

Effects of Computer-Mediated Communication

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INTRODUCTION

The purpose of this study was to answer the question: Is the level of achievement of working adult students in an online class directly related to the method of computer-mediated communication used by faculty? The study examined the relationship between the methods of computer-mediated communication utilized, the independent variable; and student outcomes, the dependent variable, among working adult students in online courses. Through an examination of course communication records and student final exam grades, the researcher developed course-based measures of the methods of computer-mediated communication and student outcomes. These measures were used to conduct statistically appropriate tests to determine if there was a statistically significant difference in the student final exam scores between classes that used only basic methods of computer-mediated communication as opposed to courses that employed both basic and advanced methods.

BACKGROUND

With businesses continuing to increase their expenditures for employee education, there is progressively more focus on maximizing employees' educational outcomes to effectively leverage corporations' investment. Dunn (2000) predicts that large corporations will develop their own approval systems for higher education programs similar to the current regional accreditation process.

Bradburn and Zimbler (2002) make the point that the 1999 National Study of Postsecondary Faculty lacked detailed questions about modes of technology, training and instructional practices in individual distance education courses and affirm that further studies in faculty participation in distance education are needed. Northrup (2002) confirms this opinion by stating that

future studies should consider variables that may affect the individual learner, the learning environment and instructional strategies that may be most appropriate for specific learning outcomes. Quilter and Chester (2001) emphasize that few formal research studies have been conducted to examine the relationships between online communication technologies and teaching and learning, and reaffirm that research employing empirical documentation of communication technologies is lacking.

The method of computer-mediated communication is important since different technology-supported methods of interaction (e.g., two-way interactive TV, text-based chat, e-mail) have different characteristics in regard to immediacy of feedback, student-student and student-faculty interaction, realism and student user control (Smith & Dillon, 1999). Kearsley (1995) reinforces the belief that the method of computer-mediated communication used is critical to the learning process, as it affects the provision of feedback to the student. Distance learning environments that support synchronous communication can provide immediate feedback to the learners and rapid interaction between learners, a feature that may motivate some learners. In contrast, distance learning environments that support asynchronous communication can provide the student with more control over where and when communication occurs as well as more time to reflect on and respond to course content and communications (Moore & Kearsley, 1995). The modality of communication employed in the course is a significant factor in determining the nature of the learning community that is formed in the course.

Duffy and Kirkley (2004) state that most higher education research relies on survey data; that is, class ratings and specialized surveys like the National Survey of Student Engagement (Kuh, 2001), to infer, based on student report, that learning has occurred. It is this researcher's opinion that one of the main reasons for a lack of prior studies using quantitative data collected

directly from course records has been the difficulty inherent in obtaining such data in an online, distributed learning environment.

THE RESEARCH PROJECT

The research project consisted of a combination of three individual studies covering a total of 116 courses and approximately 1,700 students that, taken together, provide a detailed analysis of the question. The first study of 16 courses provided a proof of concept to test the instruments and measures developed and to identify any significant issues. The main research effort involved a large sample of 80 courses that was built upon the results of the preliminary study. The third and final study of 20 courses was a validation study to further evaluate the repeatability of the results and assure the reliability of the instruments and measures.

For purposes of this project, computer-mediated communication was defined as: computer-mediated communication between instructor and student or between students, which discussed some aspect of course content, assignments or student progress in an online course. The study examined outcomes of courses that were supported by both synchronous (simultaneous) and asynchronous (delayed) methods of computer-mediated communication.

Data collected from course management software administration statistics included: (a) methods of computer-mediated communication employed and (b) student final exam grades. Data analysis was performed using appropriate statistical techniques, including the use of an index to represent study variables. The use of an index allowed for statistical analysis and comparison of the aggregated levels of activity. The following index was created: per course combined student final exam grade index (STUFIN).

STUFIN was defined as the arithmetic mean of the student raw percentage scores achieved on the final exam for a specific course. It is the average score received by students on the final exam on a scale of 0-100%, with 100% being a perfect score.

Software features provided by the course management software and used by new online faculty were divided into two categories; basic methods of computer-mediated communication and advanced methods of computer-mediated communication. The methods were grouped as either basic or advanced based on

the complexity of the method, multi-media aspects of the method and the method of utilization of the specific method in delivering the online course (Table 1). Courses designated as utilizing basic methods of computer-mediated communication employed only those items listed as basic methods in Table 1. However, courses designated as utilizing advanced methods of computer-mediated communication employed both basic and at least some advanced methods of computer-mediated communication.

The final exam process was designed so that final exams were administrated consistently and included comprehensive coverage of the entire course. The consistent nature of the final exam structure and process throughout the university and the wide range of disciplines and number of classes included in the study served to increase internal validity.

RESULTS

In each of the studies comprising this project there was a statistically significant difference in the average final exam score achieved for students in courses utilizing both basic and advanced methods of computer-mediated communication vs. the average final exam score achieved for students in courses utilizing only basic methods of computer-mediated communication. The statistical analysis was done in two stages: first using a student's t-test for comparison of the group means of the STUFIN index, and then using ANOVA to compare the group means. In each of the studies the results of both types of analysis were significant at the .01 level, indicating that there was a statistically significant difference. The advanced methods courses always returned higher average final exam scores. The average values for the STUFIN index are shown in Table 2. The t scores, ANOVA F scores and related significance levels for the comparison of the group mean values for STUFIN in each study are shown in Table 3.

Smith and Dillon (1999) refer to the media/method confound, a concept stating that the technology alone does not cause the effect; rather, it is the combination of the technology and the way the technology is employed that impacts student outcomes. The act of utilizing advanced features in a course indicated that the faculty member was attempting to actively employ technology to provide a better learning experience for the students. It should be noted that the mere presence

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