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Abstract

Technologically-supported learning (TSL) environments offer considerable promise for the enhancement of student learning through the various interaction opportunities available in the feature sets of the computer-based communication tools. At the very least, the computer-based communication provides additional venues for class participation. However, when class participation is positioned within a TSL environment, it is not clear how learning/performance benefits are associated with student predispositions toward communication mediums and computer technology, student attitudes toward participation, and student choice of participation mode. This paper describes a pilot study that investigates the relationship among student characteristics (computer anxiety, communication apprehension, computer-based communication apprehension, attitudes toward participation), student choice of participation mode, and student performance in a technologically-supported learning environment.

Introduction

Students who are actively involved with course material typically demonstrate better performance than their less actively involved peers (Angelo, 1993; Weimer, 1993; McKeachie, Pintrich, Yi-Guang, & Smith, 1986). Technologically-supported learning environments provide students with opportunities for active engagement with course material via computer-based communication (CBC) venues such as electronic mail discussion groups, conferences and/or chat rooms, and dynamic material repositories such as web pages and shared databases (Hiltz, 1994; Hiltz & Turoff, 1993). The rich feature sets and interaction potential of such computer-based communication tools offer considerable promise for student participation opportunities in higher education (Leidner & Jarvenpaa, 1995; Alavi, 1994; Alavi, Wheeler, & Valacich, 1995). As with all types of class participation, students must take advantage of the unique opportunities afforded them by the technology. However, it is unclear how student performance in technology-supported learning environments is influenced by student predispositions toward computer technology and communication media.

This research investigates the relationship among computer anxiety, communication apprehension, CBC apprehension, student interaction activities, and student performance in a technology-supported learning environment. We argue that student performance will be associated with the match between student characteristics (computer anxiety, communication apprehension, CBC apprehension, attitudes toward participation) and course participation opportunities. In this paper, we discuss our rationale for the research, the research questions and propositions, current project status, and the potential contribution of this study.

Rationale

This research is part of a larger project investigating the relationship of individual, group, and technology characteristics and student learning experience and outcomes. In this pilot study, we focus on how the choice of a "participation opportunity" informed by one's communication, computer, and CBC predispositions may influence student performance.

Active student involvement and engagement with course material and each other are fundamental goals of the interaction inherent in the cooperative model of learning (Slavin, 1990; Johnson, Johnson & Smith,

1991). The discussion and information sharing processes of interaction are believed to assist in the development of individual mental models and a collective shared understanding. These learning outcomes rest upon two assumptions about student participation: (1) participation in the interaction process is critical; and (2) individuals will participate if the interaction situation is structured to permit *successful* interaction (Slavin, 1990). In other words, in class situations where participation is encouraged as a means of enabling active student involvement, there are factors at both the individual and instructional method levels that may influence the intended outcomes of the participation activities. One way to facilitate active participation and successful interaction situations is to align or match participation opportunities with student predispositions toward communication media and computer technology.

However, it is important to note that the relationship between interaction and performance outcomes is not direct, as is evidenced by research in traditionally-organized, face-to-face classroom discussions (McCroskey, 1982; McCroskey & Anderson, 1976). Research on communication apprehension and performance outcomes indicates that an individual's predispositions toward specific communication media (e.g., written, oral) can alter the effect of interaction on learning outcomes (McCroskey & Anderson, 1976; Daly, 1978; Boohar & Seiler, 1982). In particular, communication apprehension has been associated with negative learning outcomes in the classroom (McCroskey & Anderson, 1976).

Extant research in CBC settings is inconclusive regarding the influence of individual predispositions toward communication media and computer technology upon performance outcomes. Leidner and Jarvenpaa (1993) suggest that student preferences for particular teaching methods may influence the effect of a CBC method but do not examine the specifics of the preferences/predispositions. Recent information systems research reports positive performance outcomes suggesting that it may be possible for individual learning to occur when structured group interaction is provided in a technologically-supported learning environment, however, individual predispositions are not investigated (Alavi, 1994; Alavi et. al, 1995). A prior investigation of student interaction experiences in CBC settings indicated that some students used the technology more frequently than others and reported differing levels of enjoyment (Brown & Vician, 1997), suggesting that specific individual factors may be influencing student experiences. Finally, computer anxiety has been associated with decreased use and even avoidance of information technology (Igbaria & Parasuraman, 1989), which is clearly a potential problem for CBC interaction.

The nature of participation is such that it requires communicative interaction - the information exchange and discussion processes which permit the development of shared understanding between individuals (Bormann, 1989). The results of prior communication and information systems research suggest that students may encounter barriers to exercising successful interaction in courses due to individual characteristics such as communication apprehension and computer anxiety. At the present time, it is unclear how student interaction/participation is associated with participation opportunities which are situated in a CBC setting. This study seeks to develop a more complete understanding of student choice of participation mode, student characteristics, and student performance under the CBC of technologically-supported learning environments.

Research Questions and Propositions

Our research is motivated by the following research question: What are the relationships among student characteristics, choice of participation mode, and student performance? We offer the following propositions:

P1: Students who have a choice in their participation activities will have more positive attitudes toward participation than students in a non-choice environment.

P2a: Students will not choose participation choices that are inconsistent with their levels of computer anxiety, oral communication apprehension, written communication apprehension, and computer-based communication apprehension (e.g., students with high oral communication apprehension will not choose speaking in class to fulfill their participation requirement).

P2b: Students with participation choices that are more consistent with their levels of computer anxiety, oral communication apprehension, written communication apprehension, and computer-based communication apprehension will have more positive performance outcomes than their peers in less consistent participation choices.

P3: Longitudinal activities within a particular chosen interaction mode will not influence individual levels of computer anxiety, oral communication apprehension, written communication apprehension, or CBC-apprehension.

Methodology and Project Status

Preliminary data collection took place during the fall semester of 1996. The subjects were 30 students in one section of a required introductory level Information Systems course for Information Systems and Accounting majors at a large, midwestern, state university. At the beginning of the semester, students were asked to select their choice for participation avenues: in-class discussion, on-line discussion leader, web page manager, etc. Individual levels of communication apprehension (oral and written), computer anxiety, and CBC-apprehension were assessed using the instrument developed in Brown and Vician (1995) at the beginning of the term and after the term. Attitudes toward class participation were assessed with a questionnaire instrument designed specifically for this study. Preferred participation activities were identified by students, executed over the course of the term, and reported at the end of the term. Course grades were determined at the end of the term. Data analysis and interpretation activities are planned for Spring/Summer 1997.

Contribution and Future Directions

There are many possible outcomes for this initial study. If, for example, we fail to find support for P1, this may suggest that simply having choices is not sufficient to providing an participation situation structured for successful interaction. Thus, we will need to look more closely at the interaction characteristics of the participation choices available, being careful to provide as wide a spectrum as possible. On the other hand, if P1 holds, this could indicate that providing choices is an important antecedent to participation affect. Such a finding could encourage educators to offer multiple participation opportunities, with or without a technology component.

Similarly for P2a, if, for instance, we find that students fail to make "good" participation choices (i.e., aligned with predispositions), further research will be required to explore why this occurred. Could it be that certain forms of participation are more socially acceptable than others; perhaps we have not offered a rich enough mix; or perhaps the students lack the self awareness necessary to make choices that will align their predispositions with their participation choices. If, on the other hand, P2a holds, we might consider the consequences of always giving choices, thus never pushing a student beyond his or her acknowledged comfort level.

If we find that performance outcomes for students with more of a "match" between predispositions and participation choices do not differ from performance outcomes for students in a "non-match" situation (P2b does not hold) we will need further research to determine why this is the case. It could be that the relationship between participation and performance is mediated and/or moderated by other factors not accounted for in this study. Or, there may be other measures of performance that need to be considered. If P2b does hold, it will be consistent with prior research on interaction, and will extend it to include the realm of computer-based participation.

Finally, support for P3 suggests that no matter how long students interact within a particular participation mode, there is no effect on their predispositions. This brings into question the underlying ideas that practice (e.g., usage over time) in a particular participation mode leads to comfort and/or competence with all facets of the interaction process within that mode. Lack of support for P3 leads to further research into the mixture

of interaction that will help to alleviate or reduce levels of computer anxiety, oral and written communication apprehension, and CBC-apprehension.

Conclusion

This line of inquiry promises to shed light on the nature of student participation in computer-based communication environments. This particular study focuses on **participation choice** as a means of including more students in interactions and potentially improving student performance. Results from this initial study will be used to inform research design and data collection efforts with a larger sample size in 1997. Through examining student characteristics, we can begin to understand how student performance outcomes are influenced by available participation choices.

References available upon request from first author.