Feedback Channels: Using Social Presence Theory to Compare Voice Mail to E-mail

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ABSTRACT

This study compared the effects of using voice mail files sent as electronic mail (e-mail) attachments versus text-based e-mail to provide student feedback. Social Presence Theory (SPT) was used as the theoretical framework for assessing the two modes of delivering feedback. SPT would predict that voice mail would be perceived as higher than e-mail in terms of social presence. In accordance with SPT, the results indicate that voice mail was perceived to have significantly higher social presence than text-based e-mail. Both e-mail and voice mail were perceived as capable of providing a reasonably high quality of feedback. The results of this study indicate that students in the voice mail group appreciated the higher social presence of the medium, whereas students in the e-mail group appreciated receiving the text-based feedback because it could be printed and then later accessed and referenced in a non-sequential manner.

Keywords: Electronic Mail, Feedback, Social Presence Theory

1. INTRODUCTION

The rise of Internet computing and related technologies has created a technological platform that allows professors to rethink the way they deliver feedback to their students. Providing timely and appropriate feedback is a must for a student to have a successful learning experience (Nabors 1999). It can promote student learning, increase student satisfaction with a course and an instructor, and improve course/program completion rates (Hackman & Walker 1990; Inglis 1998). Students receive intrinsic feedback while engaging in their learning activities and/or extrinsic feedback through some form of communication with the instructor (Inglis 1998). Traditionally, the extrinsic feedback is provided either through face-to-face communication or via written comments on student assignments and exams during the following class meeting (or much later). Computer-mediated-communication (CMC) technology has made it possible for students to receive their feedback electronically without having to wait for a meeting with the instructor at a specified time or location. This can reduce the time between submitting an assignment, or an exam, and receiving feedback on it (Inglis 1998; Xu 1996).

Due to its ability to support asynchronous communication, text-based e-mail facilitates communication between individuals or groups of individuals (El-Shinnawy & Markus 1997) and has become a popular communication medium (Inglis, 1998). In a recent study, Blake (2000) noted that most students preferred submitting an assignment as well as receiving feedback via the Internet. In comparing the Internet with face-to-face feedback from the instructors, more students rated receiving feedback through the Internet as extremely effective (64.6% vs. 54.2%) or very effective (27.1% vs. 16.7%). The increased use of e-mail among both students and faculty creates new avenues for delivering feedback to students. Many faculty members have used e-mail to communicate with their students, thus providing immediate feedback and a direct means for communication (Huang 2000; Nabors 1999; O'Neill 1997).

Bates (1995, p. 202) noted that CMC is "one of the

fastest growing technologies, in terms of the number of teachers and learners who are using it." E-mail is one type of CMC that allows for both one-to-one and one-to-many textual communications without regard to an individual's physical location. In spite of the benefits that e-mail can offer, it is a limited symbolic representation system. Social and contextual cues that usually regulate and influence group communication dynamics are missing or attenuated.

While many faculty members have embraced the Internet as a means of communicating with students, few have ventured beyond text-based e-mail communication to experiment with sending voice-mail messages as e-mail attachments (Huang 2000). The purpose of this research was to explore the social presence and perceived feedback quality of the two media, traditional text-based e-mail and internet enabled voice mail, in providing feedback to students. With the growing interest in distance education, these two media may become increasingly important as a primary means of communicating with students and providing feedback on their performance. One of the challenges in distance education where face-to-face contact is limited or non-existent, is making the experience as rich and as socially present as the traditional classroom experience. Social presence refers to the degree to which a medium allows communicators to experience others as being psychologically present (King and Xia, 1999). Social presence theory (SPT) predicts that communication media differ in their ability to provide a sense of intimacy and immediacy (Short, Williams, & Christie, 1976). SPT suggests that media that are capable of providing a greater sense of intimacy and immediacy will be perceived as having a higher social presence. In this research, SPT provides the theoretical foundation for comparing traditional text-based e-mail and Internet enabled voice mail. While there has been considerable research on SPT, and measures have been developed to assess the social presence construct, there has been little, if any, attempt to apply SPT within an education and learning context. Moreover, there has been no previous attempt to compare the social presence of traditional text-based e-mail and internet enabled voice mail. Therefore, in conducting this study, the following research questions were addressed:

RQ#1) Will students perceive voice mail attachments sent over the Internet to have a higher social presence as compared with more traditional text-based e-mail?

RQ#2) Will students perceive voice mail attachments sent over the Internet to provide a higher feedback quality as compared with more traditional text-based e-mail?

2. LITERATURE REVIEW

According to Short, Williams, and Christie (1976), social presence is a subjective quality of the communication medium and relates to the social psychology concepts of intimacy (determined by physical distance, eye contact, smiling, and personal topics of conversation) and immediacy (determined by the medium's capacity in transmitting information). Therefore, social presence can be a function of both verbal cues (e.g., tone of voice) and nonverbal cues (e.g. facial expression, direction of gaze, posture, dress). Based on this theory, communication media such as face-to-face meetings, which are capable of conveying nonverbal and social context cues, are considered to have higher social presence than computer-mediated communication media and written documents because they lack nonverbal feedback cues (King & Xia 1999). Presumably, the higher intimacy and immediacy the medium has, the higher the social presence (Short, Williams, & Christie 1976; Trevino, Webster, & Stein 2000).

Rice (1993) used social presence theory to compare traditional and new media by analyzing data from six studies designed to examine the use and effects of new media. He found that due to the lack of social presence, both voice mail and e-mail were ranked lower in their overall task appropriateness than traditional face-to-face meetings, and e-mail was ranked even lower than voice mail in both overall appropriateness and for exchanging timely or confidential information.

Like most theories that attempt to explain complex phenomenon, SPT is not entirely uncontroversial and empirical research testing SPT has failed to provide consistent support in terms of the theory's ability to predict media choice. While some studies have shown that SPT is predictive of media choice (e.g., Holland, Stead, & Leibroch 1976; Ochsman & Chapanis 1974; Trevino et al. 1987), other studies have not found that social presence (or the closely related construct of media richness) is predictive of media choice (e.g., El-Shinnawy and Markus 1992; Markus 1992; Markus, Bikson, El-Shinnawy, and Soe 1992; Rice and Shook 1990). The inconsistent findings suggest that social presence alone may not be a good predictor of media choice and that other factors such as users' media experience may affect media choice. In this study, however, since there is no attempt to model media choice, the debate over the predictive validity of SPT is of comparatively little concern.

In spite of the controversy that exists over whether SPT is predictive of media choice, one can still surmise based on SPT that text-based e-mail would be perceived as a more socially present communication medium for

providing feedback to students than the written feedback students normally receive on their returned assignments and exams (because e-mail has the ability to provide immediate feedback). However, e-mail would be predicted to be a much less socially present medium than traditional face-to-face or telephone communication due to its inability to provide the same level of nonverbal cues. In the same vein, SPT would predict that voice mail via the Internet should be perceived as a more socially present medium than text-based e-mail in providing feedback because voice mail has a personal focus and is easier to express in dynamic natural language, whereas e-mail can only convey static visual cues in text.

No single study has been conducted to compare the effects of using Internet based voice mail versus e-mail to provide feedback for students. Moreover, as noted earlier, there has been no previous attempt to compare the social presence of traditional text-based e-mail and internet enabled voice mail. Recently, internet-based communication technologies have made it easier for individuals to send and receive asynchronous voice communication over the Internet in the form of relatively compact voice files that can be transmitted as e-mail attachments. Such technology is likely to play an increasingly important role, particularly in the area of distance education. This study was designed to compare students' perceived social presence and the quality of feedback associated with voice mail attachments sent over the Internet versus traditional text-based e-mail.

3. RESEARCH METHOD

To address the research questions of this study, traditional text-based e-mail and Internet-based voice mail were utilized to provide feedback to students. In this study, the traditional text-based e-mail feedback was composed, delivered, and received using standard e-mail software whereas the voice mail feedback was recorded and played back using PureVoice[TM]. The PureVoice[TM] Player-Recorder lets the user record and send voice messages as e-mail attachments and the recipient can play back the sender's voice-mail message. Voice messages composed with PureVoice[TM] have extremely high sound quality – (nearly as high as one would experience in a local phone call made over a high-quality connection). Yet, because PureVoice[TM] uses compression technology, short messages (up to several minutes or so) take up relatively little disk space and can be sent (or downloaded) fairly quickly even with a dial-up connection to the Internet (Qualcomm Incorporated 1998).

3.1 Design
An experimental design was employed in this study involving students enrolled in two traditional classroom-based graduate sections of a business process reengineering course at a large southeastern university during the 1999-2000 academic year. Subjects were randomly assigned to one of two experimental conditions: Internet-based voice mail (PureVoice[TM] group) and traditional text-based e-mail (e-mail group). Students in the PureVoice[TM] group received their feedback via an attached voice file sent over the Internet as an e-mail message. Students in the e-mail group received their feedback over the Internet using a traditional text based e-mail message without a voice attachment. The text-based e-mail messages were composed in a word processor and then pasted into the body of the e-mail itself, so that no file attachment had to be opened in order to access the feedback. A total of 46 students participated in the study with 23 students being assigned to the PureVoice[TM] group and 23 students being assigned to the traditional text-based e-mail group.

Students in both groups received either voice-based or text-based feedback on their exams in the course. A copy of the exam questions was attached to each e-mail message, regardless of the group to which a student was assigned. In order to provide consistent and high quality feedback to both groups, all feedback for each student was first composed and edited in a word processor, then e-mailed (as text) to students in the e-mail group or read and recorded in a voice file which was sent as an e-mail attachment to those in the PureVoice[TM] group. This extra step of composing and editing ensured that students received the same level of feedback and comments regardless of the group to which they were assigned (i.e., the only difference was whether the feedback was communicated in text-only or voice-only format). The time lapse between when the students completed the exam and when the instructor provided feedback was four (4) days. This time lapse was the same for students in both treatment groups and included the time required to grade the exam and compose, edit, and deliver the feedback.

3.2 Data Collection and Analysis
Students in both groups completed an anonymous questionnaire with each of the two versions tailored to the particular group in which the students were assigned (PureVoice[TM] or e-mail group). Apart from minor modification of wording to reflect the treatment group to which a student was assigned, the two versions of the survey were designed to be as identical as possible, which allows for the comparison of responses across the two treatment groups.

The questionnaire included an established multi-item measure for social presence (Short, Williams, & Christie 1976), as well as a specifically designed multi-item measure for perceived quality of the feedback. In

addition, the questionnaire included single-item measures for perceived usefulness and perceived ease-of-use of the software as well as several open-ended questions designed to gather qualitative data from the students regarding their reactions to the feedback mechanism used in the group to which they were assigned. While other measures of social presence could have been used, the semantic differential scales suggested by Short et al. (1976) were chosen because they are the most commonly used measure for the social presence constructs. The Appendix shows the measurement items that were used to assess social presence, feedback quality, usefulness, and ease-of-use.

4. RESULTS AND DISCUSSION

Though the items used to assess social presence represent an established measure, their reliability was assessed using Cronbach's alpha. The four-item measure for social presence had a reliability of 0.83. The four items designed to measure perceived feedback quality were factor analyzed and revealed a single-factor structure. These four items, which measured helpfulness, usefulness, quantity, and detail of the feedback received, exhibited high reliability (Cronbach's alpha = 0.86).

Having established reliability for the multi-item scales used to assess social presence and feedback quality, a series of one-way ANOVAs were conducted to determine if there were statistically significant differences between the two treatment groups. Table 1 lists the mean value of each construct by treatment group and presents the ANOVA results.

Table 1: ANOVA results

Construct	Voice Mail over the Internet	Traditional Text-Based E-mail	ANOVA Results
Social Presence	4.08	3.25	F=28.65, Sig.=0.000
Feedback Quality	3.76	3.70	F=0.097, Sig.=0.756
Usefulness	3.95	4.10	F=0.421, Sig.=0.502
Ease-of-use	3.95	4.74	F=8.90, Sig.=0.005

Attached voice mail files sent over the Internet (using PureVoice^{TM}) were perceived as having higher social presence (mean of 4.08 on a 5-point scale with 5 being the highest social presence) as compared with text-based e-mail (mean of 3.25). A one-way analysis of variance (ANOVA) indicated that this difference was statistically significant across treatment groups (F=28.65, Sig.=0.000).

As expected, both e-mail and PureVoice^{TM} were perceived to have provided relatively high quality feedback (mean score 3.70 vs. 3.76 on a 5-point scale with 1 being the lowest quality and 5 being the highest). The difference between the two groups was not found to be statistically significant in the one-way ANOVA (F=0.097, Sig.=0.756). This indicates that the step of composing and editing feedback for each student beforehand did control for the quality of feedback. In addition, this result suggests that perceived feedback quality may be influenced less by the type of medium that is used, and more by the actual content of the feedback.

The text-based e-mail group perceived that the software they used was both more useful (4.1 mean) and easier to use (4.74 mean), as compared with the PureVoice^{TM} group on these same measures (3.95 mean for usefulness and ease-of-use). The difference in perceived usefulness of the software was not found to be significant (F=0.421, Sig.=0.502), but the difference in perceived ease-of-use was found to be statistically significant (F=8.90, Sig.=0.005).

Table 2 provides a representative sampling of the qualitative data students furnished on the survey in response to the open-ended question, "What was the thing that you liked the most about receiving feedback via e-mail/attached voice-mail files?"

As the comments in Table 2 reveal, students in the text-based e-mail group appreciated the timeliness of the feedback as well as the ability to go back and reference portions of the message. While some observations were made about personalization and the privacy that e-mail offered, students in the PureVoice^{TM} group were more apt to comment on the social presence (e.g., voice inflection) and level of personalization offered by the medium. One student in the PureVoice^{TM} group even commented that it was "more personal than a text message."

Although students in both groups had copies of the exam questions, both groups found it frustrating to relate the feedback to their own exam answers. This frustration was caused by two factors: (1) students received feedback before they received the hardcopy of their exam answers, and (2) the feedback was not on the exam itself. The following comments were typical:

"I didn't have my exam back yet, so couldn't remember exactly what I wrote to compare it to

Table 2: Representative responses about receiving electronic feedback via [e-mail/ voice-mail files]

Text-Based E-mail Group	PureVoice™ Group
Could be printed and filed/shared. Could easily refer to earlier/later sentences within the e-mail.	I like the real voice from instructor. From that, I know that instructor really read/graded my paper. Otherwise, I really wonder/doubt that the instructor read it or not.
Timely: can get the feedback before the next class. Personal: feedback is based on my own performance and more focus, more specific. Easy to reference: since it is a written message, it's very easy to use as a reference.	The things I liked most about voice mail files is that it is really to identify the points that you wanted to stress. The inflection of your voice.
The timeliness of the feedback—getting results in private.	The voice mail gave the feedback a very personal touch and I did get the feeling that you knew as a person and a student, not a just a name and a number.
E-mail feedback is descriptive and tailored to individuals	I liked the personalization of your explanation. I felt like you are probably more familiar with us, the students, and that you spoke to each of us "on our level".
I liked the timely nature and availability. It is nice to be able to reference the comments.	Tailored and customized. It's more personal than a text message.

the feedback"."

"The comments could not be specifically related to answers on the exam."

Students in the PureVoice™ group experienced additional frustration because they had to replay the entire message multiple times in order to access specific portions of the feedback as compared with a text-based e-mail message that can be more easily scanned in a direct access (non-sequential) fashion. This may have impacted perceptions regarding ease-of-use. The following remark was typical:

"With the voice responses it is not as easy to move backwards and forwards in the response to pinpoint and coordinate with each section of the test. I had to listen to the response all the way through then go back and listen to part of it. It was not always easy to get to the right place."

This finding is consistent with the literature (El-Shinnawy & Markus 1997; Valacich, Paranka, George, & Nunamaker 1993). E-mail's text quality helps people interpret the message accurately, and it is easier to process and filter than voice mail. A recipient of e-mail messages has random access to any of the messages in his/her inbox and the recipient can scan through a message in order to get to the important points, whereas a voice mail recipient has to go through the entire message sequentially and if the message is lengthy , or there is a long sequence of messages, the cognitive overload tends to be higher.

In this study, all of the subjects were graduate students who had extensive experience with e-mail and Internet usage, but no one had prior experience using voice mail software. Although PureVoice™ was easy to use, it was new software and had to be installed for the first time for the students in the PureVoice™ group. This, too, may have influenced the perceived ease-of-use. The qualitative data collected provides an indication that at least some students found the initial setup of the PureVoice™ software (dowloading/installing the plug-in) to be somewhat inconvenient. In contrast, students in the text-based e-mail group (who presumably already had access to e-mail software) would not have had to deal with downloading or installing special software.

5. LIMITATIONS

As with all studies, this one is subject to certain limitations. First, in order to reduce the overall length of the questionnaire, perceived usefulness and perceived ease-of-use were both assessed by single item scales, which cannot be evaluated for reliability. Ideally, a multi-item scale should be used to assess each of those two measures. Second, this study did not collect data on how frequently students checked their e-mail or on the speed of the Internet connections that they used to receive the feedback. Thus, while the feedback was sent out at a specific time, there is no way to know exactly when it was received or how quickly it was downloaded. However, since subjects were randomly assigned to treatments, there was no reason to believe that systematic differences existed between the two groups along these dimensions.

6. DIRECTIONS FOR FUTURE RESEARCH

This study provides a foundation for future research. Two such opportunities will be discussed here. First, while useful data were gathered to assess social

presence, feedback quality, usefulness, and ease of use, future research should attempt to measure the possible impacts of different feedback channels (e.g., e-mail and voice mail) on learning outcomes. Therefore, it would be desirable to include learning outcomes as a dependent variable in future studies. Establishing a link between the feedback channel and learning outcomes, however, may prove difficult in practice since feedback tends to be indirectly related to learning outcomes.

Second, another avenue for future research would be to examine other feedback channels since this study only compared the quality of feedback provided by two Internet-based media (text-based e-mail and voice mail attachments sent via e-mail),. Future research is needed, for example, to determine if the Internet-based media examined in this study provided higher feedback quality as compared to paper-based or face-to-face feedback. Future studies should therefore be conducted to include both traditional and Internet-based media that can be used to provide feedback to students.

7. IMPLICATIONS AND CONCLUSIONS

This study has shown that both traditional text-based e-mail and internet enabled voice mail can be used to provide timely, high quality feedback to students. One contribution of the study is that it represents the first direct comparison of the social presence of these two media. Perceptions of social presence observed in this study were consistent with the predictions of SPT; as SPT would predict, attached voice mail files sent over the Internet were perceived as having a higher social presence than text-based e-mail. The results of this study indicate that students in the PureVoice^{TM} group appreciated the higher social presence of the medium, whereas students in the e-mail group appreciated receiving the text-based feedback because it could be printed and then later accessed and referenced in a non-sequential manner. The results of the study may have important implications for distance education, where face-to-face contact with students is limited (if it exists at all) and electronic channels of communication must be used to convey feedback to students. Although this study was conducted in a traditional classroom setting, the results do suggest that educators who are involved in distance learning need to consider the tradeoff between social presence and ease of access/retrieval in choosing the appropriate feedback channel.

8. ACKNOWLEDGEMENTS

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APPENDIX
Constructs and Measures

Social Presence
Circle the number that best expresses your perception of the social presence of [e-mail/attached voice mail file] as a communication medium.

SP1. Impersonal   Personal
    1   2   3   4   5
SP2. Cold   Hot
    1   2   3   4   5
SP3. Dehumanizing   Humanizing
    1   2   3   4   5
SP4. Insensitive   Sensitive
    1   2   3   4   5

Feedback Quality
The feedback I received on my exams was:

FBQ1. Not Very Helpful   Very Helpful
    1   2   3   4   5
FBQ2. Not Very Useful   Very Useful
    1   2   3   4   5
FBQ3. A little   A lot
    1   2   3   4   5
FBQ4. Not very detailed   Very detailed
    1   2   3   4   5

Usefulness
Rate the usefulness of [e-mail/PureVoice] as a medium for receiving feedback.

Not at all Useful   Extremely Useful
    1   2   3   4   5

Ease of Use
Rate the ease-of-use of [e-mail/PureVoice] software as a medium for receiving feedback.

Not at all Easy   Extremely Easy
    1   2   3   4   5

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