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An Examination of the Relationship Between Computer Anxiety, Communication Apprehension and Student Experiences With Electronic Mail

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Introduction

Electronic mail (email) communication is fast becoming ubiquitous in the workplace and on the university campus (Garton and Wellman, 1995). Its wide availability and perceived usefulness make it a particularly attractive software tool for inclusion as a course instructional method. However, there has been little principled investigation into how this blending of computer technology and communication medium may be perceived by the users of such technology when integrated into a course as an instructional method¹.

This research is aimed at uncovering certain characteristics that might influence students' experiences with this medium. We argue that due to the nature of the medium communication and computer its use will be affected by both computer anxiety and communication apprehension. To complicate matters further, the typical distinction between written or oral communication apprehension is likely to be less clear when we examine email. In this paper, we discuss our rationale for the research, the research question and propositions, current project status, and the potential contributions of this stream of research.

Rationale

This research is conducted as part of an ongoing, interdisciplinary, multiuniversity research project on computerbased communication (CBC) in the classroom and the curriculum. The research program arose out of a curiosity about the roles that various computer technologies might play in enhancing teaching and learning. This particular project examines how certain student characteristics can influence use, and the outcomes of using CBC technologies.

Communication apprehension has been associated with lower performance in academic settings (Boohar and Seiler, 1982; Daly, 1978), particularly in interaction-intensive classes (McCroskey and Anderson, 1976). Similar results have been found in organizational settings, as well (Penley, et al., 1991). Computer anxiety has been associated with decreased use, and even avoidance of information technology (Igarria and Parasuraman, 1989). Similarly, communication apprehensives tend to avoid communication situations (McCroskey and Anderson, 1976). These findings suggest that

using CBC technology as a course instructional method may not be entirely beneficial to the students since it may lead to lower performance and/or course avoidance.

To date, computer anxiety and communication apprehension have been examined through distinct studies in the communication field (e.g., McCroskey, 1982; McCroskey and Anderson, 1976; Daly and Miller, 1975) and the information systems (IS) field (e.g., Heinssen, Glass, and Knight, 1987; Igarria and Chakrabarti, 1990; Igarria and Parasuraman, 1989). One important exception is Carlson and Wright (1993), who found a small, significant relationship between oral communication apprehension and computer anxiety. Their study, however, examined the changes in anxiety levels due to taking courses in public speaking and computer skills. Interestingly, they found that the public speaking course was associated with reduced communication apprehension, while the computer skills course increased computer anxiety.

We describe research that examines computer anxiety, oral communication apprehension, and written communication apprehension to develop a more complete understanding of CBC apprehension and its potential impact on email use and student experiences. We have chosen this approach because preliminary case studies (Owen-Cruise, Brown, and Jackson, 1994) indicate that some students use the technology more frequently than others. Some students report that they enjoy using the technology, while others are very happy to see the technology assignments end. This suggests that something other than the course or the instructor influenced the frequency of technology use and the level of enjoyment experienced by the students. This led us to examine the characteristics of CBC technology that might influence students' experiences.

Since CBC tools include characteristics of both communication and computer technology, existing attitudes toward technology may negatively influence individual's use experiences ("I don't like computers, they never work for me"). The communication components of email present interesting possibilities, as well. For instance, individuals can be oral apprehensive and/or written apprehensive (Penley, et al., 1991). Clearly, email comprises characteristics of written communication. A case can also be made that email encompasses characteristics of oral communication. For instance, one component of oral communication apprehension is the desire to avoid group discussions (McCroskey, 1982). This component could be particularly inhibiting for a student required to participate in an email discussion group. This suggests the potential for negative student impacts and experiences and led us to begin investigating the relationship among computer anxiety, oral communication apprehension, and written communication apprehension.

Research Question and Propositions

This research is motivated by the following question: How do computer anxiety and communication apprehension influence students' use of and experiences with email? We offer the following propositions:

P1: Students with high computer anxiety, high oral communication apprehension, or high written communication apprehension will use email less than their peers who are moderate to low on these dimensions.

P2: Students with high computer anxiety, high oral communication apprehension, or high written communication apprehension will feel more negatively toward email than their peers who are moderate to low on these dimensions.

Additionally, we believe that each of the three constructs will contribute equally and significantly to CBC apprehension. In other words:

P3: Students with high computer anxiety, high oral communication apprehension AND high written communication apprehension will use email the least of all students and feel the most negatively toward it.

Current Project Status

We are currently in the process of developing and testing an instrument to assess the various levels of anxiety and apprehension associated with the use of CBC tools². The instrument is a synthesis of existing instruments in the areas of computer anxiety (Heinssen, Glass, and Knight, 1987; Igbaria and Chakrabarti, 1990), oral communication apprehension (McCroskey, 1982), and written communication apprehension (Daly and Miller, 1975). Additionally, a series of questions is being developed to address students' attitudes toward email specifically. The dependent variables (use and experience) will be assessed via self-report, email logs, and the content of email messages.

The instrument validation process follows Straub's guidelines (1989) and includes the following phases:

(I) *Pretest* - initial instrument critiqued by research colleagues in the fields of information systems and communication regarding item content, item wording, scale formats, and general level of understanding;

(II) *Technical validation* - initial testing of proposed instrument with sample subjects to validate construct validity and reliability with maximally similar measures and extremely dissimilar methods;

(III) *Pilot test* - Further construct validity and reliability testing of instrument by administration of questionnaire to another sample of subjects and collection of self-report measures of usage information and experiences; and

(IV) *Full-scale computer-based communication questionnaire administration* - Use of questionnaire in Fall term courses utilizing computer-based communication technologies as instructional resources and collection of self-report usage information and experiences in order to further test validities with new sample subjects.

Table 1 presents a detailed outline of our planned instrument validation process.

Phase	Validation Tests	Content Validity	Construct Validity	Reliability	Expected Completion
I. Pretest	Qualitative	X			May, '95
II. Technical Validation	Cronbach Alphas Multi-trait, multi-method Analysis		X	X X	June, '95
III. Pilot Test	Cronbach Analysis Factor Analysis Qualitative	X	X	X	August '95
IV. Full-scale administration	Cronbach Alphas Factor Analysis Qualitative	X	X	X	December, '95

Table 1: Planned instrument validation process

Contribution and Future Directions

Data in support of our propositions lead us in two directions: What interventions are needed to decrease computer anxiety and communication apprehension? and What other instructional methods can be used with students who have high computer anxiety and communication apprehension? Data not in support of our propositions imply that the use of email is a viable means of involving computer anxious and communication apprehensive students in class discussion. Thus, results in either direction will contribute to improving the classroom environment for all students.

We believe this research has the potential to contribute to the fields of IS and communication by joining the concepts of communication apprehension and computer anxiety. Through understanding the relationship between these concepts, we can increase our understanding of individuals' experiences with CBC tools. Furthermore, this research will be useful in both academic and organizational settings. For instance, prior research has suggested that some individuals use a certain medium for communication no matter what the message (Penley, et al., 1991). Could it be that these individuals have an aversion to other communication media? Can this aversion be overcome? Does a particular level of CBC apprehension have consequences for the adoption and use of CBC technologies? Does the presence of CBC apprehension preclude the individual's ability to learn the tool and/or the educational content being demonstrated with the

technology (e.g., group discussion methods)? Additionally, as individuals are introduced to CBC tools (whether in the classroom or the workplace), it will be important to ascertain what, if any, training interventions are useful for individuals with differing levels of CBC apprehension. The key to answering these questions is to be able to assess CBC apprehension. This research is an important first step in doing just that.

End Notes

1. Note that this research assumes that email is NOT the subject matter being taught, nor is it used in the classroom in lieu of other delivery techniques as in Alavi (1994) and Leidner and Jarvenpaa (1993). Rather, email is used to facilitate class discussion and the delivery of course material beyond the traditional classroom boundaries.
2. Copies of the instrument are available from the first author.

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