Online Collaborative Discussion: Myth or Valuable Learning Tool

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Abstract

This study was designed to examine online group discussions from a student's perspective to determine what characteristics students identify as meaningful to their learning. Quantitative data were collected, analyzed, summarized in six tables. The overall results indicated that students preferred to have time to reflect on their discussions before having to give their answer. They also indicated that critical thinking skills and goals for course achievement were enhanced in online collaborative discussions. Students did not have a clear preference for group size whether for small groups or the entire class. Technical discussion projects were a preferred component of group discussions. Students were divided on their preferences for group work but overall preferred to work alone on online projects. Taking students' perceptions into consideration, this study provides valuable implications for instructors to help students effectively self-regulate their online discussions, and positively enhance their online collaborative learning experience.

Keywords: Online Discussion, Collaborative Learning, Interactions, Group Work

Introduction

Distance education continues to have a greater presence in higher education. In 2000-2001, 89 percent of public universities were offering courses at a distance (National Center for Educational Statistics, 2003). The purpose of this study is to examine online group discussions from a student's perspective to determine what characteristics students identify as meaningful to their learning. Many faculty who use

active discussions in their face-to-face classes are turning to technology to facilitate online discussions to provide their students with an interactive online experience (Anderson & Garrison, 1995).

Review of Literature

Interactions between students and their instructor and among the students themselves are significant to the process of online learning (Pallof & Pratt, 1999). Online interactions are associated with students' learning and their perceptions of online courses (Berge, 1999; Flottemesch, 2000). A caution should be added that using the technology incorrectly can result in student's becoming bored, inattentive, or even frustrated with the online discussion experience (Berge 1999) and many instructors have indicated a lack of student participation in online discussions (Jin, 2005). It is important to structure the asynchronous discussions in order to provide a foundation for critical discussions and critical thinking (Jeong, 2000). Jiang (1998) found that students displayed higher levels of achievement when online interactions were an important component of the course. The use of technology as an online discussion tool allows the online instructor to use the tool in facilitating insight and understanding rather than as a one way dispenser of knowledge. When used to facilitate learning, the possibilities for technology implementation and integration are broadened.

Importance of Group Work

Collaborative learning is not a new idea in education and the benefits of online collaborative learning have been widely researched (Roberts, 2004). Using group work as an instructional strategy has been a specific focus within the area of collaborative learning (Bonk & King, 1998; Koschmann,, Hall, & Naomi, 2002). Yet few studies have examined the details of group discussion (Thompson & Ku, 2006). Faculty often use group projects and discussions to engage students in a cooperative and/or collaborative learning environment. In examining group dynamics in an online environment, Fisher, Thompson, & Silverberg (2005) indicate one of the strengths of group work is that it helps a student explore his or her thinking providing opportunities for knowledge construction with their peers. However, distance learners have indicated experiencing a sense of social isolation (Lally & Barrett, 1999). This sense of isolation can be addressed by having group members work together in unique ways providing opportunities for students to attend to the academic and social components of the online class (Gabelnick, MacGregor, Matthews, & Smith, 1990). Graduate students in Fisher et al. study indicated that collaborative group work provides them opportunities to have deeper analysis of topics, to reflect on their learning discovering different approaches to tasks, and to discover points they missed in their preparation for the discussion.

Groups are complex systems that are dynamic and adaptive (McGrath, Arrow, & Berdahl, 2000). As complex systems, groups can also be investigated from a systems perspective. A systems perspective recognizes and studies every component in terms of how that component affects the system and how the system affects each component (Carabajal, LaPointe, Gunawardena, 2002). With online groups there is the additional component of the technology tools, which can't be ignored when examining online groups (Fisher, Thompson, & Silverberg, 2005; McGrath, Arrow, Berdahl, 2000).

Group Size

One variable of interest when examining online groups relates the group size. The size of the group has a significant impact on group success (Fisher, Thompson, & Silverberg, 2005). Fisher et. al indicate large groups are better for discussions where the aim is exploring and collecting information. To facilitate coordination, small groups of three to five are better for these types of projects. Mennecke & Valacich (1998) found a critical group size is approximately seven members. The use of a smaller group size allows for greater idea flow and development (Mennecke & Valacich, 1998; Fisher et al., 2005).

As group size increases group members feel the group has a harder time obtaining reaching its desired effect (Carabajal, LaPointe, Gunawardena, 2000). Bonito & Hollinghead (1997) found as group size increases active members maintain their level of contribution, but less active members' postings decrease in proportion. The key is to have a group size large enough to provide different perspectives, but still small enough so each member of the group has a voice (Fisher et al., 2005).

Prior Preparation

Another important component to groups and online discussions deals with the prior preparation of the group members. Prior preparation by group members is an important component for successful group participation (Petress, 2004). Jonnasen (1996) refers to computer conferencing as a "mindtool" that prompts a larger amount of reflection and analytical thinking while still connecting learners. Students have found group projects more rewarding when they were actively involved in the pre-planning, reading, and implementation (Fisher, Thompson, & Silverberg, 2005).

Johanning (2000) found using writing as a way to prepare for small group discussions provide opportunities for rich learning experiences. Tai-Seale & Thompson (2000) used "assigned conversation", which was a focused study of reading assignments and found that this method increased students' level of preparation, active participation, and the amount learned. Cohen (1994) adds a word of caution that preparation that is suitable for interaction in more routine learning tasks may have an opposite effect and actually constrain the discussion when the task is less structured and the learning objective is more conceptual.

Characteristics of Group Members

The characteristics of group members are another important component of online group work. Teachers use various methods in forming online groups. Some will mix students into groups attempting to balance technology skills, leadership ability, content knowledge, and diversity based on their personal knowledge of the students. Other teachers randomly assign students to groups. Carabajal et al. (2002) indicate the importance of balance in online discussions. Online discussions foster equal participation among the participants, but it doesn't lend itself to patterns of leadership where one person dominates what is designed to be a shared space. This poses a conflict, because Pavitt & Johnson (1999) state online groups need an effective moderator or the group loses coherence and becomes a group of individuals formulating their thoughts online. In addition, if one member is particularly adept at the skills required by the group task, that individual's skills overshadow the group's ability to succeed. Winograd (2003) addresses the moderator's role as the leader of the discussion. In this role the moderator serves as the motivator for participants by encouraging interaction while providing a trusting discussion environment. The online discussions need to allow each group member to bring their knowledge, abilities, backgrounds, and experiences to the group process as they construct new knowledge.

Group Purpose

When developing group tasks the quality of the interaction needs to incorporate a specific design goal in order to promote deeper learning (Garrison & Cleveland-Innes, 2005). Online groups have a greater proportion of task-related messages and are conducive to brainstorming tasks. (Hillman, 1999; Hollingshead, McGrath, & O'Connor, 1993). Jin (2005) found when students believed the discussion was personally relevant and applicable to the class, they were more engaged in the discussions.

The literature has identified that group size, characteristics of group members, group member preparation, and discussion topics are variables related to students' satisfaction with the collaborative group process. These variables need to be further studied by investigating student perceptions related to these group system variables and the perceived importance the components that make up the variables. In this study students' perceptions of online interaction and collaboration were examined. The study specifically concentrated on the variables of group size, characteristics of group members, prior preparation for group discussions, and the discussion topics. The following research questions guided this study:

What are students' perceptions of the components of group size, discussion design, discussion purpose, group member preferences and prior preparation and their affect on the quality of the discussion?

Specifically:

  a) Is there a relationship between the reason for the online discussion and online discussion quality?
  b) Is there a relationship between students' perceptions of group size and online discussion quality?
  c) Is there a relationship between students' preparation and online discussion quality?
  d) Is there a relationship between the purpose of the discussion and online discussion quality?
  e) Is there a relationship between group member preferences and online discussion quality?
  f) Is there a relationship between strategies for preparation and online discussion quality?

Methods

The quantitative data source included a student survey containing 26 questions related to six issues - quality of online discussions, size of groups in online discussions, type of discussion response in online discussions, type of interests associated with discussion issues in online discussions, preference for group partners [partners assigned to the study group] in online discussions, and strategies for preparation in online discussions. The survey was administered at the end of the semester and quantitative data were collected and analyzed to seek patterns of students' perceptions of online collaborative learning in the context of higher education.

Data Analysis and Procedure

Statistical Analysis: One Way Chi-Square procedure was used to compare observed and expected frequencies in each item on the survey instrument. Further, these items in the instrument were grouped into specific categories. The One Way Chi-Square procedure was used to determine if the items in the Student Survey contained equal proportions of student responses to the Likert scaled levels of responses: (a) strongly disagree, (b) disagree, (c) not sure, (d) agree, and (e) strongly agree. The numerical values of the Likert scaled responses were strongly disagree = 1, disagree = 2, not sure = 3, agree = 4, and strongly agree = 5.

Results

The following are the results of the analysis of the Student Survey related to students' online discussion experience and the factors that contribute to meaningful online discussions. A One Way Chi Square procedure was used to determine whether the distribution of observed frequencies of student perceptions were compatible with expected frequencies in each item on the Student Survey. Items in the Student Survey were grouped into specific categories. The One Way Chi Square procedure was used to determine if the items in the Student Survey contained equal proportions of student responses to the Likert scaled levels of responses.

The omnibus research question was: Are students equally likely to choose any one of the five possible Likert scale values? To test for that possibility, the researcher had to determine the expected counts for each of the Likert values. For this study, the expected count for each Likert value is the total number of students (N = 24) answering the survey divided by 5. A chi-square statistic, degrees of freedom and the observed significance level were calculated. A statistically significant chi-square, at alpha level .05, indicated the observed counts for the Likert scale values were not equally distributed. The observed N was compared to the expected N. The following tables include each individual item from the Student Survey. The mean score for each question indicates the numerical value of the Likert scale. For example, a mean score of 3.75 indicated the perception of the student approximates agree on the scale of 1 to 5 (strongly disagree = 1, disagree = 2, not sure = 3, agree = 4, and strongly agree = 5.) The observed N indicates the number of responses from the total number (N = 24) that approximates 3.75. The expected N is the average of possible choices of the total N divided by the number of Likert items, or 24 divided by 5. For brevity purposes, only the largest observed Ns were included in the tables.

Quality of Online Discussions

The first category grouped items 1 – 4 from the Student Survey into a category that examined the quality of the online discussion. The results are summarized in Table 1.

Table 1. Goodness-0f-Fit Chi-Square Procedure to Determine the Quality of Online Discussion Forums (N = 24, df = 4)

Variable	*M*	*SD*	observed n	expected n	X^2	Sig.
Q1: Ease and efficiency of Achieving an entire group	3.75	1.23	13	4.8	21.42	.000*
Q2: Successful project completion using the knowledge of an entire group	4.08	0.97	13	4.8	25.17	.000*
Q3: Construction of knowledge in a logical manner using expertise of an entire group	4.00	0.78	16	4.8	35.58	.000*
Q4: Critical thinking skills are best using the knowledge of a collaborative online group situation	3.67	1.31	5	4.8	6.83	.145

* *p* < .05

In Q1, Q2, Q3 and Q4 a majority of students agreed the quality of online instruction was best when they could use the knowledge of the entire group to achieve the course goal. This procedure provides greater efficiency to successfully complete projects. Further, use of the expertise of the entire group for construction of knowledge is more effective as opposed to work of just one individual.

Size of Groups in Online Discussions

The second category grouped items 5 - 7 into a category that examined the influence of size of discussion groups in the effectiveness of online discussion forums. The results are summarized in Table 2.

Table 2. Goodness-0f-Fit Chi-Square Procedure to Determine the Effectiveness of Size of Groups on Online Discussion Forums (N = 24, df = 4)

Variable	*M*	*SD*	observed n	expected n	X^2	Sig.
Q5: Prefer to have online collaborative discussion with group sizes of 4 – 6	4.00	0.93	10	4.8	14.33	.006*
Q6: No preference as to size of group in online discussion	2.83	1.09	11	4.8	12.67	.013*
Q7: Prefer to have online collaborative discussion with entire class	3.13	1.19	11	4.8	13.92	.008*

* *p* < .05

In Q5, 10 of 24 students in the study preferred collaborative online discussions with small groups of 4 – 6 when participating in online discussion forums, X^2 (4, *N* = 24) = 14.33, *p* = .006, as opposed to 11 of 24

students in Q6 who had no preference for group sizes, X^2 (4, N = 24) = 12.67, p = .013. In addition, 11 of 24 students in Q7 preferred the entire group for online discussion, X^2 (4, N = 24) = 13.92, p = .013.

Type of Discussion Response in Online Discussions

The third category grouped items 8 - 13 into a category that examined the manner or type of discussion response in the quality of online discussion forums, e.g., students waited to see who says what, the behavior of other students, etc. The results are summarized in Table 3.

Table 3. Goodness-0f-Fit Chi-Square Procedure to Determine if Type of Discussion Response Affects the Quality of Online Discussion Forums (N = 24, df = 4)

Variable	M	SD	observed n	expected n	X^2	Sig.
Q8: Prefer to prepare for online discussion before attending the online discussion	3.13	1.19	11	4.8	13.92	.008*
Q9: Prefer to wait until others in online group have begun the discussion	2.83	1.20	11	4.8	13.92	.008*
Q10: Prefer to prepare ahead of time before attending online discussion	4.33	0.70	13	4.8	32.25	.000*
Q11: Sometimes feel inadequate in online discussion groups	2.42	1.10	12	4.8	14.75	.005*
Q12: Quit contributing when I feel inadequately prepared	2.33	1.17	12	4.8	14.75	.005*
Q13: It bothers me when group participants are not contributing	4.33	0.87	13	4.8	23.50	.000*

* p < .05

Overall, students agreed they were more at ease with prior preparation and felt inadequate if not prepared when participating in online discussion forums.

Type of Interests Associated With Discussion Issues in Online Discussions

The fourth category grouped items 14 - 18 into a category that examined the interests associated with discussion issues of online discussion forums, e.g., discussing the group project with others, discussing the theoretical framework with other students, etc. The results are summarized in Table 4.

Table 4. Goodness-0f-Fit Chi-Square Procedure to Determine If Type of Interests Associated With Discussion Issues Affects the Quality of Online Discussion Forums (N = 24, df = 4)

Variable	M	SD	observed n	expected n	X^2	Sig.
Q14: Prefer to discuss group project with others in the online discussion	3.83	0.82	14	4.8	24.33	.000*
Q15: Prefer to discuss theoretical framework with others	3.13	0.45	19	4.8	54.75	.000*
Q16: Prefer to discuss issues I have previously researched compared to topics of which I am unfamiliar	3.79	0.78	15	4.8	28.92	.000*
Q17: Prefer discussing issues concerning detailed or technical components	4.00	0.72	15	4.8	30.17	.000*
Q18: Prefer discussing any topic as long as I am learning additional knowledge	2.79	0.88	11	4.8	16.83	.002*

* $p < .05$

Students felt the quality of online discussion and the level of learning was better when discussing theoretical frameworks, detailed or technical components, and previously researched topics with the online group of students.

Preference for Group Partners in Online Discussions

The fifth category grouped items 19 - 21 into a category that examined the preference for group partners [partners who are members of the study group] associated with discussion issues of online discussion forums, e.g., work with partners having good knowledge, work with a partner who is a good leader, etc. The results are summarized in Table 5.

Table 5. Goodness-0f-Fit Chi-Square Procedure to Determine If Preference for Group Partners Affects the Quality of Online Discussion Forums (N = 24, df = 4)

Variable	M	SD	observed n	expected n	X^2	Sig.
Q19: Prefer partners with good knowledge of the topic for discussion	2.75	0.90	10	4.8	16.00	.003*
Q20: Prefer a good leader as a partner	3.38	0.88	12	4.8	17.25	.002*
Q21: Prefer to work by myself because I have had bad partners in the past	2.71	1.33	12	4.8	13.92	.008*

* $p < .05$

Students were almost evenly divided as to their preference for group partners in online discussion. About half of the students preferred partners who were good leaders or who had good knowledge of the topic for

discussion. The other half preferred to work by themselves because of previous bad experiences with online discussion partners.

Strategies for Preparation in Online Discussions

The sixth category grouped items 22 - 26 into a category that examined the strategies for preparation that affect the quality of online discussion forums, e.g., students prefer to study in advance of online discussions, consult with the instructor prior to online discussion, etc.,. The results are summarized in Table 6.

Table 6. Goodness-0f-Fit Chi-Square Procedure to Determine the Affects of Prior Preparation on the Quality of Online Discussion Forums (N = 24, df = 4)

Variable	M	SD	observed n	expected n	X^2	Sig.
Q22: Prefer to study in advance before attending the online discussion	3.88	0.99	13	4.8	22.25	.000*
Q23: Prefer to contact the instructor before the discussion	4.17	0.92	10	4.8	19.33	.001*
Q24: Prefer to do additional research on the subject before an online discussion	4.08	0.72	15	4.8	31.42	.000*
Q25: Prefer to contact other students before online discussion	3.36	1.01	12	4.8	16.42	.003*
Q26: Prefer to read the material several times before online discussion	3.75	0.94	14	4.8	24.33	.000*

* $p < .05$

In all instances, students preferred to study in advance, contact instructor or other students, and prepare by reading the material ahead of time in online discussion forums.

Discussion and conclusions

These results indicate students associated the quality of online discussions with successful project completion and knowledge construction. The students also indicated their critical thinking skills were enhanced when working collaboratively and found the achievement of course goals easier and more efficient. There didn't seem to be a clear indicator in terms of group size preference. Student responses were split in their preferences for small groups, entire class groups, and no preference. Future research that examines group size in relation to the task might provide further insight into student preferences related to group size.

Students also indicated they preferred advanced preparation when participating in online discussions, which may explain why they didn't have a sense of inadequacy when participating in discussions online. In preparing for discussions, students preferred to study in advance, contact the instructor or their peers, and read the material ahead of time. The preference for preparation may also be related to their being bothered by those who come to the online discussions unprepared. This advanced ability to research a topic also seemed to stimulate a more confident student online discussion, particularly with topics with which they were not familiar. The students also indicated a preference to discuss group projects and detailed or technical components of these projects. Overall, students were divided on their preference for group work. Approximately half of the students preferred partners who were good leaders while the other half, due to past negative experiences, preferred to work by themselves. Previous research has indicated

students are inclined to be more active when working collaboratively (Johnson & Johnson, 1994). The growing number of online courses offered at postsecondary institutions should prompt educators to investigate the factors that will enhance the collaborative online environment and consequently enhance their students' online learning environment. This study attempted to further interpret previous quantitative findings using a naturalistic approach in describing online collaborative learning environments. It was an important complement to the existing literature in collaborative learning. Perhaps the most important implication of this work is to inform online learning environment designers to be sensitive and cognizant of *needs* (not only expectations) of the students as they create future distance education experiences. As designers and educational scholars, we must also understand conflict is often produced in a system which rewards individual effort when embedded within a collaborative learning context.

What does this mean for instructional designers who wish to take the findings from this study and apply them to the creation of online learning environments? The primary concept to take from this study is to recognize and deal with conflict inherent in the diverse learners themselves enrolled in a collaborative online learning environment. These authors believe it is possible to create more flexible online learning environments, though we recognize this innovation may take more time.

This study attempted to further interpret previous quantitative findings using a naturalistic approach in describing online collaborative learning environments. It was an important complement to the existing literature in collaborative learning. Perhaps the most important implication of this work is to inform online learning environment designers to be sensitive and cognizant of *needs* (not only expectations) of the students as they create future distance education experiences. As designers and educational scholars, we must also understand conflict is often produced in a system which rewards individual effort when embedded within a collaborative learning context.

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