Facilitating Students' Critical Thinking in Online Discussion: An Instructor's Experience

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Abstract

This paper reported using the practical inquiry model as discourse guide to facilitate students' critical thinking in online discussion. It was found that almost all the postings of the students who had no knowledge of the inquiry model fell into exploration phase except three postings in triggering events phase and two in integration phase. In comparison, the postings of the students who used the model as the guide included more instances of integration than the postings of those who did not know about the model. No instance in resolution phase was found. The findings indicated that providing students inquiry model raised their awareness of critical thinking and helped them intentionally engage in reflection and higher-order thinking when responding online.

Introduction

Asynchronous online discussion is an important strategy for communication in distance education. It allows students to discuss course topics outside the classroom at their convenience. Most important, text-based communication and asynchronous environment encourage reflective learning, in-depth thinking and meaningful processing of information (Black, 2005; Dixson, Kuhlhorst & Reiff, 2006; Gilbert & Dabbagh, 2005; Hara, Bonk & Angeli, 2000; Lang, 2000).

Although online discussion has the potential to foster higher level of thinking, the actual quality of discussion was not always satisfactory and students' cognitive engagement has become a major concern. For example, after analyzing students' asynchronous communication on WebCT, McLoughlin and Luca (2000) found that most of the postings consisted of "comparing and sharing information", with "little evidence of construction of new knowledge, critical analysis of peer ideas or instances of negotiation" (What Types of Cognitive Interactions Did We Find section). Using Bloom's Taxonomy of Learning as rubric to evaluate students' thinking level in online discussion in a graduate course, Christopher, Thomas and Tallent-Runnels (2004) found that medium level of thinking was evidenced in the majority of students' responses. Angeli, Valanides and Bonk (2003) examined undergraduate student teachers' communication in case-based instruction using asynchronous web-based conferencing tool. The results showed that students' interactions primarily focused on sharing personal experiences and offering personal opinions without reasoning. Little evidence of in-depth discussion and critical thinking was found.

Promoting students' critical thinking is a principal issue in online discussion (Stein, et al., 2007). According to Lang (2000), critical thinking is

a dialogical process that produces an increasingly sound, well-grounded, and valid understanding of a topic of issue, involves participants developing and examining their ideas as fully as possible, presenting them clearly and credibly to others, and examining and challenging the ideas of others. In other words, critical thinking happens in good discussions" (p. 20).

Thus, interaction online needs to be structured to go beyond simple exchange of information and influence communication with the intent to foster higher level of cognitive thinking (Garrison & Cleveland-Innes, 2005).

Some researchers examined the effectiveness of strategies of improving the quality of online discussion and facilitating students' cognitive presence. Nussbaum et al. (2002) found that using note starters as scaffolds can encourage students to think deeply about a topic and express different viewpoints instead of simply repeating what other students' opinions. Gilbert and Dabbagh (2005) examined the impact of facilitator guideline, posting protocol and online discussion evaluation rubric on students' meaningful discourse in asynchronous online discussion. They reported that evaluation criteria, specifically timely and even discussion contributions, had positive influence on students' meaningful discourse. Swan, Schenker, Arnold and Kuo (2007) also found that students responded more often to others and discussed in greater depth after they were informed of evaluation criteria of online behaviors. Ertmer et al. (2007) investigated the use of peer feedback in increasing the quality of students' online discussion. They suggested that requiring students to provide feedback to one another may help to maintain the quality level of postings that has been reached. Some other researchers examined peer teams (Rourke & Anderson, 2002) and discursive moves (Topper, 2005) in facilitating students' higher order thinking in online discussion.

One common problem in online discussion is that students do not know what "good input" is (Klemm, 2000, p. 336), which may lead to shallow and trivial responses. To cultivate students' critical thinking, it may be helpful to have them be aware of the characteristics of accepted responses so that they will deliberately think and reflect in critical way when responding online. Garison, Anderson and Archer (2000, 2001) constructed a practical inquiry model that reflects the critical thinking process in asynchronous text-based computer-mediated communication. According to this model, critical inquiry is presented in a sequence of four phases, which are triggering event, exploration, integration and resolution. In the phase of triggering event, students communicate a dilemma or a problem from an experience. In exploration phase, students brainstorm, search for clarification and exchange information. Students' inquiry in integration phase is characterized by integrating knowledge and information into a concept and creating meaning from the ideas generated in the phase of exploration. In the phase of resolution, students test and implement solution to the problem or issue through real world application.

This study intended to examine whether introducing this inquiry model to students as a guide of online postings can facilitate students' critical thinking. It was hypothesized that the postings of students who were aware of the four phases of critical inquiry would demonstrate more evidence of critical thinking than the postings of students who had no knowledge about this model.

Methodology

This study was conducted with students who enrolled in a graduate level educational technology course in fall 2007 and spring 2008. In this class, students learn to use computer

technology in elementary education. Although this course was not taught online, a few class sessions were delivered online via Blackboard in which students were required to participate in online discussions on technology issues in school.

Fall 2007, a total of 8 students enrolled in this class. Before online sessions started, an online activity protocol was given to students. The protocol specified how to access the discussion forum, the deadlines of participation and the minimum number of postings. Also, it suggested that students make substantive comments, propose different perspectives and pull in information from other resources when posting messages.

Spring 2008, 14 students enrolled in this class. Again, the online activity protocol was given to students to help them know how to participate in online discussion. In addition, Garrison et al. (2001) practical inquiry model was introduced to students as a guide (Table 1) to direct their writing when posting responses. Unlike online activity in fall 2007, critical analysis and thinking were emphasized in online discussion in spring 2008.

Table 1

Posting Guide (Adapted from the guidelines in Garrison et al., 2001)

Please don't take online discussion simply as online chat. All your postings should be closely related to the discussion topic in each discussion thread. Critical analysis and higher order thinking are needed. Comments should be substantive and help move the discussion forward. Your postings should demonstrate your cognitive presence in the following 4 categories:

1. Trigging events
    Posting has the following characteristics
    (a) Presents background information that culminates in a question (Recognition of a problem)
    (b) Asks questions to address puzzlement
    (c) Takes discussion in new direction

2. Exploration
    Posting has the following characteristics
    (a) Presents many different ideas/themes, some could be unsubstantiated contradictions of previous ideas (Divergence)
    (b) Exchanges information including personal narratives/descriptions/facts (not used as evidence to support a conclusion)
    (c) Adds to established points but does not systematically defend/justify/develop addition (Brainstorming)
    (d) Being explicitly characterized as exploration

3. Integration
    Posting has the following characteristics
    (a) Reference to previous message followed by substantiated agreement, e.g., "I agree because…." (Convergence)
    (b) Builds on or adds to other's ideas (Convergence)
    (c) Provides justified, developed, defensible, yet tentative hypotheses
    (d) Connecting ideas or synthesizing ideas by integrating information from various sources – textbooks, articles, personal experience.

(e) Creates solution

4. Resolution
   Posting has the following characteristics
   (a) Various application to real world
   (b) Testing solutions
   (c) Defending solutions

In each discussion thread, the instructor first posted a question based on the assigned reading materials; the students then posted their responses to the question and meanwhile made comments on other students' postings. In this study, students' postings in one discussion thread in fall 2007 (Thread A) and one thread in spring 2008 (Thread B) were analyzed to answer the research question. The reason for such data selection is that this two threads share the same discussion topic and the same discussion question posted by the instructor based on the same readings. The instructor's question is, 'Read the attached article about the effect of media on learning. At the end, the authors proposed that "it is time to reframe the original debate to ask, not if, but how media affects learning.' This article was published in 2005. Today, if you wanted to join in this debate, what would be your arguments and ground?" After initiating the discussion, the instructor did not actively participate in online discussion. When necessary, the instructor asked students to clarify their comments. In general, most of time the instructor played the role of observer online and did not interfere students' discussion in this two threads.

Content analysis was used to examine students' critical thinking. Data was analyzed according to the coding template of the model (Garrison et al., 2001). Since the evidence of students' critical thinking was the interests in this study, each posted message was coded to find out the evidence of any phase of critical inquiry. When a message contained evidence of more than one phase, it was coded as multiple phases. Therefore, the total number of instances of all four phases may be larger than the number of messages. The comparison of the postings in the two threads helped to examine whether letting students know the expected discourse by presenting them the inquiry model can facilitate their critical thinking.

Results and Discussions

A total of 38 messages posted by the students in Thread A and 48 messages posted by the students in Thread B were analyzed and coded. Table 2 showed the number of and percentage of instances that fell into each of the phases of the inquiry model.

Table 2

Phases of Inquiry Model by Thread

Two Threads	Total Instances		Triggering Event		Exploration		Integration		Resolution	
	N	%	n	%	n	%	n	%	n	%
Thread A (2007 fall)	38	100	3	8	33	87	2	5	0	0
Thread B (2008 spring)	68	100	15	22	37	54	16	24	0	0

Overall, in each discussion thread, more than half of the instances fell in exploration phase. Some researchers (Garrison et al., 2001; Pawan, Paulus, Yalcin, & Chang, 2003) reported similar findings. According to Garrison et al. (2001), it was not surprising that students' discourse focused more on exploration phase, because "this phase is a brainstorming phase whereby people feel free to share their insights and contribute relevant information"(p. 19). In this study, the instructor's question asked students to offer their arguments and grounds when discussing the effects of media on learning. It was not unexpected that most of time the students expressed their perceptions and thoughts in dialogical writing.

In comparison, there were more instances of critical thinking in Thread B ($N = 68$) than that in Thread A ($N = 38$). In Thread A, each coded message fell into a single phase, however, in Thread B, the majority of the messages were coded as multiple phases. Take the following two messages as examples. Example 1, Linda's message in Thread A, was coded as exploration phase. Example 2, Lora's message posted in Thread B, was coded as 3 phases: triggering event, exploration and integration.

Example 1: After reading the article, I think I am in favor of Kozma, especially when he said that media increased motivation and time on a task, which in turn increases learning outcomes. That statement sold me! I believe that media does increase motivation within students, especially when it comes to computers. If I have students do a project using the paper resource from a reference section, or the same resource on the computer, I almost always get better answers and results from the computer lesson. The graphics and sounds make kids sit and listen. The ability to "play" while learning is a big plus for students with ADD or ADHD, or even kids with disabilities. Although it takes time to teach students how to properly use the computer, whether they are on the Internet or not, it is to anyone's advantage to do so. Computers offer so much in education. I don't know why anyone would want to prohibit a student from using one.[Exploration phase]

Example 2: I feel that media affects learning by providing ways for the teacher's message to be given to students in an interesting way. It states in the article that both Clark and Kozma agree that information can be taught using many different methods and that is true. However, many of my students would learn more easily using, for example, a PowerPoint that includes video, audio, and visual information, as opposed to simply reading a textbook. Also, student's motivation grows significantly when technology is used. My students have begun using blogging as a method for discussing literature. Although these discussions can be done in person, or through written journals, I find that

the discussions are more genuine and enjoyed more by students through the blogging medium. Because motivation is increased, learning in increased.[Integration phase] Having said this, I do want to add that media can affect learning in negative ways if the teacher does not choose that media carefully.[Triggering event phase] Using technology just for the sake of technology is generally not going to result in improved student learning. Teachers need to be aware of what it is that they want students to learn, and then decide which methods will best allow students to achieve this learning. Sometimes the best way will involve newer types of technology, and sometimes old-fashioned methods will work best, depending on a variety of things, such as time available and technology available.[Exploration phase]

In Lora's post, she first gave her own argument. When defending her argument, she connected the viewpoint presented in reading to her own teaching experience and examined it against her experience. Then, Lora took her discussion in a new direction by bringing up the issue of possible negative effects of media on learning resulted from inappropriate use. Along this direction, she explored this issue by presenting her thoughts and suggestions. In example 1, Linda stated her standpoint and then followed up with her experience. Her discourse affirmed the established points but did not develop addition. Therefore, Linda's message stayed in exploration phase.

That more instances were found in Thread B than Thread A indicated that providing students inquiry model as a posting guide raised their awareness of critical thinking. Students intentionally engaged in reflection and higher-order thinking when responding online. Their cognitive presence did not stay at one phase but move from one phase to another. Compared to the students in Thread A, the students in Thread B demonstrated more cognitive engagement and dynamic thinking in online learning, with the scaffolding of inquiry model.

It should be noted that the frequency of exploration instance was overwhelmingly high (87%) in Thread A, however, this index went down (54%) in Thread B. In Thread B, the second highest frequency of instance was integration. The instances of integration in Thread B were 8 times of that in Thread A. In addition, the instances of triggering events in Thread B were 5 times of that in Thread A. The change of distribution of instances in each phase implied that besides sharing information to explore the discussion topic, the students in Thread B also took more efforts to initiate inquiries in critical thinking process and go beyond exploration to higher level engagement than the students in Thread A.

Integration was more challenging than exploration. Garrison et al (2001) suggested that active teaching presence be needed to facilitate students' thinking to move to integration phase. In this study, however, the instructor did not play an active role in online discussion, which may have caused less frequent instances of integration. The increase of integration instances in Thread B indicated that using the inquiry model to guide students' posting was helpful to some extent. Future study can be conducted to examine whether more teaching presence in addition to the use of inquiry model as posting guide would have students demonstrate more critical thinking in integration phase.

In this study, no evidence of resolution was found in the two threads, which may be due to the question that initiated the discussion. The question asked students to talk about their arguments and grounds. It was not designed to engage students in applying and testing the ideas or solutions, which in turn, did not promote students' thinking in resolution phase. This suggested that to help students' cognitive activity progress to resolution stage, thought-provoking question needs to be generated to guide and facilitate the discourse toward higher order thinking

that involves practical application and problem solving. As King (1995) said, "the level of thinking that occurs is influenced by the level of questions asked. We can use particular questions to induce in students whatever specific thinking processes we wish" (p. 13).

Recommendation for Future Research

Since this study focused on the influence of the inquiry model itself on students' critical thinking, the instructor's influence was reduced to the minimum. Future study can further explore this topic by taking teaching presence as a variable to see how the moderation of instructor can facilitate students' thinking in each phase of critical inquiry.

This study made comparison between two groups of students who enrolled in the same course but in different semester. Future research can examine the difference of students in the same class but in different treatment. Specifically, the students can be divided into two small groups, with one group having the knowledge of the practical inquiry model as posting guide, while the other one not. Current web technologies, such as Blackboard, have the function of restricting access to discussion groups. Thus, instructor can monitor the discussion of two independent small groups that do not interact with each other. Hopefully, the results of such study design can provide instructor more information about the effects of the inquiry model.

Summary and Conclusion

Black (2005) suggested that "specific guideline, checklists and rubrics regarding acceptable responses" (p. 19) may facilitate thoughtful and reflective discussion online. In this study, the practical inquiry model developed by Garrison et al. (2001) was introduced to students to guide their online discourse in spring 2008. The comparison between the students' postings guided by the model with the postings without the guide of the model showed that using the model can facilitate students' critical thinking. When the students were aware of what discourse was expected, the responses were structured with intent. Unlike the postings in fall 2007 that the majority of messages reflected students' exploration, the students' postings in spring 2008 evidenced more critical thinking in triggering events and integration phases. Asynchronous online discussion can "provide opportunities and means for thoughtful exchange" (Lang, 2000, p. 21) because it allows students to read, to think, to reflect and formulate their thoughts in writing. In attempt to promote students' higher level of thinking in online discussion, instructor needs to let students' know that they are expected to provide meaningful input and learn the characteristic of such input. Then, the students will have a clear goal when shaping discussion. This study indicated that the practical inquiry model was effective in facilitating students' cognitive development in online discussion, even in the condition of low teaching presence.

The question that initiates discussion usually sets the tone of online discourse. In this study, it was not surprising to find that no message presented resolution thinking. This may be because the discussion question was not structured to make activity in resolution phase required. Therefore, designing discussion question is a critical step in design of online learning. It can influence the achievement of the level of critical thinking. Thus, instructor of online class should endeavor to set up critical inquiry environment for students by asking questions that can prompt the desired level of thinking.

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