Exploring student perceptions of group interaction and class satisfaction in the web-enhanced classroom

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Abstract

This paper presents an exploratory study of a web-enhanced televised class encouraging learner–learner interaction in small online groups. The purpose of the study was to examine whether various interactions among students in small groups could substitute for one-on-one interaction between the instructor and each student and lead to high levels of perceived class interaction and student satisfaction. It was found that perceptions of overall class interaction and student satisfaction seem to be positively affected by small group interaction. Implications for research and practice are discussed. © 2002 Elsevier Science Inc. All rights reserved.

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1. Introduction

The idea that effective learning environments require some form of social interaction is not new. Particularly in distance education, researchers have noted the importance of active exchanges with others to enhance student performance and satisfaction (Everhart, 2000; Fulford & Zhang, 1993; Gunawardena & Zittle, 1997; Hayes, 1990; Hiltz & Wellman, 1997; Moore & Kearsley, 1996; Ritchie & Newby, 1989; Vrasidas & McIsaac, 1999; Wegegrif,

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1998). While Internet or web-enhanced learning environments featuring Computer-Mediated Conferencing (CMC) among other modalities of communication have been found to be effective with regard to the potential for interaction (Hiltz & Wellman, 1997; Horvath & Teles, 1999), the need to pay special attention to interaction in such environments has been emphasized (Gunawardena & Zittle, 1997; Hayes, 1990; Hiltz & Wellman, 1997; Moore & Kearsley, 1996; Vrasidas & McIsaac, 1999; Wegegrif, 1998). Further it has been noted that designing web-enhanced learning environments for effective interaction is a time-consuming endeavor for students and instructors (Gaud, 1999; Porter, 1997).

Based on previous findings that students' perceptions of overall interaction in a televised class were not necessarily related to individual participation (Fulford & Zhang, 1993), and that learner–learner exchanges are becoming equally if not more important than learner–instructor interaction in online environments (Ritchie & Newby, 1989; Wegegrif, 1998), the current study explored whether students' perceptions of overall interaction in a web-enhanced environment could be improved through small group online activities rather than through one-on-one instructor attention and individual exchanges among all class members. This study adds to the current body of research in that although the importance of learner–learner interaction has been noted (Hayes, 1990; Hiltz & Wellman, 1997; Wegegrif, 1998), most researches examining web-enhanced environments focus on strategies enhancing instructor–student interaction and individual participation (Fulford & Zhang, 1993). Additionally, it adds to current research exploring how limited institutional and faculty resources can best be deployed in that if small group learner–learner interaction can somehow substitute for large class learner–learner and instructor–learner interaction and still have similarly positive outcomes with regard to student satisfaction, instructors may rethink the way they design web-enhanced courses.

In the following, a brief literature review will examine how interaction has been defined and why particularly learner–learner interaction is deemed to be important for learning. Then an exploratory study of student perceptions of interaction in a web-enhanced televised course will be presented. Finally, study results and implications for researchers and practitioners will be discussed.

2. Interaction in web-enhanced learning environments

Moore and Kearsley (1996) describe three types of interaction that allow students to learn effectively in distance learning environments. Specifically, they suggest that there exists a transactional distance in such learning environments, which is due to the fact that instructors and learners do not interact in the same physical and temporal space. This distance may lead to learners and instructors misinterpreting each other's behaviors and may negatively affect the quality of the learning environment. Consequently, the authors suggest overcoming potential shortfalls due to transactional distance by focusing on three types of interactions, namely learner–content interaction, learner–instructor interaction, and learner–learner interaction. The first refers to the student's engagement with the course materials. The second refers to the student's engagement with the instructor. The third

refers to the student's engagement with other students in the class. In keeping with Moore and Kearsley's (1996) ideas, pointing to the importance of all three types of interaction, many researchers have focused on strategies encouraging individual participation via instructor–learner interaction (Fulford & Zhang, 1993), and fostering learner–content interaction through the effective design of web-based materials and activities (e.g., Freberg, 2000) in addition to enhancing learner–learner interaction via student collaboration (e.g., Hayes, 1990).

While some investigations focus more heavily on one or the other type of interaction, there is little, if any, research examining the respective role of each type of interaction for student outcomes and how each should be weighted. Most practitioner-oriented writings, for example, suggest that teachers should take as comprehensive an approach as possible in incorporating a host of pedagogical principles (Polichar & Bagwell, 2000). Given the limited resources that most teachers and students face today, it would seem that some researches could focus productively on potential substitution effects among the various kinds of interactions and whether some types of interaction can be leveraged more effectively than other types. One study that seems particularly encouraging in this regard was undertaken by Fulford and Zhang (1993) who found that:

> Overall interaction dynamics may have a stronger impact on learners' satisfaction than strictly personal participation. Vicarious interaction may result in greater learner satisfaction than would be the divided attention necessary to ensure the overt engagement of each participant. (p. 19)

Their finding, that perceptions of overall interaction in a particular class were not necessarily related to individual participation (Fulford & Zhang, 1993), may suggest that interaction in the minds of students is perceived as a general characteristic of a class that can be attained in a variety of ways, with some ways being more effective than others. This in turn would imply that some types of interaction may be leveraged more highly or even that one may be substituted effectively for the other. For teachers, it may be particularly interesting to explore whether instructor–learner interaction can be replaced to some extent at least with learner–learner interaction, thereby allowing the instructor to shift resources from one activity to another and perhaps even to use fewer resources overall. The current study is a first step in that direction. In particular, it will be examined whether focusing mainly on learner–learner interaction in a web-enhanced classroom will lead to high levels of perceived overall class interaction and student satisfaction.

3. An exploratory study of a web-enhanced classroom

Learner–learner interaction has been described as a range of activities from small group cooperation to the creation of larger learning communities. Hayes (1990), for example, proposes, "Learners at a distance may be asked to work in small groups... [offering] opportunities for students to share and critique project work . . ." (p. 33). Wegegrif (1998)

points to the importance of learning as a socially situated process and presents study findings supporting the idea that unless students feel part of a community of learners, they are unlikely to succeed in online learning environments. Hiltz and Wellman (1997) suggest that optimal web-based learning environments "... create the feeling of a true 'class' or group of people learning together... and support carefully planned collaborative learning activities..." (p. 47). Gunawardena and Zittle (1997) refer to this collaborative aspect of computer-mediated learning as "social presence," which is described as the experience of immediacy and intimacy in social exchanges and was found to be a strong predictor of student satisfaction with a computer conference.

Based on this research, the current study focused on the creation of a learning environment that offers opportunities for learner–learner interaction aimed at enriching the television classroom with targeted web-based learning tools designed to give students fairly structured tasks to cooperate on in small groups and to provide an atmosphere in which students would feel part of a learning community.

Specifically, the classroom under study was a graduate course in the Management of Organizational Change. The course is taught as part of an MBA program targeted mainly at adult, part-time, professional students, and is regularly broadcast via two-way interactive television. For this study, the course was set up in the following way. Lectures were given weekly via television broadcast and simultaneously transmitted to one on-campus site and three remote sites. The lectures were used strictly to disseminate information with little, if any, two-way interactions taking place between instructor and students.

Students were provided access to a course web site containing lecture slides, readings, an announcement section, e-mail and chat room capabilities, a class discussion forum, and several group discussion areas. All students had access to all areas with the exception of the group discussion forums, to which only members of a specific group had access. Course activities included the following: two in-class exams, a group class presentation, and group online discussions worth 20% of individual grades. Students were asked to log on to the web site at least twice a week and to respond to a discussion question in their work groups. Work groups consisted of about five students selected randomly into groups by the instructor. All groups were assigned one course-related discussion topic every 2 weeks over the course of a 15-week semester. They were asked to discuss this topic in their groups extensively and then to post a summary of their discussions to the main class discussion forum. The purpose of posting summaries for the entire class was just so that every student would have access to all other group discussions and could view as many different perspectives on the topic without having to read all other students' comments individually.

Students were asked to engage in active discussions and dialog in their work groups only. While the instructor monitored the group discussions and occasionally interjected to ensure that proper discussion techniques were used and groups were aware that they were being monitored, the discussions were mostly self-managed by members of each group. Students were graded on the quality of their group contributions only. Any discussions taking place in the main forum were voluntary and not graded. There were 35 students enrolled in the course.

User statistics for the web site show that each student accessed the site about 560 times on average, with each student spending an average of 30% of their time reading announcements and readings online, downloading course materials, logging on to the main class discussion forum, or sending e-mails; the other 70% of their time was spent in their group discussion areas. The chat function was not used. Students reported that the chat function seemed cumbersome to use and that they preferred face-to-face meetings if they had to meet at the same time at all. In the discussion areas, less than 10% of the time was spent discussing the group's class project and over 90% of the time spent discussing the assigned class-related topics.

The discussions in nearly all groups were of a high quality, with avid participation of all members and rotating leadership activities. Different members volunteered for each topic to compose and post the summary to the main discussion forum and also initiated the discussions in their groups. The instructor provided no preplanned structure to students as to how to organize and carry out the discussions, so the groups mainly organized by various members taking the initiative depending on who had time to do a task. Because students were graded on their individual contributions to the group discussions, nearly all students logged on and contributed on a regular basis with at least one initial answer to the topic and at least one or two comments about other member's responses. Students were graded based on how actively they contributed to the discussions and how much they demonstrated understanding of course material in their responses. That is, they were graded on how much they applied course concepts to answer questions, illustrate examples, and respond to others. All discussion topics were specifically designed to help students apply course concepts to their own experiences, make new connections between the theories presented, and share examples with each other that would illustrate course ideas.

4. Study results

At the end of the semester, students were asked to complete an anonymous paper-and-pencil survey (shown in Appendix A) containing 15 statements relating to their perceptions of group interaction (Statements 2–5, 8, 9, and 12–14), class interaction (Statements 1, 6, 7, and 10) and overall class satisfaction (Statements 11 and 15). Respondents were asked to mark their agreement with these statements on five-point Likert-type scales ranging from 5 (*strongly agree*) to 1 (*strongly disagree*). Twenty-seven of the 35 students completed the survey. After students filled out the surveys, an assistant collected and held them until after the end of the semester.

Results of the survey, as presented in Table 1 and Fig. 1, indicate that overall student perceptions of group and class interactions as well as class satisfaction were positive, with most students strongly agreeing or somewhat agreeing with statements describing high levels of interaction and satisfaction.

Specifically, as shown in Fig. 1, results of the survey seem to indicate that the online group discussions had a positive effect on student perceptions.

Table 1
Percentage of respondents for each response category

	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
(1) Interaction, all	0	0	7	30	63
(2) Interaction, group	4	4	0	33	59
(3) Learning community group	4	3	4	41	48
(4) Active group discussions	0	4	4	36	56
(5) Enjoyed group exchanges	0	7	8	22	63
(6) Learning community class	0	4	3	37	56
(7) Enjoyed class exchanges	0	0	4	40	56
(8) Value of group discussions	0	7	5	44	44
(9) Learned from group members	0	7	7	42	44
(10) Satisfaction with class interaction	0	4	0	48	48
(11) Value of class	0	4	4	33	59
(12) Knowing group members	4	4	10	26	56
(13) Discussions and group work	7	4	15	33	41
(14) Group interaction and class	0	7	7	30	56
(15) Satisfaction with class	0	0	4	18	78

The average response value for each statement — calculated by adding the response values for each student by statement (1, *strongly disagree*; 2, *somewhat disagree*; 3, *undecided*; 4, *somewhat agree*; 5, *for strongly agree*) and then dividing by the number of respondents (27) — is near 4 or higher, indicating that most respondents at least somewhat agreed with various statements about high perceived levels of interaction and satisfaction. No response had a median lower than 4 and standard deviations for the 15 statements ranged from 0.53 to
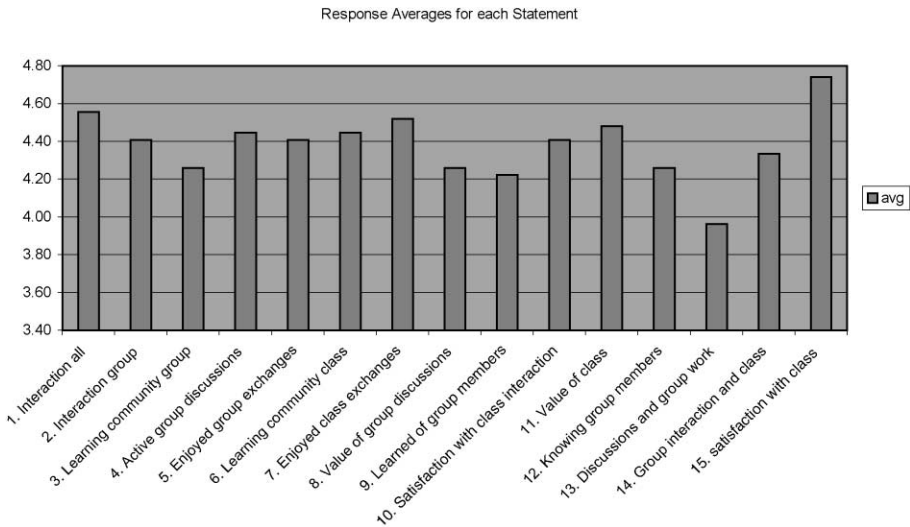

Fig. 1. Response averages for each statement.

1.19, indicating that responses did not have wide variations. This pattern becomes more obvious when examining the percentage of responses for each statement as shown in Table 1.

The following results relate to assessments of group interaction. Specifically, 59% of students strongly agreed that there was a lot of interaction in their group, with 48% feeling that they were part of a learning community in these groups. Fifty-six percent of respondents strongly agreed that they were very active in their group discussions and 63% strongly agreed that they enjoyed the exchanges with other group members. Forty-four percent of students strongly agreed that the group discussions were valuable to them and that they learned a lot from group members. This seems to indicate that while students enjoyed the active group work, they did not value it as highly in terms of learning from others. Therefore, their feeling that they are part of a learning community may reflect more of their own learning as they write in the discussions and reflect on topics rather than their capitalizing on the opportunity to learn from others. Further, 56% of respondents strongly agreed that the online group discussions helped them to get to know better the members of their groups, which may indicate that the online discussions were more effective in enhancing perceptions of social presence rather than peer-to-peer learning opportunities. This same phenomenon may have contributed to perceptions of the online discussions as a group development tool with 41% of students strongly agreeing that these discussions helped the group work more effectively as a group on their semester project. This percentage may have been higher if they had been asked specifically to work on their projects online. As it was, students spent less than 10% of their group discussion time on project-related matters.

The following results relate to assessments of overall class interaction. Sixty-three percent of students strongly agreed that there was a lot of interaction among all participants in the class. Fifty-six percent of respondents strongly agreed that they felt part of a learning community in the class and were happy with the quality of exchanges that occurred in the class. Forty-eight percent strongly agreed that they were satisfied with the level of class interaction. These percentages are particularly noteworthy in that very little interaction actually occurred among all class participants. During the televised lectures, there was little or no interaction with only the occasional student asking a clarifying question or making a comment. On the web site, students spent most of their time in the group discussions and very few, if any, regularly logged on to the main discussion forum apart from the time the discussion summaries were posted. Therefore, the perception of overall class interaction may have been largely the product of perceptions of group interaction being generalized to the entire class. This seems to be corroborated by the fact that 56% of respondents strongly agreed that their group's interaction made a significant difference to how they felt about the class overall. Further, 59% of students strongly agreed that the class was of value to them, while a notable 78% of students strongly agreed that they enjoyed it.

5. Discussion

Overall study results seem to support the notion that high levels of group interaction stimulated by structured online discussions positively affect perceptions of group interaction,

which in turn may be generalized to perceptions of high overall class interaction and class satisfaction. This would be similar to Fulford and Zhang's (1993) findings that vicarious interaction significantly affects student class satisfaction. In some way, perhaps group interaction is vicarious when it comes to overall class interaction even in the absence of significant learner–instructor interaction. This in turn would mean that small group learner–learner interaction may be substituted successfully for other types of interaction, such as instructor–learner interaction or even large classroom interaction involving the individual participation of all students. The latter forms of interaction are particularly resource-intense not just for the instructor, who has to focus on each learner individually, but also for the students, who have to engage with all members of their class and in online environments have to read a sometimes unreasonable number of postings. In this class, for example, each student would have had to read 34 other postings to interact with all other students and the instructor would have had to respond to 35 contributions for each topic at a minimum. Instead, in this class, the instructor was able to facilitate smaller group interaction by making summary comments to the group, if necessary, but mostly by monitoring a process of group interaction in which the group members took the initiative for social interaction and provided feedback and social presence to each other. Further, the students were able to enjoy a rich exchange with others and feel part of a learning community without having to spend large amounts of time to sift through numerous postings. In addition, students were able to build a strong social presence in their groups rather than perhaps feeling alienated by the participation in a discussion with 34 other students, which does not allow them many occasions for rich and repeated social exchanges nor provide the intimacy and immediacy required for a strong social presence.

5.1. Study limitations

Before moving on to concluding remarks, it seems important to point out that the present study is of an exploratory nature and as such has limited generalizability to other settings and student populations. Furthermore, the survey instrument used in this study needs validation to ensure that it is measuring what it is supposed to measure and reliably operationalizes the constructs in question. Additionally, study results may have been confounded by several factors, such as the sample that was used, and other variables that were not measured in the present study, such as, for example, student characteristics or motivation, which may have affected perceptions of levels of interaction. Finally, the study's findings are limited to exploring initial trends in the absence of comparative data gathered, for example, by having a control group.

6. Conclusion

The current study explored whether students' perceptions of overall interaction in a web-enhanced environment could be improved through small group online activities rather

than through one-on-one instructor attention and individual participation in overall class interaction involving all students. Results of the exploratory study are encouraging in that they seem to show that students' perceptions of class interaction and satisfaction may be generalized from a group to the class context and that small group interaction may effectively lead to overall class satisfaction even in the absence of students actively engaging with their instructor and all other participants in the class. These results have to be interpreted cautiously of course in that they merely reflect the dynamics of one classroom and one particular group of students. More research is needed to ascertain whether such results can be generalized to other student populations and classrooms. Additional research is also needed to determine whether there are moderating factors that may affect perceptions of interaction, such as whether perceptions vary with group effectiveness, member communication skills, other student and instructor traits, or even the course content. Given the study's exploratory nature and limitations, it seems nonetheless noteworthy that small group learner–learner interaction stimulated by course-related online discussions may effectively enhance students' class experience in the form of social presence, being part of a larger learning community, and enjoying the class in general. For researchers in the field of distance education, this may imply that more attention needs to be paid to developing strategies encouraging small group interaction particularly with regard to what types of web-enhanced tools or instructional methods are conducive to doing this. Further, researchers may take this study as a first step toward exploring the role and weighting of different types of interaction with a view to student outcomes such as satisfaction and performance. For teachers, this study may be a first step in rethinking the way classrooms, particularly those marked by transactional distance, are structured. Rather than attempting to enhance all types of interaction, instructors may consider focusing on certain types of interaction, such as small group learner–learner interaction, to enhance their students' overall satisfaction levels while better leveraging limited resources. As in this study, instructors might consider experimenting with instructional techniques that are designed to facilitate regular small group interaction above and beyond scheduled class meeting times through web-enhanced communications and structured online group assignments. They might also consider experimenting with various ways by which students learn to become more active in these group discussions and engage in the kind of feedback and facilitation that the instructor would normally provide, making groups increasingly self-managed and freeing up instructor resources.

Appendix A. Survey instrument

This survey is designed to measure some of your perceptions on the level and quality of interaction in this classroom. There are no right or wrong answers, but it is important that you respond as accurately as possible to each question by marking the most appropriate response. Your cooperation in this matter is greatly appreciated!

1 = *strongly disagree*; 2 = *somewhat disagree*; 3 = *undecided*; 4 = *somewhat agree*; 5 = *strongly agree*.

	1	2	3	4	5

(1) I think there was a lot of interaction between all participants in this course.

(2) There was a lot of interaction in my particular group.

(3) I felt part of a learning community in my group.

(4) I was very active with the discussions in my group.

(5) I really enjoyed the exchanges I had with my group members.

(6) I felt part of a learning community in this class.

(7) I am very happy with the quality of the exchanges that occurred in this class.

(8) The discussions I had in my group were valuable to me.

(9) I learned a lot from other members in my group.

(10) I am satisfied with the level of interaction in this class.

(11) What I learned in this class is valuable to me.

(12) I got to know the other group members better through the online discussions.

(13) The way we interacted in the online discussions helped us work better as a group on our project.

(14) The interaction I had with my group members made a significant difference to how I feel about this class.

(15) Overall, I enjoyed having been a member of this class.

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