

GENDER DIFFERENCES IN EMAIL AND INSTANT MESSAGING: A STUDY OF UNDERGRADUATE BUSINESS INFORMATION SYSTEMS STUDENTS

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ABSTRACT

This study examined gender differences concerning the use and perceived usefulness of email and instant messaging software. Participants were asked to rate both media in terms of frequency and usefulness.

The findings provide evidence that women perceive email as more useful than men do when communicating with people who were geographically distant. Aside from that difference, this study suggests that male and female college students use and perceive email and instant messaging in a similar manner. There was no evidence of a statistically significant difference between men's and women's perceptions of email or instant messaging usefulness and frequency of use when communicating with people who were geographically close. There was also no evidence of a statistically significant difference between men and women in usefulness perceptions when using instant messaging for communicating with people who were geographically distant.

Key Words: gender differences, email, instant messaging, usefulness, ease of use, technology acceptance model, channel expansion

INTRODUCTION

Interpersonal communication has been a prevalent use of the Internet, despite the number of other services available [26, 42, 44]. The Pew Internet and American Life Project reported that on a typical day in 2000, 47 percent of people who went online sent email, over double the number of people who conducted any other Internet activity [34]. Communication improves the probability that people will have had fulfilling personal relationships, a higher self esteem and sense of purpose in life, and a greater physical and psychological well-being [11, 51, 58]. The Internet provides a communication medium with the potential to create a positive social impact for individuals [31], communities [57], organizations [42], and society in general [22]. Because of the proliferation of virtual organizations [49] and other electronic business applications, the Internet is often thought of as a medium for business communication, but it has also proven useful and even preferred for other contexts [59]. One of the most notable contexts is education, (see for example, [28] and [32], in addition to many others). The implication is that the Internet is changing the way we communicate. It has provided an inexpensive way to communicate with geographically distant friends and renew dormant relationships and also has allowed people to develop and maintain relationships with others that might not be sustained otherwise [3].

Purpose of this Study

The purpose of this study is to explore how people use email and instant messaging to relate to one another. Earlier work on email showed that it was used differently by men and women [3]. This study added to that research by examining the differences between instant messaging technologies and email. It analyzed the pattern of gender differences shown in previous studies and collected data to see if that pattern existed in instant messaging.

REVIEW OF LITERATURE

This section will discuss gender differences in interpersonal communication, gender differences in Internet use, and computer mediated communications theories.

Gender Differences in Interpersonal Communication

To understand gender differences between men and women who used a specific communications technology, it is critical to understand how men and women communicate without the technology. It is also important to understand how men and women manage their relationships, because it influences how they communicate. The differences in gender discussed in the literature are not always clean cut. In general however, men and women communicate and manage their relationships differently. Spence and Helmreich [41] coined the terms expressiveness and instrumentality in relationships. Expressiveness was described as a set of behaviors and attitudes associated with sharing and emotional intimacy while instrumentality referred to an agentic relationship revolving around common activities. Studies indicated that while there were individual differences between men and women, proportionally women were more relationally oriented and men were more agentic (e.g. [10, 15]). More recent studies indicated that women and men were becoming similar in instrumentality but not expressiveness [40, 53].

Men and women communicate differently in other ways as well. Women use more facilitative styles of communication while men use restrictive styles [29]. Facilitative styles of communication promote interaction and restrictive styles of communication deter interaction [20]. Men reported more same sex friendships than women, although these friendships were less intimate [6]. However, women proportionally had more extensive social networks than men [54, 56]. Women were socially expected to maintain family ties [12, 36] and connections to family friends [56]. Women also used the telephone more frequently than men for maintaining friendships over a distance, and men may not

have called others without an instrumental reason behind the call [54].

Gender Differences in Internet Use

Just as men and women differ in their communication patterns, they also differ in their use of Internet and have different attitudes towards the technology. Recent research indicates that the gender gap in terms of Internet usage has begun to decrease rapidly. Fifty two percent of Internet users who were online for less than a year were women [19]. Despite that both genders comprise almost an equal percentage of new Internet users, studies have shown that men find the Internet easier to use than women do. Men also use the Internet to obtain news and information [19], entertainment and leisure [55], and a greater variety of reasons than women do.

Women use the Internet more for communication and education [19, 55], and finding "personal information" than men do [19]. A study on Internet Relay Chat (IRC) indicated that men sent more messages than women, always initiated and closed the online chats first, and that women typically had shorter messages than men [45]. This implies that women are less likely to initiate contact with people using instant messaging software than men.

Gattiker, Perlusz, & Bohmann [17] summarized Internet attitudes by the demographic characteristics of gender and age based on previous research. They stated that women had a less positive attitude towards the Internet, spent less time on it, were more concerned about privacy issues than men, and placed a higher value on communication. Women also found it more difficult to obtain information on the Internet and had more difficulty using the software to connect to the Internet [19].

Thus, the literature suggests that men and women communicate differently both in electronic and non-electronic communications. While men and women use the Internet in similar frequencies as new users [19], women use it for communication and education more than men do [19, 55]. Men are more likely to initiate contact with others [45]. Men seem to be more comfortable with computer technology in general and use it for information gathering purposes. Women use email and other computer technologies to expand their social networks and keep in touch with others.

Gender Differences in Internet use among College Students

College students are an important group to study when examining future trends of Internet use. Only 19 percent or less of Americans with a high school degree reported using the Internet, while 53 percent with a baccalaureate degree or higher used the Internet [2]. In 1999, 87 percent of college students in the U.S. were online in comparison to 56 percent of adults in the general population [50]. Additionally students who lived in dormitories had equal access to the Internet (although not all students may own a computer). One study [33] found that as a whole, male college students spend an average of 7.1 hours per week on the Internet while female college students spend an average of 5.3 hours per week. There were no significant gender differences in Internet use at public colleges, although significantly more men used the Internet in private colleges. Women used the Internet more for email and research while men were more likely to research purchases, play games, listen or copy music on the Internet, and visit sex sites. About 30 percent of men and women shopped online and used chat programs.

Gender Differences in Email

Research has been reported on gender differences in email, both in the psychological literature [3] and the information systems literature [18]. Because email is fairly close to instant messaging (a form of text messaging) in terms of conveying social presence [35] the literature in this area will be examined closely.

Boneva, Kraut, & Frohlich [3] conducted a study comparing men and women who used the Internet. The study was conducted on households in the Pittsburgh area which makes it different from previous studies that used college students for their populations [33, 55]. The researchers measured frequency of email use and how much time men and women spent per day communicating with friends and family, sending email, and using the World Wide Web. Women reported spending more time communicating with friends, family, and using email. There were no significant gender differences on the amount of time that was spent surfing the World Wide Web. While there was no difference between men and women who used email to keep in touch with local friends, women used the Internet more frequently to communicate with people at a distance.

Boneva, Kraut, & Frohlich [3] measured the perceptions of usefulness of different software by men and women in their study. Perceptions of usefulness strongly influence a person's adoption and use of a technology [9]. Females reported that computers were more useful for meeting communication partners and keeping in touch with family and friends than men did. Females also ranked email software as being more useful than men ranked it, although this difference was not statistically significant. No gender differences in perceived usefulness were found for the nonsocial items, specifically searching for hobby information, music and entertainment, and playing computer games. In terms of fun, women rated sending email, communication with family and friends, and finding communication partners higher than men rated those activities. There were no gender differences concerning the fun ratings for nonsocial items. While there was no difference in perceived usefulness and fun of nonsocial activities, Weiser [55] reported that males spent more time using the Internet for entertainment and leisure than women. Odell, Korgen, Schumacher, & Delucchi [33] also reported that males spent more time playing computer games and listening to music.

Implications for Gender Differences in Instant Messaging

Previous research has shown that online gender differences are consistent with the gender differences found in traditional forms of communication such as face-to-face or telephone interactions [3]. In general, men use the Internet for entertainment and leisure while women use it for communication and education [55]. Computer mediated communication theory suggests that instant messaging would be preferred to email because it has a higher degree of social presence [35, 39].

Differences from Previous Research

Keeping the literature previously discussed in mind, this study is different from prior research in several ways. This study provides information on whether gender differences are manifested when people use instant messaging software. It compares these possible differences in instant messaging and email. College students have been used in previous research (e.g. [5, 33]). By using college

students, the results of this study are more comparable to previous research. College students also have higher rates of Internet use than the general public [50], which increases the likelihood of them having experience with email and instant messaging.

RESEARCH OBJECTIVES

Some differences between the communication styles of men and women are documented [10, 15, 40, 53]. Women have better social networks than men do [54, 56] and use the telephone more frequently to maintain their relationships with others [54].

Email and instant messaging media contain factors that allow people to maintain friendships with one another [4, 14, 16, 25, 37]. Therefore, women might be inclined to use email and instant messaging to communicate with others.

Gender differences are not addressed in the information technology acceptance models [30, 48], or information technology behavioral research [27, 47], with limited exceptions [18, 52].

Research on gender differences in computer use has resulted in conflicting reports of email use. Some reported that men and women use email in similar frequencies [18], while others reported that women use email more frequently [3]. Some research indicated that in programs like IRC, men communicate using the Internet more frequently than women [45]. However, there is stronger support in the literature showing that women use the Internet for communication purposes more frequently than men [10, 12, 15, 36].

Hypotheses

The following hypotheses are related to the differences (if any) between men and women regarding their use and perceived usefulness of email and instant messaging software.

Hypothesis 1

Women use email and instant messaging more than men do, and perceive both media to be more useful. More specifically:

- H1a: Women perceive email as more useful than men perceive it.
- H1b: Women perceive instant messaging as more useful than men perceive it.
- H1c: Women use email more than men use it.
- H1d: Women use instant messaging more than men use it.

Hypothesis 2

Women perceive email and instant messaging to be more useful for communicating with people who are both geographically close and geographically distant than men do. More specifically:

- H2a: Women rate email as more useful than men rate it when communicating with people who are geographically close to them.
- H2b: Women rate instant messaging as more useful than men rate it when communicating with people who are geographically close to them.
- H2c: Women rate email as more useful than men rate it when communicating with people who are not geographically close to them.

- H2d: Women rate instant messaging as more useful than men rate it when communicating with people who are not geographically close to them.

Hypothesis 3

Women spend more time communicating with others via email and instant messaging than men do. More specifically:

- H3a: There are no differences between men and women on time spent on email with people who are geographically close to them.
- H3b: There are no differences between men and women on time spent on instant messaging with people who are geographically close to them.
- H3c: Women score higher than men in time spent on email with people who are not geographically close to them.
- H3d: Women score higher than men in time spent on instant messaging with people who are not geographically close to them.

PROCEDURES

Previous studies on gender differences in Internet use utilized survey research for data collection (e. g. [3, 18, 33, 55]). This study also used a survey format.

Population and Sample

For purposes of this study, college students were identified as the population of interest. The reason for this choice is that college students are more likely to have computer and internet experience than other age groups. Attempting to focus particularly on those students who are most likely to use e-mail and instant messaging, we narrowed the scope to students taking courses in business and information systems.

Demographic information of the students was collected to allow descriptive statistics to be reported for comparison of the sample to the general college population.

The study randomly sampled undergraduate Business Information Systems students at a university in the western United States. A list of all the undergraduate Business Information Systems classes offered at the university was obtained. The instructors/professors of 18 randomly selected classes were asked to have their classes participate in the survey. In all classes surveyed, the researcher spent a few minutes at the beginning of class to have students fill out the questionnaire. There were 54 Business Information Systems classes taught that semester. All instructors/professors who were solicited agreed to have their classes participate. The questionnaire was then distributed and subjects were asked to specify if they had already filled one out or if they did not want to participate. Those questionnaires were then discarded and the sample size for analysis purposes adjusted accordingly. Sixty-one questionnaires that were returned were marked as already having been filled out and eight were marked by students as not wanting to participate.

Data and Instrumentation

In addition to collecting demographic information and gender, the survey collected information on perceived usefulness of email

and instant messaging. The two primary categories of questions fell under email and instant messaging. Under each of these categories, there were two subgroups, geographically close and geographically distant. Under these subgroups, data was collected on perceived usefulness and use. The instrument was tested using a pilot sample of students at the university and modified as necessary. The data was coded and reviewed for coding errors by the researchers.

To test each hypothesis, two scales were constructed. One was for perceived usefulness and the other was for use. The perceived usefulness scale for each situation (e.g. instant messaging with people inside the city) was measured by four items that were averaged to form a single score. The four items were measured using a five point Likert-type scale. On this scale, one represented “not at all”, three represented “some”, and five represented “very much so”. In short, a score of one represented the least useful and a score of five represented the most useful.

For the use scale, there was one item for each situation (e.g. email use with people outside the city). These items were rated on a six point scale. One represented “never”, two represented “monthly”, three represented “weekly”, four represented “several times a week”, five represented “daily”, and six represented “several times a day”. In short, a score of one represented the least use and a score of six represented the most use.

Perceived Usefulness and Use Items

The items measuring perceived usefulness were based on the instrument created by Davis [8, 9]. The Davis scale is a six item scale that measures the perceived usefulness of an application. The Davis scale is frequently used in the information systems literature and has received considerable attention [1, 21, 24, 38, 46]. The scale has also been validated in previous studies by factor analysis [1, 13].

There is no standard scale for use of technology in interpersonal communications. However, the Boneva, Kraut, and Frohlich, [3] and Gefen & Straub [18] studies used a Likert-type scale to measure use. This study based its scale on the one utilized in the Boneva, Kraut, and Frohlich study.

Survey Validation

A graduate level Business Information Systems class was used to pilot the survey instrument. A graduate level class was chosen to prevent undergraduate exposure to the survey instrument. The survey was administered to the class. Then, class members made suggestions on formatting and wording clarifications on the perceived usefulness questions. The questionnaire was then modified based on these suggestions and presented to a second Business Information Systems class. The second class was a graduate level research methods class. The students in the class completed the survey and were then asked to make comments on the formatting and wording of the questions. Students in both classes were also told the intent of the survey and asked if the questions matched the intent. In both classes, students understood the intent of the questions. Appendix A shows the evolution of the perceived usefulness items. This process attempts to maintain content validity of the questions by trying to stay as close as possible to the original Davis scales, while adapting it for a different purpose.

Analysis

Statistical Corrections

The Bonferroni correction is often used when more than one statistical significance test is run in a particular study. It reduces the alpha level of each individual test (i.e., the comparison-wise alpha) to assure that the overall alpha (i.e., the family-wise alpha) is at a desired level. The drawback of using the Bonferroni correction is that while the chances of making a type one error is reduced in multiple tests, the chances of making a type two error is increased.

This study conducted 16 tests. If the Bonferroni correction is not used with an alpha of 0.05, there would be a 55.99% chance of a type one error, or finding one or more statistically significant differences by chance alone, among the 16 tests. The chances of an experiment-wise type one error were reduced to 14.85% with an alpha of 0.01. If the Bonferroni correction is used to get an overall experiment-wise alpha of 0.05, the alpha for each test would need to be lowered to 0.0032. By using the Bonferroni correction in this situation there would be a high probability of getting a type two error. Therefore as a compromise, an alpha level of 0.01 is used for each test.

One of the purposes of this study was to examine the trend of perceived usefulness and use for communication technologies. While it was important to note if individual hypotheses are accepted or rejected, it was more important to note the trend regarding the differences in use and perceptions of usefulness of email and instant messaging between men and women. As a result, an overall experiment-wise alpha of 0.1485 (obtained by using an alpha of .01 for individual tests) was deemed acceptable.

In this study there was also the possibility of having an unequal number of males and females. This possible inequality was compensated for in the analysis. SPSS uses four methods to calculate the sum of squared deviations for ANOVAs. Type III was the default calculation. By using this calculation, an unequal N was automatically compensated for because “the Type III sums of squares have one major advantage — they are invariant with respect to the cell frequencies as long as the general form of estimability remains constant. Hence, this type of sums of squares is often used for an unbalanced model with no missing cells” [43, p. 265]. Effect sizes for all hypotheses (calculated using Glass’s delta) were also examined.

RESULTS

This section will list the results of the study in three parts. The first part will discuss the characteristics of the respondents. The second part will discuss the factor analysis of the perceived usefulness variables. The third part will discuss the ANOVAs for each of the hypotheses.

Characteristics of Respondents

Five hundred twenty seven surveys were distributed. Of those, 61 were duplicates and 8 were returned by graduate students (and eliminated), leaving 458 surveys. Of those, 8 indicated they did not want to respond. Therefore, when accounting for graduate students and duplicate responses the total response rate was 98.3%. Table 1 shows the demographic characteristics of the respondents.

Factor Analysis of Perceived Usefulness Variables

There were four questions (similar to the questions in the Davis [9] scale) for each construct. A factor analysis was conducted on each of the groups of questions to determine if they could be reduced to a single variable. Because of the high factor loadings, each group of questions was reasonably reduced to a single variable (shown in Table 2). For the sixteen questions, all 16 of the factor loadings were over 0.8 and thirteen were over 0.9. The extraction of the principle components was obtained through a variance maximizing (varimax) rotation of the original variable space. The first component was the perceived usefulness

TABLE 1:
CHARACTERISTICS OF RESPONDENTS

Gender Characteristics		
	Frequency	Percent
Male	279	62.0
Female	171	38.0
Total	450	100.0
Class Rank Characteristics		
	Frequency	Percent
Freshman	47	10.4
Sophomore	121	26.9
Junior	151	33.6
Senior	128	28.4
Unreported	3	0.7
Total	450	100.0
Race Characteristics		
	Frequency	Percent
White, Non-Hispanic	407	90.4
Spanish/Hispanic/Latino	4	0.9
Asian Indian	2	0.4
Chinese	11	2.4
Japanese	1	0.2
Korean	7	1.6
Vietnamese	2	0.4
Other Asian	5	1.1
Some other race	9	1.9
Unreported	2	0.4
Total	450	100.0
Marital Status		
	Frequency	Percent
Single	316	70.2
Married	125	27.8
Divorced	3	0.7
Widowed	1	0.2
Unreported	5	1.1
Total	450	100.0
Age Characteristics		
No. Reported	448	
No. Unreported	2	
Mean	22.47	
Minimum	17	
Maximum	50	
Std. Deviation	3.515	
Variance	.942	

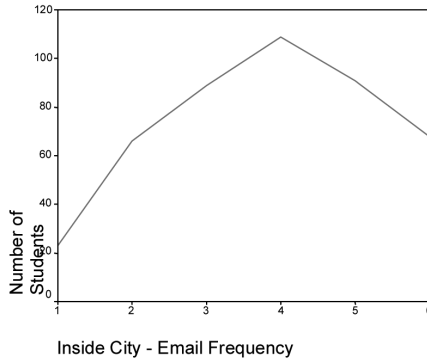
of email when communicating with people in the city. The second component was perceived usefulness of email when communicating with people outside the city. The third component contained the instant messaging questions for communicating with people both inside and outside the city. For all three components the factor loadings were similar indicating that subjects responded in a similar manner for each question in the group. The email and instant messaging questions had almost identical wording (with the exception of the terms “email” and “instant messaging”). While the instant messaging questions fell into a single category, the email responses fell into two groups. Therefore, we concluded that there is a differentiation between the “inside the city” and

TABLE 2:
FACTOR ANALYSIS FOR INDIVIDUAL COMPONENTS

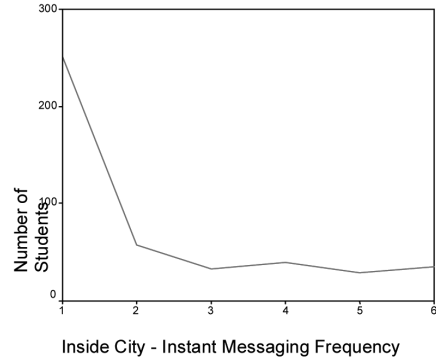
Component Matrix — Perceived Usefulness — Email — Inside City		
		Component
City – Email improves communication		.904
City – Email enhances communication effectiveness		.879
City – Email makes communicating easier		.912
City – Email is useful		.918
<i>Extraction Method: Principal Component Analysis. 1 component extracted.</i>		
Component Matrix — Perceived Usefulness — Email — Outside City		
		Component
Outside City – Email improves communication		.897
Outside City – Email enhances communication effectiveness		.860
Outside City – Email makes communicating easier		.904
Outside City – Email is useful		.918
<i>Extraction Method: Principal Component Analysis. 1 component extracted.</i>		
Component Matrix — Perceived Usefulness — Instant Messaging — Inside City		
		Component
City – Instant Messaging improves communication		.943
City – Instant Messaging enhances communication effectiveness		.941
City – Instant Messaging makes communicating easier		.947
City – Instant Messaging is useful		.961
<i>Extraction Method: Principal Component Analysis. 1 component extracted.</i>		
Component Matrix — Perceived Usefulness — Instant Messaging — Outside City		
		Component
Outside City – Instant Messaging improves communication		.972
Outside City – Instant Messaging enhances communication effectiveness		.947
Outside City – Instant Messaging makes communicating easier		.958
Outside City – Instant Messaging is useful		.973
<i>Extraction Method: Principal Component Analysis. 1 component extracted.</i>		

FIGURE 1:
Frequency and
Mean Score
Graphs

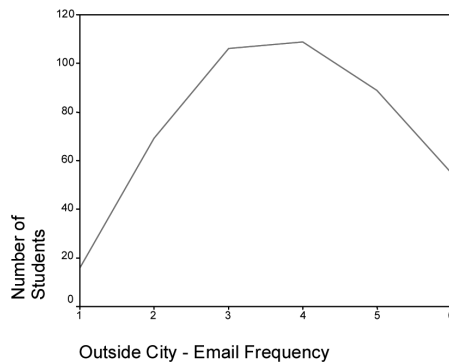
Email Use When Communicating
with Geographically Close People



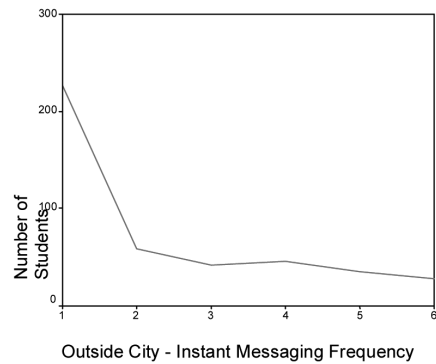
Instant Messaging Use When Communicating
with Geographically Close People



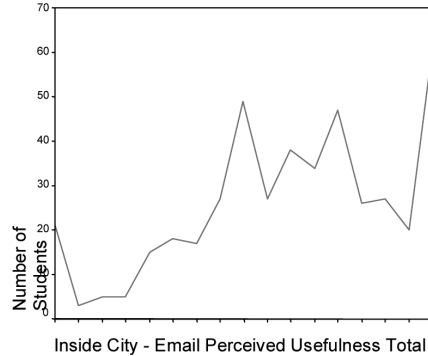
Email Use When Communicating
with Geographically Distant People



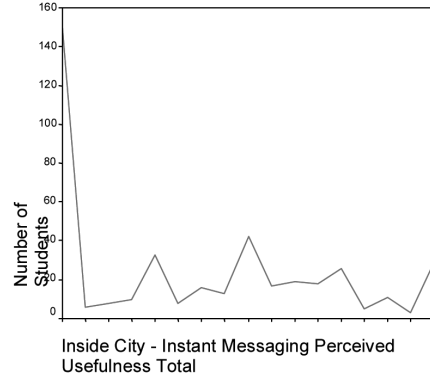
Instant Messaging Use When Communicating
with Geographically Distant People



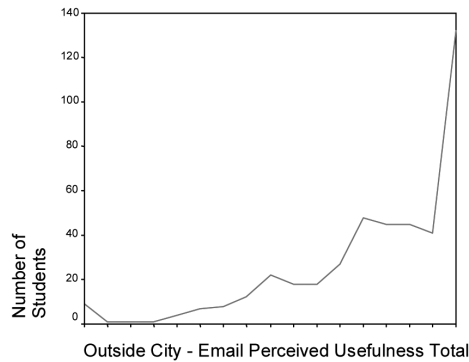
Email Perceived Usefulness When Communicating
with Geographically Close People



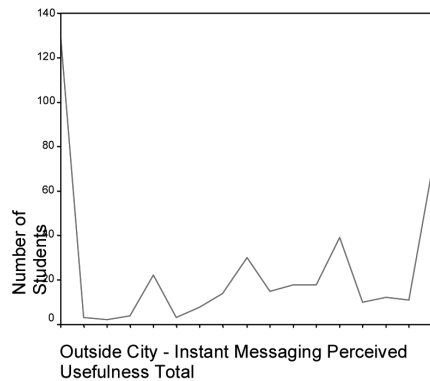
Instant Messaging Perceived Usefulness When
Communicating with Geographically Close People



Email Perceived Usefulness When Communicating
with Geographically Distant People



Instant Messaging Perceived Usefulness When
Communicating with Geographically Distant People



“outside the city” categories by the participants for questions about email, but not for questions about instant messaging. Thus, participants responded in a similar manner to questions asking them about instant messaging use with people in the city as they did with people outside the city.

Opinions of Respondents

Mean scores for email and instant messaging use and perceived usefulness are shown in Table 3. A graph of the mean scores and frequency distributions are in Figure 1.

Hypothesis 1

Hypothesis 1 suggested that in general women use email (H1A) and instant messaging (H1B) more than men do. It also suggested that women’s perceived usefulness scores would be higher than men’s scores (H1C and H1D). To analyze hypothesis 1, the scores on email use for email inside and outside of the city were averaged. The same was done for instant messaging. Then the procedure was repeated for perceived usefulness. The results of the analysis are summarized in Table 4.

Based on the mean scores only, women reported that they used email more than men, and perceived email and instant messaging to be more useful than men did. This was consistent with previous findings [3]. The findings in this study were also inconsistent with previous findings because men reported they used instant messaging more than women used it.

An examination of hypothesis 1 subsections A-D using an ANOVA with an alpha level of 0.01 led to the hypothesis being not supported. However, hypothesis 1C (where women hypothetically would use email more than men would use it) was significant at the .05 level (0.046).

Hypothesis 2

Hypotheses 2A-D suggested that women would perceive email (H2A, H2C) and instant messaging (H2B, H2D) as more useful than men did when communicating with people both inside (H2A, H2B) the city and outside (H2C, H2D) the city. To analyze hypotheses 2A-D, perceived usefulness scores for each of the conditions (email usefulness within the people inside the city, outside the city, etc.) were averaged. This allowed for the creation of a single variable to test each hypothesis. The results are summarized in Table 5.

Hypothesis 2 subsections A-D were not supported when using an alpha level of 0.01. Men and women found email and instant messaging equally useful for communicating with people who were geographically close to them and geographically distant from them. The differences in means were neither significant at the 0.01 nor 0.05 alpha levels. Additionally, effect sizes for all conditions were small.

Hypothesis 3

Hypothesis 3 suggested that women use email (H3A, H3C)

TABLE 3: DESCRIPTIVE STATISTICS

Descriptive Statistics — Email and Instant Messaging Mean Scores and Standard Deviations

	No. Responses	Mean	Std. Deviation
Inside City – Email Frequency	446	3.86	1.433
Outside City – Email Frequency	444	3.79	1.357
Inside City – Instant Messaging Frequency	446	2.20	1.674
Outside City – Instant Messaging Frequency	436	2.29	1.646
Inside City – Email Perceived Usefulness Average	440	3.51	1.082
Outside City – Email Perceived Usefulness Average	439	4.14	.922
Inside City – Instant Messaging Perceived Usefulness Average	414	2.41	1.346
Outside City – Instant Messaging Perceived Usefulness Average	408	2.88	1.542

TABLE 4: ANOVA FOR HYPOTHESIS 1

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.	Effect Size
H 1A	Between Groups	.903	1	.903	1.145	.285	-0.11
	Within Groups	339.107	430	.789			
	Total	340.010	431				
H 1B	Between Groups	.312	1	.312	.166	.684	-0.04
	Within Groups	760.185	405	1.877			
	Total	760.497	406				
H 1C	Between Groups	5.482	1	5.482	4.013	.046	-0.12
	Within Groups	598.334	438	1.366			
	Total	603.816	439				
H 1D	Between Groups	.525	1	.525	.215	.643	0.05
	Within Groups	1057.071	432	2.447			
	Total	1057.597	433				

and instant messaging (H3B, H3D) more frequently than men do when communicating with people both in the city (H3A, H3B) and outside the city (H3C, H3D).

Hypotheses 3 A, B, and D were not supported by ANOVA when using an alpha level of both 0.01. Hypotheses 3 A, B, and D all had small effect sizes. The results of the ANOVAs are summarized in Table 6. However hypothesis 3C, which suggested that women score higher than men in time spent on email with people who are not geographically close to them, was supported. In this case, women scored significantly higher than men (4.01 and 3.66 respectively) with a p-value of 0.007 and an effect size of -0.26. This suggests that women use email to communicate with people who are geographically distant more than men do. The results of hypothesis 3 subsections A-D are consistent with Hypotheses 1 subsections A-D. Women used, and perceived email to be more useful when communicating with people who were geographically distant significantly more than men did (however in the case of perceived usefulness the test was not successful with alpha level of 0.01). Scores for use and perceived usefulness were higher for women in all areas except for instant messaging. Men reported using instant messaging more and perceiving it to be more useful than women did.

Other Results

Because there were a number of students who reported that they did not use instant messaging at all, a question was raised. Would the results have been different if students without instant messaging experience were omitted from the analysis? To test this, four ANOVAs were conducted that checked for differences

between men and women in terms of use and perceived usefulness for instant messaging when communicating with close and distant communication partners. Respondents who did not have experience with instant messaging (rating of 1 in use) were excluded.

The results indicated that for use of instant messaging when communicating with people in the city, women averaged 3.62 and men averaged 3.81 ($p = 0.376$ and the effect size was 0.13). For perceived usefulness of instant messaging when communicating with people inside the city, women averaged 3.28 and men averaged 3.28 ($p = 0.981$ and the effect size was 0.00). For the use of instant messaging when communicating with people outside the city, women averaged 3.73 and men averaged 3.64 ($p = 0.58$ and the effect size was -0.06). For the perceived usefulness of instant messaging when communicating with people outside the city, women averaged 4.13 and men averaged 3.88 ($p = 0.058$ and the effect size was -0.27). Because these tests are exploratory, an alpha of 0.05 was used. These results indicate that at alpha = 0.05 and when excluding those who do not use instant messaging, men and women report similar levels of use and perceived usefulness for instant messaging when communicating with near and distant communication partners.

Additionally, for students who reported a one for instant messaging use (for communicating with people inside and outside of the city), two Chi-squared tests were conducted. One checked for gender differences in perceived usefulness when communicating with people inside the city, and the other checked for gender differences in perceived usefulness when communicating with people outside the city. For people communicating with others inside the city, men averaged 1.62 and women averaged 1.67.

TABLE 5: ANOVA FOR HYPOTHESIS 2

ANOVA		Sum of Squares	df	Mean Square	F	Sig.	Effect Size
H 2A	Between Groups	.728	1	.728	.581	.446	-0.08
	Within Groups	535.685	428	1.252			
	Total	536.413	429				
H 2B	Between Groups	.491	1	.491	.542	.462	-0.08
	Within Groups	361.876	399	.907			
	Total	362.367	400				

TABLE 6: ANOVA FOR HYPOTHESIS 3 A-D

ANOVA		Sum of Squares	df	Mean Square	F	Sig.	Effect Size
H 3A	Between Groups	2.107	1	2.107	1.026	.312	-0.10
	Within Groups	911.994	444	2.054			
	Total	914.101	445				
H 3B	Between Groups	3.054	1	3.054	1.090	.297	0.10
	Within Groups	1244.186	444	2.802			
	Total	1247.240	445				
H 3C	Between Groups	13.243	1	13.243	7.296	.007	-0.26
	Within Groups	802.277	442	1.815			
	Total	815.520	443				
H 3D	Between Groups	.095	1	.095	.035	.852	-0.02
	Within Groups	1179.068	434	2.717			
	Total	1179.163	435				

Chi-squared was 23.43, with 14 degrees of freedom, and $p = 0.054$. For people communicating with others outside the city, men averaged 1.73 and women averaged 1.69. Chi-squared was 20.68, with 15 degrees of freedom, and $p = 0.147$. The results indicate that at the 0.05 level, gender is not a factor affecting the perceptions of usefulness for instant messaging with people who never use it.

DISCUSSION

The results of this study suggest that with few exceptions, men and women have similar perceptions regarding the usefulness of email and instant messaging. This is seen both in the results of the ANOVAs and the small effect sizes. Men and women also use email and instant messaging to a similar degree. One explanation is that since college students and college graduates use the Internet more frequently than the general population [2, 50], college attendance may be a better predictor of email and instant messaging use than gender. College students may be forced to use email and instant messaging to frequently communicate with their classmates or professors. Additionally, Business Information Systems students may enjoy using technology like email and instant messaging and as a result use it to communicate more frequently with other people than different groups.

People in general may be using email and instant messaging to communicate with one another more frequently than in the past. Both men and women could be using this technology in similar numbers. One study indicated that fifty two percent of Internet users that were online for under a year were women [19]. Therefore, the hypothesized differences between men and women may have been narrowed as a result of more women using the Internet in general. Because the Internet is growing at such a rapid pace [7], communication through its channels (specifically email and instant messaging) may have become a primary communications channel in today's society. This information could also indicate that the gender gap between computer users is narrowing.

From a commercial standpoint, if men and women use email and instant messaging the same, then if a company sends out email to a list of random email addresses, the email will most likely reach an equal amount of men and women. Therefore an email advertisement, for example, may have the greatest impact if it is tailored to a more gender neutral audience. In spite of attempts to make some IT such as web sites gender specific [23], there is supporting evidence that both genders use email and instant messaging in similar numbers, and therefore gender specific advertising may not be as effective as gender neutral advertising.

The differences between men and women that arose in this study occurred when people communicated with others at a distance. Women appeared to use email and instant messaging more when communicating with people who were geographically distant. These findings provide support for the Boneva, Kraut, and Frohlich [3] study that reported women used email more than men did to communicate with geographically distant people.

Previous findings have provided conflicting reports on how men and women use email. Some studies report they use email in similar frequencies [18], while others reported that women use email more frequently than men did [3]. Other research indicated that in programs like IRC, men communicated using the Internet more frequently than women [45]. There was however, strong support in the literature reporting that women used the Internet

for communication purposes more frequently than men [10, 12, 15, 36].

There are several possible reasons there is a difference in perceptions of usefulness and the reported use for email and instant messaging. Instant messaging is a newer technology and students may have familiarity or access to it. Email is more accessible to the people in this study (since it is available in the computer labs while instant messaging may not be). Instant messaging may not be perceived as useful or as widely used compared to email because instant messaging requires two people available at the same time to communicate. Email only requires one.

Suggestions for Future Research

This study relied on students to provide self reported estimates of use. It did not measure actual use. However, this information would have been difficult to obtain as it would have required the consent of participants having their email and instant messaging communication habits monitored. This in and of itself may have caused people to use email and instant messaging differently. Research could be done to further test the differences between college populations of males and females to the general population in terms of email and instant messaging use. This study also examined technology with a low level of social presence. A possibility for future research is to examine gender differences using a medium with a high level of social presence (e.g. videoconferencing).

Future research may provide additional information on why the differences reported in this study on use and perceptions of usefulness for email and instant messaging occurred. Other questions that could be asked include why did instant messaging score lower than email overall in terms of use and perceived usefulness? How is the incorporation of video and voice affecting the perceptions of use and usefulness of instant messaging? Which features are more preferred by which gender? How does environment (i.e. work, home) affect gender differences?

Businesses and residential areas could be studied to see if there are gender differences. While men and women in college today could use email and instant messaging in certain patterns, those patterns could be different given a work or home environment. Those patterns could also differ based on the positions within a company itself. Men and women who are in management positions at companies could have different gender differences in email and instant messaging use in comparison to men and women who were not affiliated with management.

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APPENDIX A

PERCEIVED USEFULNESS SCALES

Davis scale

1. Using <application name> in my job would enable me to accomplish tasks more quickly.
2. Using <application name> would improve my job performance.
3. Using <application name> in my job would increase my productivity.
4. Using <application name> would enhance my effectiveness on the job.
5. Using <application name> would make it easier to do my job.
6. I would find <application name> useful in my job.

Modified scale

1. Using <application name> would improve my communication with others.
2. Using <application name> would enhance my effectiveness communicating.
3. Using <application name> would make it easier to communicate with others.
4. I would find <application name> useful when communicating with others.

Modified scale after focus group

1. <Application name> improves my communication with others.
2. <Application name> enhances my effectiveness communicating.
3. <Application name> makes it easier to communicate with others.
4. I find <application name> useful when communicating with others.

Note: <application name> refers to email or instant messaging