Effects of Gender on Computer-Mediated Communication: A Survey of University Faculty

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The influence of gender on computer-mediated communication is a research area with tremendous growth. This study sought to determine what gender effects exist in email communication between professors and students. The study also explored the amount of lying and misinterpretation that occurs through online communication. The study results indicate many interesting findings that may prove beneficial for scholars and practitioners to take into consideration when using forms of computer-mediated communication to interact with others.

Keywords: Gender, Computer-Mediated Communication, Email Interaction

Gender roles and their influences have been researched for decades. One of the areas in which gender differences has become evident is in the use of technology, as this usage in academia and by practitioners has increased tremendously over the last decade (Becker, 1999). One of the strongest influences on a college student's education is the rise in the use of computer-mediated learning environments (Polluck, Hamann, & Wilson, 2005). One of these influences is the change in the type of communications that occur between individuals. Without an email address a person can feel very left out of the fast moving world of school and work. A recent meta-analysis of the plethora of research in the area of gender effects on computer-mediated communication indicates that gender-stereotyped interactions continue to occur in online environments (Li, 2006).

Email seems to be used more frequently than other types of communication, such as the phone or face-to-face conversations. However, research has shown that the increase in this type digital interaction has unknown effects upon communications between individuals. One of these effects is that certain details are lost when transferring phone or face-to-face conversations to a text-based communication environment. One of the main losses is that of clarity (Hollingshead, 1996, 2000, 2001). Nonverbal cues and paralanguage (tempo, pitch, and voice changes) are often used to communicate particulars which are difficult to duplicate when typing a message, such as in email (McGrath & Hollingshead, 1994).

Due to this loss of nonverbal cues, individuals tend to modify their written messages by including additional hints so that the receivers of their messages have clues as to how to interpret them (Hollingshead, 2001). The ability to punctuate and capitalize words can assist in communicating certain emotions, for example typing "YAY!!!" indicates a very enthusiastic response. Emoticons, that is, facial expressions created through keyboard symbols, are another way to demonstrate emotions. For example, ":-)" which signifies a smiley face at the end of a sentence, can often clarify if a remark was meant in a friendly manner or not. Although these typing nuances can help to clarify meaning, it is still very difficult to judge sarcasm and humor in typed communication. In general, much of the information that is passed through tone of voice and facial expressions is lost through computer-mediated communication (CMC).

Theoretical Framework

Characteristics such as age, gender, and status all influence how people communicate (Hollingshead, Fulk, & Monge, 2002). In general, interactions between peer groups tend to perpetuate gender stereotypes (Bravo, Gilbert, & Kearney, 2003). In the traditional classroom, female students interact and participate more than male students (Howard & Henney, 1998). This discontinuity between the genders carries over into the online learning environment, as there is evidence that men and women interact differently when using technology (Arbaugh, 2000). Other research has confirmed these findings that there are differences in how men and women communicate and interact online (Savicki, Kelley, & Oesterreich, 1999). In general, when communicating online, females tend to use more self-disclosure, personal opinions, "I" statements, and are less likely to argue. They also communicate by apologies, justifications, questions, and by supporting others. On the other hand, males use strong assertiveness, self-promotion, presuppositions, rhetorical questions, are generally authoritative, give challenges, and tend to use humor and sarcasm more than females. They also contribute more and longer messages. In addition to these findings, the researchers also found that women contribute more interactive messages, while men contribute more socio-emotional messages (Barrett & Lally, 1999). Women also initiate more agreements and open-ended questions, but they have the same number of disagreements as men (Wolfe, 1999).

More males than female students tend to use the web for dialogue with their instructors (Hoskins, 2005). This is in contrast to the study of Jackson, Ervin, Gardner, and Schmitt (2001), who found that men are not as likely as women to communicate via the web. One of the main differences between these studies is that the former examined actual data, while the latter used self-reported data. Inconsistencies like this abound in the current research database; thus, it is important that further research studies be taken in an attempt to resolve these contrasting findings.

In addition to the research results mentioned above about email communication, is has also been found that in computer-media communication less information is exchanged than in face-to-face encounters (Hollingshead, 1996). This leads to the theory that meeting in person may convey more information in greater detail than communicating via email. Thus, less information may be given to a learner who asks a question via email then if the learner phones or visits their professor or supervisor. Therefore, the learner may loose out on a deeper level of education if they rely only upon email communication with their superiors.

Finally, research indicates that lying and misinterpretations are more pervasive in computer-mediated communication due to a lack of nonverbal communication (Hollingshead, 2000). As mentioned previously, lack of nonverbal communication can partially be resolved by the use of punctuation and capitalization in text-based communication, but the lack of nonverbals stills negatively affects how others may perceive remarks made through commuter-mediation communication. In addition to this, individuals may also feel more at ease lying through email and other text-based communications because of the informality of this type of communication. This trend of miscommunication is recurrent in the business setting as well as the university. Large companies like to use email because it is easy to use, allows almost instant communication, and allows people in different areas to work together (Digilio, 2001). However, in addition to the aforementioned reasons, communication via email can also cause miscommunication problems because people tend to quickly write and scan their emails instead of checking before sending and carefully reading all of the content of their emails. One potential reason behind this is the tremendous amount of email that individuals receive everyday (Young, Cantrell & Shaw, 2001).

Overall research results indicate that the gender gap is still evident, although conflicting reports exist despite the amounts of research that have been done regarding the effects of gender on computer-mediated communication (Li, 2006). In addition, research on the types and amounts of lying and misinterpretations that occur from using this type of communication is neglected in the literature. Since the use of CMC continues to increase, and clear results are still difficult to determine, it is important that the issues related to this CMCs usage continue to be rigorously examined.

The purpose of this study was to examine in more detail how gender differences affect computer-mediated communication between faculty and students. A variety of factors related to gender and email communication were examined, including the email usage of professors, gender influences on email communication, and the amount of misinterpretations that faculty perceive and with whom it usually occurs. This study builds on previous research by examining all of these variables at the same time and with the same faculty sample with the hope of confirming the results of the research studies mentioned above. An additional purpose of this study is to add addition conclusive data to the existing body of research.

Research Questions:

Based on the review of the literature and past findings from research studies, this study chose to focus on the following research questions:

1. What, if any, gender differences exist in email communication by professors and students?
2. Is less information given to a student who asks a question via email than if the student phones or visits the professor?
3. What are the self-reported amounts of online misinterpretations that professors experience?
4. Is there a self-reported gender bias in how faculty members respond to students' emailed questions?
5. Is there a gender difference in lying or deception in online communication?

Methodology

This study was grounded in a causal-comparative research methodology. This research design is appropriate because it seeks to gather information about whether an independent variable (gender) has any affect upon a dependent variable (computer-mediated communication), although the researcher admits no control over the independent variable (Gay & Airasian, 2003). Although this design does not allow for any strong conclusions to be made about cause and effect relationships, the study does provide some baseline knowledge that will allow future researchers to conduct more advanced studies in this area. Research in this area typically does not allow for cause and effect results to be concluded since we are dealing with human subjects in already established environments, and therefore, very little control can be assumed.

Participants

The targeted sample of participants for this study were 75 male and 75 female professors randomly selected from a large Midwestern University's Liberal Arts and Science phone book by using a random numbers table. The researcher chose to use the Liberal Arts and Science (LAS) department because this is the largest department on campus, thus increasing the population to which the results can be generalized to. In addition, the LAS department contained many smaller departments, such as psychology, math, biology, sociology, etc., which allowed the study's sample to include participants from many different career paths that use varying levels of technology.

To protect the human subjects in this study, all of the participants were guaranteed confidentiality. To help increase the response rate, the participants were given a brief explanation of the study and its importance when they were first contacted, and in the introduction to the survey. They were also given the opportunity to receive the results of the study once it was completed and the data were analyzed.

Materials

The survey used in this study was designed by the researcher. The questions asked in the survey were worded to specifically address the five research questions. Before use, the survey was examined by a small team of faculty members for content and clarity. The survey was uploaded to a secure password-encoded website by the researcher. The password to access the survey was given in the emails to the study participants. The first four questions of the survey gathered demographic information about the participants. The next four questions asked about communication styles with other individuals. Questions eight through twenty-three gathered information about email usage and the demographics of those emails. The next six questions asked about interactions between faculty. The next seven questions asked about gender differences in regard to communication. The last eleven questions sought to gather information about the participants' experiences with lying and misinterpretations when communicating with technology.

Procedure

This research study was conducted entirely through the Internet. Once the 75 male and 75 female participants were randomly selected, an email detailing the purpose of the study and how to access and anonymously complete the web-based research survey was sent to all of them at one time. After reading and agreeing to the informed consent document, the subjects were then directed to the survey page. The participants were given one week to respond to the online survey. A follow-up email was then sent reminding the participants of the study and asking them again to participate. The participants were given two weeks to respond. Finally, a third follow-up email was sent once again reminding the participants of the study and asking them to participate. When a participant completed the survey, their anonymous information was sent to the researcher, who encoded it into an Excel spreadsheet. The emails of the participants who asked for information about the study results were placed into a separate file with no relationship to the data.

The researcher used the statistical program SPSS to analyze the spreadsheet data. The data in the spreadsheet were first examined by running frequency distributions and descriptive statistic analyzes on every survey question. The output from these analyzes summarized the demographic information about the participants and the various questions that were asked in the survey. Next, t-tests were run on the gender of the participant versus the survey questions to determine if any significant results occurred. The researcher chose an alpha level of 0.05 for the statistical significance of the t-tests.

Results

Of the 150 subjects that were initially contacted, only 22 participants (11 female, 10 male) completed the questionnaire. One data point could not be used, because the only questions answered were those asking about age and gender. The following tables report the study participant demographics which were gathered by the first four questions of the survey.

Table 1. *Demographics of the Study Subjects*

Subject Demographics	Mean	Range	Standard Deviation
Age	47.9	32-78	10.5
Years Employed At University	12.9	2.5-51	11.6

Thirty independent samples t-tests were run in SPSS; of these, three were found to have significant outputs. These were gender vs. number of faculty emails, gender vs. faculty immediately answering faculty emails, and gender vs. faculty immediately answering other emails. For all three results, the mean for female faculty was significantly higher than the mean for male faculty ($p = 0.003$, 95% CI), ($p = 0.028$, 95% CI), ($p = 0.024$, 95% CI).

Table 2. *Study Subjects Professor Classification*

Classification of Professor	Number of Subjects in Each Category
Associate	8
Assistant	4
Lecturer	3
Full	1
Distinguished	1
Not Otherwise Indicated	3
Did Not Answer Questions	1

In addition to these significant results, there were multiple other findings that were close to, but were not significant. There was a slight preference for female faculty over male faculty wanting to communicating with students via email rather than in person ($p = 0.07$). There was also a slight preference for female faculty to receive more emails from students than male faculty did ($p = 0.06$). There was also a slight trend for more female faculty to immediately answer emails from students ($p = 0.063$) and immediately answer emails in general ($p = 0.065$) than male faculty. Finally, there was a trend for a larger percentage of female faculty than male faculty to respond within 24 hours to emails that fell into the 'other' category ($p=0.08$), that is, emails that were not from faculty, friends/family, or students. In contrast, there was a trend for a larger percentage of male faculty than female faculty to respond within 24 hours to emails from friends and family ($p = 0.064$).

Limitations of the Research

One of the biggest weaknesses of this study was the small sample size. Despite the initial large sample that was contacted multiple times, only a fraction of the participants actually chose to complete the study (21 subjects, ~15% return rate). This disappointing return does hamper the results of the study, because several of the most interesting results were found to be almost statistically significant. If a larger sample size could be gathered in future studies, it is a distinct possibility that many of the results of this study could be duplicated, and further significant relationships found among the data.

This study was based on self-reports from faculty, which is a weak form of research. However, the goal of this study was to provide some basic research on gender trends in email communication, and the study was designed so that the participants would feel safe in providing the confidential information. Because of this, a self-report method was sufficient, and several confirmations of previous research studies were found. Future studies should take this research one step further, and use a quasi-experimental methodology to attempt to further study the variables addressed in this research.

Finally, this study was conducted on a sample of faculty from the population of Liberal Arts and Science faculty at a large Midwestern University. Because of this, the results of this study can only be generalized to similar populations. However, it is the opinion of this researcher that since some of these results have been verified by previous research on different populations, that the study results can be generalized to the population of University faculty as a whole, and some results can also be generalized to an HRD practitioner population.

Discussion

Gender has been shown to influence communication between faculty and students. This research study supported this statement through several significant and interesting findings. In review, this study focused on the following five research questions:

1. What, if any, gender differences exist in email communication by professors and students?
2. Is less information given to a student who asks a question via email than if the student phones or visits the professor?
3. What are the self-reported amounts of online misinterpretations that professors experience?
4. Is there a self-reported gender bias in how faculty members respond to students' emailed questions?
5. Is there a gender difference in lying or deception in online communication?

Based on the results discussed previously, there were multiple gender differences that existed in computer-mediate communication by faculty and students. The first significant result mentioned in the preceding section indicates that female faculty receive significantly more emails than male faculty (Appendix B – Graph 1). This finding helps confirms the study of Jackson et al. (2001) who found that men are not as likely as women to communicate via the web, and contrasts the findings of Hoskins (2005) study, which found that more males than

female students used the web for dialogue with their instructors. Since past research has indicated that females use more self-disclosure and contribute more open-ended interactive messages, perhaps female faculty members come across as easier to communicate with via email than male faculty members, and this is why they engage in more communication with their students in this way.

The second significant finding mentioned in the results section gives evidence that female faculty tend to immediately answer emails from fellow faculty members more often than male faulty members immediately answer emails from fellow faculty members. However, this result may be due to the first finding that female faculty receive more emails in general. When comparing the actual percentage of total emails answered instead of the number, the result is not significant, with females answering about 73% of fellow faculty emails right away and males answering about 69% of fellow faculty emails right away.

Finally, the third significant result found that more female faculty than male faculty immediately answered emails that fell into the 'other' category. This result was not found to be due to the number of emails answered, but based on the comments several faculty members offered at the end of the survey, the researcher has reason to believe that this significant result is probably due to the type of 'other' emails that were received. For example, several subject participants commented on how the 'other' category includes departmental mailings and announcements, as well as emails from listservs. The result that female professors immediately answered more emails classified as 'other' may be because these types of emails (work from outside the University) require an answer, while the types more male professors confessed to receiving (department-wide mailings, etc.) do not require an answer. It was beyond the call of this study to examine this 'other' category in more detail with regards to gender differences, and as a result, future researchers should examine this finding.

The results of the study also indicated several other relationships that might have been significant if the sample size had been larger. Most of these results indicated that, in general, female faculty were more likely to respond to emails, and also to respond to them sooner than male faculty. However, one result contradicted this; the finding that a larger percentage of male faculty than female faculty responded within 24 hours to emails from friends and family. This finding was interesting because male faculty do not receive significantly more emails from friends and family than female faculty, but there seems to be a trend to respond to them quicker. If the trend is examined, it turns out that males actually have a greater spread in the amount of time that they take to respond to emails from friends and family, while most females respond immediately. Once again, the number of responses within 24 hours to emails classified as "other" is higher for females, most likely for the same reason mentioned in the previous paragraph.

Regarding the second research question of this study, no significant trends were evident regarding the bias in the amount of information that is given to a student depending on how they communicate with the professor, although the overall data (as well as several comments from the participants) suggests that such a trend does exist. Mostly likely, the small sample size did not have enough power to clearly show the trend. Further research with a larger sample size is needed to clarify the results to this research question.

For the last three research questions, again, no trends were found. Few participants were more willing to lie or deceive online than in a face-to-face situation, and fewer had ever done so. However, the overall amount of misinterpretation that faculty reported was high (Appendix B – Graph 2). One participant did answer that she would more willing to deceive males instead of females, but this is not enough to generate a trend, and so the topic requires still further research.

Although most of the participants insisted that they do not write different responses for males and females, several faculty reported only a few questions later in the survey that men and women do communicate differently online than face to face. This confirms the findings of past research that gender roles are evident in CMC communication (Li, 2006). A better way to examine this trend would be to us a non-self-reported measuring device to avoid subject bias. However, the study did find an interesting, although non-significant, finding regarding male and female faculty's opinion on whether communication online allows things to be said that wouldn't normally be said in a face to face situation. Over 60% of female faculty agreed with this statement, while just 33% of male faculty did. In general, because many of the participants elected not to answer the questions pertaining to lying and deception, no clear trend could be found here, but again, if a large enough sample could be obtained, the results could confirm past research studies.

Another interesting finding relates to faculty member's communication preferences. The study found that male faculty overwhelmingly prefer to communicate with students via email (90%), while female faculty were split on whether they preferred to communicate with students through email (45%) or in person (56%). This finding contrasts the study of Jackson et al. (2001), who found that men are not as likely as women to communicate via the web. Since this study used self-reported data, as did the Jackson study, this difference is important to note, and future researchers should seek to confirm these results with a larger sample size.

Some additional interesting demographic findings of the study: In general, faculty prefer to communicate with students and other faculty via email, and prefer to communicate with friends and family via the phone. Most professors spend less than an hour a day checking an average of 58 emails a day on their work computers, over half of which are junk mail. Perhaps as a way to combat the amount of time taken up by checking and

deleting so much email, the study found that professors primarily use the subject line and the sender's name to determine which emails to read. A downfall of this is that if a student does not use a clear enough subject line, or uses a non-University email address (puppy@yahoo.com, for example), their email may be classified as "junk" and automatically not read. This result is extremely important, because if students are unsure about how to properly write emails to their professors, then their questions and comments can get lost in the influx of data.

Another interesting finding was that over half (56%) of the study subjects agreed that if a student contacts a professor by phone or in person, that he or she is going to get a more detailed response than if the student had used email. This confirms the findings of Hollingshead (1996), and has potentially negative implications for students who are uncomfortable or unable to visit their professors by phone or in person, such as distance learners. This finding furthers the need for faculty to be as thorough with their comments and instruction in email as they would be in person.

According to the study participants, faculty meet an average of eight times a semester with their department heads. Almost half of the participants counted these meeting as being face-to-face, while 42% said that these meetings occurred via email. Faculty also said that they met an average of 22 times with fellow faculty a semester, with almost half of these meeting occurring face-to-face and 42% occurring via email. The study also found that while most faculty (75%) said that they would not prefer to use an alternate online method of holding departmental meetings (such as a chat or messenger program), the quarter of participants that said they would use it stressed that they would use it most of the time.

Conclusions and Implications for HRD Practice

Researchers have noted how gender affects computer-mediated communication, specifically that which occurs between students and faculty members. Several of the findings of this study are important for University faculty and practitioners to take notice of. The first of these is that female faculty receive significantly more emails from students than male faculty, despite the finding that male faculty overwhelmingly prefer to communicate with students via email. The finding that female faculty tend to answer emails sooner than male faulty is also important for Universities and practitioners to note. Finally, another interesting finding was that over half of the faculty agreed that if a student contacts a professor by phone or in person, that he or she is going to get a more detailed response than if the student had used email.

Based on these findings, it can be concluded that some sort of disjunction is occurring in which female faculty are receiving nearly three times as many emails from students, which logically will mean that more of their time is taken up by answering emails, especially since they answer them sooner than male faculty. Universities should be made aware of these findings, and take steps to make their departments more equal in the amount of time spent receiving and responding to emails from students. Since the University environment of communication between faculty and students echoes that of the communication found between managers and employees, practitioners also can use the results of this study effectively.

Perhaps as a way to combat the amount of time taken up by checking and deleting so many emails, most faculty read the subject line to determine whether an email is worth reading. Many Universities and large organizations are now offering online and hybrid courses and training, in which learners are instructed to use primarily email to communicate with their professors. However, if the learners are not instructed on how to write emails with informative subject lines, then responses to their questions may not be answered in a timely fashion, or completely disregarded altogether, thus degrading the learners' overall learning experience. Departments that offer these kinds of courses and training should ensure that their faculty and supervisors are taking steps to educate their learners on how to write emails, and that the faculty/supervisors are taking care to respond to each individual email quickly and completely.

Another important finding was that overall amount of misinterpretation that faculty reported occurring in online communication was frequent and high, as was the finding that a majority of female faculty agreed that communication online allows things to be said that wouldn't normally be said in a face to face situation. These findings are important to address in any work environment, and in addition to the suggestions mentioned above, organizations and universities the may want to rework their mission and vision statements to include honesty and integrity in online settings, in addition to their everyday face-to-face communications. Furthermore, additional training may be needed on how to avoid miscommunication via email.

Another finding that should take into consideration is the amount of meetings that faculty have with their department heads and fellow faculty, and whether any of these meetings can be replaced with an alternate online meeting form. This change might especially be important for departments with a high amount of technology-use, because the transition to a potentially time-saving online meeting form might be supported by a large majority of the faculty. This last finding may be of particular note to HRD practitioners, because industry tends to involve a great number of meetings, some of which could be replaced with an online format to save time and prevent inconvenience among meeting-attendees.

This study produces some significant findings to add to the pool of knowledge about gender influences on CMC. By asking a variety of questions of one sample, additional knowledge has been gained by confirming that past research findings apply to the population of university faculty. Many of these findings can also be applied to an HRD setting. Thus, this study has resulted in valuable knowledge that practitioners can apply to the everyday computer-mediated communication that occurs at work.

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