Investigating students' level of critical thinking across instructional strategies in online discussions

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ABSTRACT

Online discussion questions, which reflect differing instructional strategies, can take many forms and it is important for designers and instructors to understand how the various strategies can impact students' critical thinking levels. For the purpose of the study three instructional strategies used in the development and implementation of online discussion questions were examined: a case-based discussion, a debate, and an open-ended (or topical) discussion. Using a mixed method approach, the study focused on critical thinking levels as described in the Community of Inquiry (CoI) framework and operationalized in the Practical Inquiry Model (PIM). The study investigated (1) participants' preferred instructional strategy and rationales for the selection, (2) the contribution of student background and demographic criteria to students' preferred instructional strategy, (3) the contribution of students' strategy preferences in predicting level of critical thinking, based on the Practical Inquiry Model's (PIM) indicators, and (4) comparisons of participants' critical thinking levels across instructional strategies. Implications for the design of online discussions that foster critical thinking are discussed.

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1. Introduction

Online discussions have been heralded as a powerful tool that can assist students in the construction of knowledge and serve as a scaffold that allows for multiple perspectives, negotiation of meaning, and an understanding of knowledge gaps a learner may possess (Land, Choi, & Ge, 2007; Haavind, 2006). Discussion questions are generally based on course or learning module objectives and are developed with a variety of purposes in mind: to promote recall of information, to encourage reflection, to diagnose learning difficulties, to focus attention, and to stimulate learners (Berge, 2002). However, online discussions, which reflect differing instructional strategies, can take many forms including article discussions, jigsaws, scenarios, critical incidents or problems, case studies, controversial topics, role play, and debate (Bonk & Dennen, 2007). As Bonk and Dennen (2007, p. 240) explain, it is important to "understand the various types of learning activities that can be effectively used to enhance the quality" of online learning.

The authors of this study were interested in gaining insight into how employing differing instructional strategies via online discussion questions engaged students in meaningful learning, and whether or not there was a connection between student's levels of critical thinking and the different instructional strategies. For the purpose of

this study three instructional strategies for the development and implementation of online discussions were examined — a debate, a case-based discussion, and an open-ended (or topical) discussion. The three strategies fall within different pedagogical activity subdivisions according to Bonk and Dennen's (2007) "Online Learning Pedagogical Activities by Thinking and Learning Model." Debates are classified as "structured controversy" and are collaborative learning activities; topical discussions are classified as creative thinking activities; and case-based discussions are classified as "online cases analyses" and are critical thinking activities.

2. Background

2.1. The instructional strategies

In asynchronous online discussions, the traditional instructor-led discussion format is shifted, and student participation is promoted by providing everyone an equal chance to contribute and learn from others at times of their own choosing. Relying on a constructivist learning approach, asynchronous online discussions encourage student interaction, analysis, and collaboration (Bonk & Dennen, 2007; Pilkington & Walker, 2003; Winiecki, 2003). However, whether one considers traditional face-to-face or online learning, different learning goals require different conditions for learning and an appropriate instructional strategy that includes all the necessary conditions to reach the goal (Merrill, 2000). This study examined students' perceptions of, and experiences with, online discussions

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utilizing three different learning strategies: a case study, a debate, and a topical discussion.

The object of the case-study approach is to help learners develop skills in dealing with real-life situations by analyzing a typical case, or, alternatively, to reach a better understanding of the general principles that are evoked by the case (Romiszowski, 1995). A central goal is to enable rich discussion among students and between students and the instructor (Webb, Gill, & Poe, 2005) while "bridging the gap between theory and practice and between the academy and the workplace" (Barkley, Cross, & Major, 2005, p. 182). According to Kleinfeld (cited in Hsu, 2004), students have the benefit of "learning to examine problems, reflect on their own values, and weigh the merit of their decisions within a group while demonstrating 'a creative way of thinking, a process of problem framing and inquiry, a process of design'" (p. 682).

The use of debates as an instructional strategy helps develop students' critical understanding in a specialist subject area by encouraging them to explain and justify their reasoning (Pilkington & Walker, 2003). Debating "is a structured contest of argumentation that forces the participants to consider not only the facts of a situation but the implications as well. Participants think critically and strategically about both their own and their opponent's position" (Saskatoon Public Schools, 2008, Index section, paragraph 1).

Open-ended or topical discussions are a popular way, possibly the most commonly used, to encourage students to explore readings in online and blended courses. They involve "an 'oral' exploration of a topic, object, concept or experience that begins with teacher-posed questions that promote the exploration of a particular theme, topic or issue. Through discussion, students should achieve a deeper understanding of the topic" (Saskatoon Public Schools, 2008, Instructional Strategies section, paragraphs 3 and 4). Research on open-ended discussions suggests that they can be used to promote collaborative learning around unrestricted questions (Sammons, 2007).

2.2. Teaching and assessing critical thinking

There is much talk given to the concept of critical thinking and related skills in learning and instruction, and as many definitions and perspectives as there are disciplines. Facione and Facione (2007) define critical thinking as "reflective decision-making and thoughtful problem solving about what to believe and do" (p. 44). Similarly, Halpern (2003) defines critical thinking as "cognitive skills and strategies that increase the likelihood of a desired outcome… thinking that is purposeful, reasoned, and goal-directed — the kind of thinking involved in solving problems, formulating inferences, calculating likelihoods, and making decisions" (2003, p. 6).

The many approaches to assessing critical thinking skills are parallel to the many approaches to teaching them. Spicer and Hanks (1995) reported on standardized critical thinking tests available as well as several performance assessment approaches that can be used as outcome measures within various subjects. Standardized tests can provide useful information that is diagnostic and may help to guide instruction. However, multiple measures of critical thinking should be used whenever possible, since critical thinking is not a general ability but rather a complex set of general and specific factors.

Studies have shown that online discussions can support critical thinking (c.f. Gunawardena, Lowe, & Anderson, 1997; Yang, 2002). Furthermore, several recent studies have reported on the assessment of critical thinking skills focusing on students engaged in online discussions, and one popular framework is the Community of Inquiry (CoI) model, a conceptual framework that "identifies the elements that are crucial prerequisites for a successful higher educational experience" that makes use of computer-mediated communication (Garrison, Anderson, & Archer, 2000, p. 87). One core aspect of that model is cognitive presence, which is operationalized in the Practical Inquiry Model (PIM); it "reflects the process and the means to create cognitive presence (Garrison, Anderson, & Archer, 2001, p. 11)." The PIM, which focuses on thinking processes versus individual learning outcomes, can be used as a tool to assess critical discourse and reflection, specifically higher-order thinking, in online discussions (Garrison et al., 2001, p. 7). The PIM is a four phase model (triggering, exploration, integration and resolution) that is derived from Dewey's concept of practical inquiry. A *triggering event* is presented in the form of an issue, problem or dilemma that needs resolution; *exploration* is the search for relevant information that can provide insight into the challenge at hand; *integration* involves connecting ideas in the search for viable explanations, and *resolution* is established through the selection and testing (through vicarious or direct application) of the most viable solution. As noted by Swan, Garrison, and Richardson (2009), the phases of practical inquiry should not be seen as discrete or linear and that for each of the phases there may be a need to return to a previous phase. Table 1 presents the categories and subcategories, which serve as indicators for the four phases of the PIM (Garrison et al., 2000).

3. Methods

The central hypothesis of this study was that students' critical thinking levels would vary across instructional strategies and students would achieve higher levels of critical thinking, in accordance with the PIM model's indicators, for the instructional strategy that they preferred. A mixed methods research approach was utilized

Table 1
Using the Community of Inquiry framework to assess critical discourse and reflection in a computer conference.
From Garrison et al. (2001); reprinted with permission of authors.

Category	Indicator	Sociocognitive processes
Triggering events	Recognizing the problem	Presenting background information that results in a question
	Sense of puzzlement	Asking questions, messages that take discussion in new direction
Exploration	Divergence — within the online community	Unsubstantiated contradiction of previous ideas
	Divergence — within a single message	Many different ideas/themes presented in one message
	Information exchange	Personal narratives/descriptions/facts (not used as evidence to support a conclusion)
	Suggestions for consideration	Author explicitly characterizes message as exploration. e.g. "Does that seem about right?" or "Am I way off mark?"
	Brainstorming	Adds to established points but does not systematically defend/justify/develop addition
	Leaps to conclusions	Offers unsupported opinions
Integration	Convergence among group members	Reference to previous message followed by substantiated agreement, e.g. "I agree because…"; building on adding to others' ideas
	Convergence within a single message	Justified, developed, defensible, yet tentative hypothesis
	Connecting ideas, synthesis	Integrating information from various sources — textbooks, articles, personal experience
	Creating solutions	Explicit characterization of message as solution by participant
Resolution	Vicarious application to real world	None
	Testing solutions	Coded
	Defending solutions	