Utilizing Peer Moderating in Online Discussions: Addressing the Controversy between Teacher Moderation and Nonmoderation

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This study focused on the effects of peer moderation on meaningful interactions in online discussions. A meaningful interaction was defined as a message relating to a discussion topic, responding to a previous message, and adding substance to the discussion. A randomized-subject, posttest-only control group design was used to test the first hypothesis, that a peer-moderated online discussion forum would contain more posts responding to previous comments than a nonmoderated forum, and the second hypothesis, that a peer-moderated online discussion forum would contain more substantive responses enriching the conversation than a nonmoderated forum. Both hypotheses were supported. Results showed that students responded to messages more actively and engaged in more in-depth discussions when discussions were moderated by a peer.

The effect of moderating in online discussions has been a subject of persistent debate. For instance, Anderson et al. (2001) stated that active involvement of a teacher was critical to maintaining the interest and motivation of students in computer conferencing. Russo and Benson (2005) reported that student perceptions of instructor presence were significantly correlated with student learning satisfaction. Many other studies supported the view that a moderator’s role, typically filled by the instructor, was an essential factor for successful online interaction (see Ahern, Peck, and Laycock 1992; Hara, Bonk, and Angeli 2000; Howell-Richardson and Mellar 1996; Zhu 1998). Contrary to the previously mentioned studies, some other studies supported the value of nonmoderated online discussions. Galanouli and Collins (2000) reported that their students successfully managed their online discussions without
teacher moderation. Rodrigues (1999) observed that even if the students indicated they wanted the teacher’s participation in the discussion, they were able to carry out the discussion on their own very well. According to McConnell (1994), moderation is not necessary if participants share a common purpose in their online discussion.

Both approaches have drawbacks. It is true that a positive learning environment can be created and maintained when the teacher actively guides students toward a higher level of learning, challenges assumptions, and corrects misconceptions (Anderson et al. 2001). However, teacher moderation incurs the risk that the discussion might become instructor-centered (Light et al. 2000; Nickel 2002). McConnell (1994) found that the power and authority that the instructor carried could make students read more into the instructor’s interventions than the instructor intended. Students may feel intimidated by the presence of the instructor, and consequently they may feel less confident about expressing their ideas (Pearson 1999). In addition, managing many discussion groups in a large class can be overwhelming for the teacher. Omitting moderation has some drawbacks as well. It has been reported that when the engagement of the moderator was minimal, students were frequently off task, there was a sense of confusion due to the lack of guidance, and offensive messages were posted freely (Light et al. 2000).

This study examined the effectiveness of peer moderation as an alternative to the modes of teacher moderation and nonmoderation. The strategy of appointing students to moderate online discussions can provide educational benefits that neither teacher moderation nor nonmoderation offers. According to Hara et al. (2000), Tagg (1994), and Veen, Lam, and Taconis (1998), student moderators can lead discussions more effectively and foster greater student comprehension than the instructor because student moderators better understand their peers’ ways of thinking. Leh (2002) noted that when peer moderators facilitated online discussions, students felt that their conversations became more active. Poole (2000) reported that the use of student moderators contributed to promoting a sense of community among students. In their study comparing peer moderators with teaching assistants, Cifuentes and Murphy (1997) found that peer moderators collaborated more effectively to brainstorm discussion topics. Given these findings, peer moderation has the potential to elicit more meaningful interaction.

For the purpose of the study, meaningful interaction was defined as a message that (a) pertained to a discussion topic, (b) responded to a question or an idea expressed in a previous statement or invites a
comment, and (c) enriched the conversation by adding substance to the discussion. Using this definition, two hypotheses were tested concerning response and substance, respectively. The first hypothesis was that when considering messages relating to the discussion topic, a peer-moderated online discussion forum would contain more posts responding to previous comments than a nonmoderated forum. The second hypothesis was that when considering messages relating to the discussion topic, a peer-moderated online discussion forum would contain more substantive responses enriching the conversation than a nonmoderated forum.

Method

Data Collection Procedures

Population and sample. The target population of this study was a class of undergraduate students participating in threaded discussions. The sample consisted of 174 undergraduate students enrolled in an introductory chemistry course at a Western university. The class included first-year students (49%), second-year students (36%), and upper-level undergraduates (15%). Approximately 61% of the participants were in the 18–20 age range and 33% were in the 21–23 age range. Approximately 58% of the students were female. Both the large sample size and the differences in student status were considered likely to increase the generalizability of the research findings.

Grouping. The 166 participants, not including eight volunteer moderators, were randomly distributed into a peer-moderated experimental group and a nonmoderated control group. Each group, consisting of 83 discussants, respectively, was again randomly divided into eight smaller discussion groups of 10–11 students. It seems that there is no consensus in the literature on an optimal discussion group size. Collison et al. (2000) reported that 8–10 members worked well. Piezon and Donaldson (2005) stated that groups larger than six could be ineffective. Cifuentes and Murphy (1997) reported that the most substantial discussions took place when a discussion group consisted of 13–15 participants. Palloff and Pratt (1999) noted that as many as 20 or more could have a successful experience, but that the nature of assignments or activities should be considered. In this research, 10–11 students were assigned to each discussion group in order to avoid an excessive number of ideas.
Discussion requirements and topics. The students were required to participate in online discussions for four weeks. They were asked to post at least one message per week. Discussion topics were assigned by the instructor. For the first week (Week One), the students were asked to post their personal introductions as a trial run for learning to use the discussion forum. For the following three weeks, the students discussed what possible problems air quality (Week Two), stratospheric ozone depletion (Week Three), and global warming (Week Four) could pose.

Grading. Eastmond and Ziegahn (1995), Khan (2005), and Wells (1992) indicated that students would not participate actively in discussions unless participation was reflected in their grades. To motivate the students to participate, the instructor assigned 20% of the students’ final grade points to their online discussions. In addition, to encourage participation, the instructor provided the students with a handout that specified discussion expectations and grading. Moore (2002) and Teles, Gillies, and Ashton (2001) noted that participation was closely related to course design, and that providing explicit, detailed expectations would encourage students to participate more actively in dialogue.

Moderators. Eight students volunteered to serve as moderators. They were informed that the weight of grades assigned for moderation would be 30% of their final grades. Each moderator was randomly assigned to a group. The discussants knew that their moderators were their peers, even though they did not know the moderators personally due to the large size of the class. The moderators introduced themselves through their first posting at the beginning of the forum.

Based on strategies for online moderators suggested by Collison et al. (2000), the student moderators were instructed to perform the following six tasks geared toward building a social community and supporting the intellectual content of the community: (a) create a friendly environment, (b) encourage participation by reminding participants of the course expectations, (c) encourage sharing of ideas, (d) start each week’s discussion by clarifying the topic and discussion schedule, (e) prompt participants to pursue their ideas, and (f) end each week’s discussion by summarizing the shared ideas. The moderators received one hour of training covering what their tasks would be, how they could perform the tasks effectively, and how their performance would be evaluated. In addition, the moderators were provided a moderator’s guide summarizing the content of the training. The instructor evaluated each moderator’s performance on
the six tasks and provided feedback each week. The maximum that the moderator could earn each week was 25 points.

For the purpose of the study and to ensure the presence of peer moderation in the moderated groups, it was planned that if the moderator’s performance points were less than 12, his or her group’s discussions during the week would be excluded from the data. All of the moderators performed their required tasks well. Collison et al. (2000) and Heckman and Annabi (2005) indicated that spontaneous moderating might occur among discussants. To ensure the absence of peer moderation in the nonmoderated groups, it was monitored whether any of the six activities defined above occurred voluntarily in the nonmoderated discussion groups. No moderation activity was observed in the control group.

**Research Design**

The research approach was a randomized-subject, posttest-only control group design. The structure of this research design can be visualized as shown in Table 1.

A meaningful interaction, the dependent variable, was defined as a message (a) relating to a discussion topic, (b) responding to a previous statement or inviting a comment, and (c) adding substance to the discussion. Student messages meeting these criteria were identified through a data reduction process consisting of three essential steps (Seo, forthcoming). This coding system was designed to select messages meeting each of the criteria at each step.

First, to select student messages meeting the first criterion, that a statement must concern the discussion topic, all the student messages were coded as either “extraneous statement” or “pertinent statement.” Messages not related to the discussion topic were categorized as extraneous statement and discounted from the data. Messages addressing the discussion topic were coded as pertinent statement, and only messages passing the first criterion were advanced to the next coding phase.

Second, to identify messages meeting the second criterion, that a statement must respond to a previous comment, the investigator

<table>
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<th>Group</th>
<th>Independent Variable</th>
<th>Dependent Variable</th>
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<tr>
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<td>Meaningful interaction</td>
</tr>
<tr>
<td>Control (Random)</td>
<td>—</td>
<td>Meaningful interaction</td>
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recategorized all the pertinent messages as “responding statement,” “independent statement,” or “inviting statement.” The first two categories were based on an analysis model suggested by Henri (1992). A statement directly or indirectly responding to the previous message was coded as responding statement. A message that was related to the topic but did not refer to any previous message was categorized as independent statement. The investigator extended Henri’s model by adding another category, inviting statement, to count messages that were independent but that encouraged others’ responses. The messages categorized as independent statement were discounted from the data. The statements coded as responding statement or inviting statement, meeting the second criterion, were moved up to the last coding step for further analysis.

Finally, the third coding step was designed to determine whether a message added substance to the conversation. For this purpose, Henri’s (1992) method to distinguish a surface treatment of information from an in-depth treatment of information was adopted. If the student offered an appropriate interpretation, inference, or justification in describing his or her views, the message was treated as a “substantive statement.” A comment that did not add such an element was treated as a “nonsubstantive statement.” Messages identified as substantive statements in this coding system are truly interactive ones that can be defined as meaningful, meeting all the three criteria.

To enhance the reliability of data coding, any identifying information was removed from the data by a hired worker before the investigator started the process of data coding. Student messages and moderator messages were separated by the worker so that the investigator did not know which message was from which group. In addition, to enhance the accuracy of data recording and interpretation, Cohen’s kappa was computed as an index of interrater reliability. A set of ninety messages was randomly selected and coded by a second coder. It was found that the obtained kappa values were satisfactory at all the coding steps. At the first coding step, the kappa value was 1.00, indicating complete agreement between the two coders. At the second and third coding steps, the kappa values were .94 and .84, respectively.

Results and Discussion

Effects of Peer Moderation on Response Rate

For the discussion period of three weeks, the peer-moderated students \((n = 83)\) posted a total of 167 messages, an average of 2.01 per student.
The nonmoderated students \((n = 83)\) posted a total of 159 comments, an average of 1.92 per student. A total of 326 posts were analyzed in this study.

To test the first hypothesis, a response ratio was calculated for each discussion group, based on Nickel’s (2002) measuring method. The messages categorized as responding statement or inviting statement at the second coding step were used to calculate a response ratio for each discussion group by dividing the number of messages coded across the categories by the number of total posts. The response ratio was compared between the peer-moderated group and the nonmoderated group.

**Descriptive results.** A categorical mean comparison revealed that the peer-moderated groups submitted responding statements most frequently (50.81% for Week Two, 60.43% for Week Three, and 53.32% for Week Four) and inviting statements least frequently (17.15%, 12.17%, and 21.02%, respectively). On the other hand, the nonmoderated group posted independent comments most frequently (70.05%, 56.56%, and 58.32%, respectively) and inviting statements least frequently (6.16%, 7.12%, and 10.14%, respectively). An interesting fact is that both the peer-moderated and nonmoderated groups rarely invited other students’ responses. These low rates of inviting statements can be explained by the cultural communication patterns described by Hofstede (1986, 1997) and Hall and Hall (1989). According to the researchers, people in the Western culture, based on individualism, seek to express their own intentions and positions rather than to build a consensus with other people. Actually, many of the student messages in this study tended to be conclusive, not encouraging further discussion: “It helps out the wildlife, plantlife, and us. Anyway those are my feelings on this discussion”; “I strongly doubt that anyone is willing to give up their cars. End of story.”

A comparison of mean response ratios revealed that the peer-moderated group responded to previous messages more actively than the nonmoderated group throughout the discussion weeks. The peer-moderated group had mean response ratios of 67.96%, 72.60%, and 74.34%, during Week Two, Week Three, and Week Four, respectively, whereas the nonmoderated group had mean response ratios of 28.80%, 43.44%, and 40.11%, respectively.

**Analysis of variance (ANOVA) results.** To determine whether the differences in the mean response ratios were statistically significant, a repeated measures ANOVA was performed. The within-subject tests
Table 2. ANOVA Results on Response Ratios

<table>
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<tr>
<th>Source</th>
<th>Type 3 Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial $\eta^2$</th>
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Note. ANOVA = analysis of variance; Sig. = significance.

found there was no difference between observations from Week Two through Week Four. As shown in Table 2, the between-group tests showed a significant difference ($p < .01$) between the peer-moderated group and the nonmoderated group for Week Two through Week Four ($\text{partial } \eta^2 = .765$). Therefore, the first hypothesis was supported.

**Effects of Peer Moderation on Substance Rate**

To test the second hypothesis, that a peer-moderated group would post more substantive comments than a nonmoderated group, a substance ratio was calculated for each discussion group. The messages identified as substantive statements at the last coding phase were used to calculate a substance ratio by dividing the number of substantive messages by the number of total messages. The substance ratio was then statistically compared between the peer-moderated group and the nonmoderated group.

**Descriptive results.** When comparing substance ratios, the means for the peer-moderated group were higher than the means for the nonmoderated group for the entire discussion period. The peer-moderated group had mean substance ratios of 48.28%, 64.03%, and 69.91%, for Week Two, Week Three, and Week Four, respectively, whereas the nonmoderated group had means of 16.56%, 33.67%, and 25.11%. The line chart in Figure 1 shows how the substance ratios changed over time. Whereas the peer-moderated group showed a consistent increase as time passed, the nonmoderated group did not make steady progress. The increased substance ratio in the middle week did not hold up through the last week.

**ANOVA results.** A repeated measures ANOVA was performed to determine whether the differences in the mean substance ratios were statistically significant. The within-subject tests found there was no difference between observations from Week Two through Week Four. As shown in Table 3, the between-group tests showed a significant difference
Figure 1. Mean Comparison of Substance Ratios in a Line Chart.

Table 3. ANOVA Results on Substance Ratios

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<tr>
<th>Source</th>
<th>Type 3 Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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<tr>
<td>Error</td>
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</table>

Note. ANOVA = analysis of variance; Sig. = significance.

($p < .01$) between the peer-moderation group and the nonmoderated group for Week Two through Week Four (partial $\eta^2 = .754$). Therefore, the second hypothesis was supported.

The substantive messages were further analyzed to explore the manner in which the substantive statements added depth to the discussion. The investigator examined the content of the messages using Jeong’s (2003) event categories as a framework. The messages contributed to enriching the conversation in ten different ways: (a) stating personal beliefs (e.g., “I don’t believe in fast health or anything else that is fast or easy”); (b) evaluating the previous argument (e.g., “The fact that the ocean is expanding due to expansive force of heat seems a little unlikely”); (c) presenting an example of the previous comment (e.g., “The example of London is very serious”); (d) describing personal experiences (e.g., “Another area of personal experience is when I lived in Bakersfield, we had continued problems with air quality”); (e) adding facts to the discussion (e.g., “When a car burns gas, it emits carbon dioxide”); (f) referring to resources (e.g., “I add from our book that the problem is particularly acute in America”); (g) predicting consequences (e.g., “If the rate of carbon dioxide continues to increase, then it will lead to a very unhealthy planet”); (h) posing questions (e.g., “Don’t you wonder how ozone is going to look in the next 100 years? Maybe better? Or worse? Something to think about”); (i)
identifying reasons (e.g., “Global warming is the biggest threat because it causes droughts and floods”); and (j) presenting solutions (e.g., “Air pollution can be fixed through car pool and stricter air laws”). The occurrence of these categories was compared between the peer-moderated and nonmoderated groups as shown in Figure 2.

Results showed that the peer-moderated group tended to add substance with more objective information, such as facts and literature references,

Figure 2. Substance Types in Weeks Two, Three, and Four. Be = belief; Eval = evaluation; Ex = example; Exp = experience; Fact = fact; Ref = reference; Pre = prediction; Que = question; Rea = reason; Sol = solution.
whereas the nonmoderated group used more subjective information, such as personal experience and personal beliefs. As shown in Figure 2, the fact and reference categories were greater in the peer-moderated group than in the nonmoderated group. On the other hand, in the nonmoderated group, the experience and belief categories were the greater ones, whereas the percentages of those subjective categories were low in the peer-moderated group. The presence of the moderator overseeing the discussion may have led the participants to support their views more formally by using reliable, well-known references: “When a car burns gas, it emits carbon dioxide”; “I add from our book that the problem is particularly acute in America.” Without such a facilitating individual, the nonmoderated group appeared to make more personal and informal comments: “I don’t believe in fast health or anything else that is fast or easy”; “Another area of personal experience is when I lived in Bakersfield, we had continued problems with air quality.” In addition, the solution category in the peer-moderated group was notably greater than that in the nonmoderated group: “Air pollution can be fixed through car pool and stricter air laws.” Apparently, the presence of the moderator led the students to focus more frequently on generating solutions.

The results of this study contradict some earlier studies that proposed unmediated online discussions. Galanouli and Collins (2000) and Rodrigues (1999) reported that their students were able to manage their online discussions on their own without any intervention. As McConnell (1994) argued, moderation may not be an essential element in online discussions when all participants share a clear sense of purpose. In reality, however, many students who participate in online discussions do not engage in social construction of knowledge and often fail to exchange in-depth ideas (see Angeli, Valanides, and Bonk 2003; Card and Horton 2000; Edens 2000; Henri 1995; Moran 1991; Murphy 2004). The results of this study indicate that peer moderation can help students achieve their instructional goals more effectively and more efficiently by providing them with guidance for sharing ideas in a constructive, meaningful way.

Conclusion

The results of this study indicated that peer moderation was effective in eliciting more meaningful interaction. This study involved some limitations. First, using a convenience sample limited generalizability. In addition, the research design did not allow the investigator to determine what factors of peer moderation contributed to these results. To provide
more complete insight into these findings, further research should investigate which factors contribute to the effectiveness of peer moderation and what effect students perceive peer moderators have on their interaction patterns. For instance, Anderson et al. (2001) noted that a teacher moderator supported student participation by modeling appropriate behaviors and by acknowledging or reinforcing positive student postings. Can the effect of modeling be a factor in peer-moderated discussions? This qualitative component can deepen our understanding of the effectiveness of peer moderation.

This study raises some further questions about peer moderation. The peer moderator role in synchronous computer-mediated communication systems such as chatting should be examined. It is true that asynchronous communication provides many instructional benefits; it eliminates time and place dependence and encourages more in-depth reflection and critical thinking by providing students with enough time to think over their messages before posting them (see Brouwer 1996; DeBard and Guidera 1999; Dehler and Porras-Hernandez 1998; Hathorn and Ingram 2002; Huang 2000; Liaw and Huang 2000; McComb 1994; Nisan-Nelson 1999; Smith, Ferguson, and Caris 2002; Sullivan 2000; Warschauer 1997). However, this very asynchronous characteristic can be frustrating to participants expecting instant responses. Therefore, it would be interesting to investigate how the moderator role is different or similar between asynchronous and synchronous computer-mediated communication systems and how a synchronous setting affects the moderator’s performance.

Subsequent research should also determine tasks of peer moderators and identify effective methods of training and assisting them. There have been some studies on the moderator role (see Berge 1995; Collison et al. 2000; Mason 1991). These studies, however, did not distinguish between a teacher moderator and a peer moderator. Does a peer moderator carry the same voice as a teacher moderator? Should a peer moderator perform different duties and use different approaches in facilitating discussions? According to Nickel (2002), students perceived an instructor and a teaching assistant differently and reacted differently. This finding implies that students may have different expectations toward a peer moderator. Therefore, researchers should investigate how to determine a peer moderator’s tasks and how to train him or her properly in techniques required to perform these tasks. Seeking answers to the questions raised here can help to implement successful student interaction in online discussions.
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References


Eastmond, D. V., and L. Ziegahn. 1995. Instructional design for the online classroom. In *Computer-mediated communication and the online*


Moore, M. G. 2002. What does research say about the learners using computer-mediated communication in distance learning? *The American Journal of Distance Education* 16 (2):61–64.


