rotation, eight items loaded in the first factor with a coefficient of 0.47 or better (Slowness, Information, Advertising,

Table 2. Items Used in Survey Two, with Score Mean (M) and Standard Deviation (S.D.), Listed in Order of Mean Score

Positive items	M	S.D.
Search engines that allow you to find what you are looking for	6.72	1.55
Privacy	6.63	1.63
Up-to-date and accurate information	6.61	1.56
Ease of use	6.60	1.63
E-mail	6.54	1.64
Websites that load quickly	6.51	1.62
Ability to communicate with friends and family around the world	6.32	1.72
News	4.57	2.00
Instant messaging	4.41	2.56
Lack of censorship	4.27	2.40
On-line shopping	3.99	2.13
E-business	3.64	2.22
Pornography	1.33	2.36
Negative Items	**M**	**S.D.**
Viruses	5.94	2.04
Junk e-mail; 'spamming'	5.82	2.05
Slow connections	5.78	1.79
Advertisements; pop-up windows	5.64	2.23
Information that is bad for children	5.16	2.40
Lack of privacy; 'cookies'	5.04	2.17
Pornography	4.72	2.70
Search engines unable to find what you are looking for	4.67	2.12
Security	4.57	2.31
Information reliability	4.40	1.95
Censorship	3.56	2.27
Amount of time spent on-line	3.26	2.36
Poorly designed web pages	3.09	2.24

Searching, e-mail, Security, Censorship, Design). Four items loaded on the second factor with a coefficient of 0.43 or better (Pornography, Privacy, Security, Children). Finally, Viruses loaded on the first factor at 0.42 and 0.38 on the second factor.

Looking at the variability of response to the positive and negative items, some differences were seen based on age (see Table 3). There was a significant difference both in the response to the positive items about Speed ($F(2,206) = 5.25$, $p < .006$) and Instant Messaging ($F(2,206) = 6.26$, $p < .002$). In both cases, paired

Table 3. Mean Score (M) of Selected Items, by Age Group

Item	Age group	M
Positive–Websites load quickly (Speed)	18–19	6.80
	20–21	6.59
	22–30	6.57
	31–40	5.18
	Over 40	6.10
Positive–Instant messaging	18–19	5.80
	20–21	4.77
	22–30	4.13
	31–40	1.63
	Over 40	2.89
Negative–Pornography	18–19	4.41
	20–21	4.58
	22–30	4.14
	31–40	6.54
	Over 40	6.63
Negative–Information that is bad for children	18–19	5.27
	20–21	5.18
	22–30	4.54
	31–40	7.09
	Over 40	6.00

comparisons indicated the primary break was for the ages on either side of 30 years (younger respondents considering these items more important). For negative items, Pornography solicited significantly different responses based on age ($F(2,206) = 3.35, p < .04$) with the difference primarily seen between those under 21 (less important) and those over 30 (more important). Paralleling this, the item concerning Information Harmful to Children was significantly different ($F(2,206) = 3.96, p < .02$) for those on either side of 30 years.

Pornography, both as a positive and negative item elicited significantly different responses from men and women. As a positive item, men rated pornography more important ($M = 2.28$) than women did ($M = 0.13$) ($F(1,206) = 8.91, p < .003$) while for the negative item, the reverse was true (men, $M = 3.81$; women, $M = 5.87$) ($F(1,206) = 7.36, p < .007$).

Individuals who were full-time students had a significantly different response to the negative items concerning Information Reliability ($F(1,206) = 4.54, p < .03$), Design ($F(1,215) = 7.31, p < 0.007$), and Advertising ($F(1,206) = 6.76, p < .01$) than those who were not. In all cases, full-time students had stronger concerns

(Reliability, $M = 4.61$; Design, $M = 3.34$; Advertising, $M = 6.00$) about these items than those who were not full-time students (Reliability, $M = 3.85$; Design, $M = 2.43$; Advertising, $M = 4.71$). There was also a significantly different response to the positive item of e-mail ($F(1,215) = 12.67$, $p < 0.0005$) with full-time students showing a stronger response ($M = 6.78$) than those who were not full-time ($M = 5.91$).

DISCUSSION

Negative and Positive Responses to the Internet

The free response format, used in the first survey for identifying negative and positive aspects of the Internet, provided an opportunity to capture what was "on the mind" of those who responded to the survey. This format provided a number of interesting findings. On the negative side, factors that keep people from finding the information they wanted—either because of speed or quality/quantity of information—dominated the list. Close behind, however, on the negative side were issues of security and pornography. Farther behind, eleven percent of respondents mentioned the addictive nature of the Internet, mirroring an earlier study of college undergraduates [5]. These issues are also ones that have appeared in the popular press, government reports, and industry white papers [13-15]. Whether the high profile of these issues in the media has influenced their appearance in the survey or whether real concern over these issues has influenced their prominence in the press is unclear. What is important is that they are issues that individuals bring with them when using the Internet.

Interestingly, many of the same higher level categories also appeared on the positive side. While many persons noted negative technology performance aspects, quite a few individuals also listed ease of use and speed as positive aspects. Clearly, perceptions of these aspects of the Internet are variable and highly dependent on past experience. These experiences, in turn, have influence on affective responses [16]. Negative aspects concerning the quality/quantity of information are also balanced by the flexibility of how one communicates and gathers information on a global scale. Here, information is the clear theme, but the medium used for transport and how it is organized can elicit both positive and negative responses.

A central aspect of a college student's education is concerned with the conveyance, harvesting, synthesis, and interpretation of information. Clearly there are affective elements to these processes that are as worthy of attention as the cognitive aspects are. Previous research by Luconi and Tabatabai [7] and Marchionini [17] have shown the interrelationship of attitudes and information

acquisition strategies. Not only are these two elements intertwined, but the results of this study indicate that information performance aspects of the Internet elicit both strong positive and negative attitudes.

When looking at the relationship of demographics to responses, the dominant finding of the first survey was the lack of significant difference in the free response patterns based on age, gender, or ethnicity. However, a number of "hot-button" issues were significantly different when respondents were asked to rate them in the second survey. In the second survey, social issues such as pornography and information harmful to children showed differences based on both age and gender, paralleling other studies on differential responses to such issues based on gender (e.g., Lo and Paddon [18]). The positive items that showed differences based on age seem to point to a younger generation having positive experiences with speed and instant communication.

While responses to speed and instant communication showed differences as a function of age, there was no significant difference based on student/non-student status. This result seems to indicate that it is age and not the prevalence of access to high speed Internet access on college campuses that is the factor influencing these attitudes about information performance. However, full-time students did feel stronger than non-students concerning the positive aspects of e-mail, a critical communication tool. High speed Internet access is not a prerequisite for e-mail communications, though high level of communication between students and with instructors, the general mobility of students, along with the ubiquity of computers on campus, may explain its heightened importance to students. Less clear are the threads that tie together the three negative items that differ between students and non-students: Reliability, Advertising, and Design. Reliability (or lack thereof) as a negative performance issue may differentiate between students and non-students more than positive performance issues such as speed because students are using the Internet for more "mission-critical" activities than the non-students who took part in the survey. That is, students feel the negative impact of a down network more than they recognize the pleasure of having high speed access. What the underlying factors are that cause Advertising and Design to differentiate between students and non-students is less clear.

Validation of the Categories

These two surveys demonstrate how results of a free response survey and a more traditional scaled response survey on a similar topic can gather different types of information. Most directly, the results indicate that the frequency of occurrence of an aspect of the Internet in free response does not necessarily correspond directly

with the strength of scaled response when presented with this aspect as part of a list of items about the Internet.

The free response format of the first survey was also very useful for generating a list of topical aspects of the Internet and helping guide the development of the list of positive and negative items used in the second survey. Here, the use of the first survey to generate items for the ratings improved the second survey's content validity. By eliciting responses from a broad population of users, the content of the items moved beyond the individual biases of the research team and tapped a much broader range of experiences and viewpoints concerning the Internet.

The subordinate categories developed from the results of the first survey (and used to help structure the positive and negative items) were supported in part by the results of the factor analysis. The analysis of the positive items showed three factors, all of whom showed support for the subordinate categories. The first factor was closely aligned with Information Performance, with four of the five loading aspects being part of that group. Similarly, the second factor seemed to be a combination of Information and Technology Performance, combining speed and searching efficiency with communicating with others. Finally, the third factor captured one of the Social/Safety aspects concerning free expression.

An analysis of the negative items showed two factors, both of which supported the subordinate grouping scheme. The first factor clearly was tied to Information and Technology Performance, with six of the eight items as part of these two subordinate areas. The second factor aligned itself quite strongly with the Social/Safety area, with all four items coming from this area.

CONCLUSION

The results of these two surveys clearly indicate that there continues to be a love-hate relationship with the Internet by both current and future students. Many of these feelings seem to surround both the universality of communication and the breadth of information, tempered by the perceived difficulty of accessing the information one wants and securing personal information one does not want released. Those involved with shaping the use of Internet technologies in higher education clearly need to be aware of these affective issues and how attitudes and beliefs vary across demographic variables such as age and gender. Since institutions of higher education are increasingly delivering instruction to a diverse population of students using Internet-based tools, these issues are of central importance for attracting and retaining students. Improving the quality of education and the quality of life in general for students involves understanding how these students respond to their school environment. For an earlier generation of students this primarily meant response to their physical environment. Increasingly, the concern needs to be also focused on the virtual electronic

environment where students conduct an increasing amount of their academic affairs: learning, social, and bureaucratic. Continued efforts should be made at not only identifying these affective elements, but also understanding how they affect behaviors related to effective use of these powerful technologies.

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