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Does Computer-Mediated Collaboration Really Improve Group Communication? Our General Findings

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As companies continue to expand world-wide, effective communication among project teams and employees becomes a serious challenge. This has not only made it a necessity for businesses to share information electronically, but has also made it essential for organizations to promote team learning and innovation through group collaboration. In fact, as we all know, it is common for business to interact and conduct group seminars in several countries, all at once, via the Internet. For example, several years ago Hewlett Packard conducted collaborative seminars in traditional classrooms. Now however they focus almost exclusively on instructions via an interactive electronic network. As Susan Burnett, of Hewlett Packard points out, "we are constantly pushing to blur the lines between learning and doing the job" by using information technology (Perelman, 1994, p. 88).

Research in text-based, computer-mediated (CM) collaborative learning has shown that collaborative technologies can enhance learning performance and increase the affective experience in the context of group learning over more traditional face-to-face (FtF) groups by eliminating common time and space constraints that are found in traditional classroom settings (Brandon & Hollingshead, 1999). Text-based CM collaborative learning can also reduce evaluation anxiety of the participants by allowing for more anonymous communication if the identity of the communicators are hidden. This often produces more creative and open discussions. On the down side, CM interaction has been found to reduce the richness of communication that is observed in FtF communication, which lessens the quality of information exchanged. This reduction in the communication "bandwidth" sometimes has a negative effect on the experience of collaborative learning.

As part of an on-going research project, SURL, and the Department of Decision Sciences at Wichita State University, has been conducting a series of studies examining the use of text-based cooperative software for enhancing student collaboration in small classroom groups. In our studies, we are examining the effects that synchronous, CM interactions have on collaborative learning groups for both individual and group performance, as well as group member satisfaction, cohesion, and consensus, when compared to more traditional FtF groups.

For example, we have recently conducted an experiment that consisted of six biweekly sessions that lasted one semester. During each session, participants (undergraduate students enrolled in semester-long courses on Production and Operations Management) examined a new case study each week which involved concepts and techniques that were taught in the preceding week. The meetings lasted fifty minutes and proceeded as follows: Each team member studied the case on his/her own for fifteen minutes and took notes of his/her ideas about the case. In the following thirty-five minutes, team members discussed the case, exchanged their ideas, and reached their conclusion about the case either by computer or face-to-face. The meetings of CM groups were held in a computer laboratory that had 24 personal computers, which were equipped with three-way, text-based synchronous communication software. The FtF groups sat together in clusters of three in the same classroom. The CM groups could not see their members while communicating and the identity of the communications

between them were hidden.

This study, as with several other studies, found that CM groups started out the semester performing about the same as, or worse than, FtF groups, but around half-way through the collaborative sessions they significantly out-performed the FtF groups in terms of the quality of solution to the case study scenarios. It is believed this occurs because CM mediums may reduce the amount of information that can be transmitted at one time, such as facial cues, and thus, it takes more time for group members to become situated and for any benefits to occur.

These results should be taken with caution, however. In our studies, we found that the differences, although they may be significant, are still too small to conclude that text-based CM mediums are *better* than FtF in dealing with collaborative learning. For example, the greatest performance difference between the FtF and CM groups in this study was only 10% in favor of the CM groups. In addition, we found that our CM groups tended to be less satisfied with the communication medium and their group interactions, were a less cohesive group and developed less of a perception of achieving group consensus. CM groups also took longer to reach a group decision. It is believed this occurs because of the reduced communication bandwidth for CM environments. Interestingly, we found that CM groups also were more focused on the internal communications of their group, such as posing questions to other members within their group instead of seeking answers from the professor, which was common in the FtF groups. It is believed this occurs because the CM group members have to exert much more cognitive resources just to communicate with the other group members and thus tended to become more group focused.

Thus, we found that CM communication can improve the productivity of collaborative groups. However, it may take some time for this to occur and may cause some resistance from the communicators because of its lower communication richness. Increasing the communication bandwidth without sacrificing the value that more anonymous CM communication can provide can be done by using communication platforms such as electronic whiteboards to accompany the text-based software. Currently, we are preparing a study that uses these platforms to determine their impact on computer-mediated collaboration.

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