Chapter 7
Testing Strategies to Enhance Online Student Collaboration in a Problem-Based Learning Activity

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ABSTRACT

Most units of learning are being offered flexibly, either using distance education or online facilities, and often with asynchronous computer-mediated communication or online discussions. The use of asynchronous computer-mediated communication is believed to offer students the opportunity to communicate independently of time and place, and to ask questions, state opinions and offer advice when transferring interactive learning activities to an online environment. This chapter uses an action research framework to examine the quantity and nature of student engagement in a problem-based learning activity as a consequence of placing face-to-face instruction on and practice in problem-based learning prior to using asynchronous computer-mediated communication. The effectiveness of early placement of a 4-day residential component to improve student collaboration in the online problem-based learning activity was tested against six years (2001-2006) of electronically-archived online discussions in a 13-week, under- or post-graduate tertiary-level natural science unit.

INTRODUCTION

Combining online delivery with problem-based learning activities requires opportunities for students to interact with each other and develop a range of skills and competencies (personal, people and professional) in conjunction with the knowledge base so they can confidently enter the workplace. Problem-based learning activities (Barrows & Tamblyn, 1980; Barrows, 1985; 1988; 2002; Bjorck, 2002) using a case study approach to problem-solving and self-directed research, delivered online, is a learning approach that can supports knowledge acquisition to actively engage students in the learning process, and enable students to develop and strengthen their competencies in the areas of information literacy, communication, self-directed learning, and solv-
ing ‘real-world’ problems (Boud & Feletti, 1997). Furthermore, online delivery of problem-based learning activities offers those students learning at a distance, and often in isolation, the opportunity to communicate asynchronously with other students; and to work collaboratively with others to: brainstorm, analyse and redefine the issues in relation to the problem-based learning activity as well as engage in social interaction. Nevertheless, there remains some uncertainty among students about online learning, as shown by reported higher attrition rates (Carr, 2000), and lower levels of course satisfaction (Sikora & Carroll, 2002) in online courses. Educators too express concern about how well problem-based learning activities and online delivery can be combined to create a learning environment that motivates students to engage in positive social interaction and learning as well as achieve the desired learning outcomes (Vonderwell & Zachariah, 2005, Rourke & Kanuka, 2007; Rovai, 2007). Hara and Kling (2000; 2001) suggest that students undertaking online courses experience “… confusion, anxiety, and frustration due to perceived lack of prompt or clear feedback from the instructor, and from ambiguous instructions on the course Web site and in e-mail messages from the instructor” (p.68). Rovai and Jordan (2004) interpreted this finding as suggesting deficiencies in online courses were related more to poor design of online discourse and inappropriate pedagogy used by instructors who have limited knowledge and skills in designing and facilitating learning activities, and creating a sense of community through online discussions in online courses.

Communication amongst peers is an integral part of creating an interactive learning environment (including facilitating learning and creating a sense of community amongst learners). The research presented here focused on the capacity of asynchronous computer-mediated communication to support collaborative learning amongst students within the context of a problem-based learning scenario delivered online to off-campus students, with a compulsory face-to-face teaching component (residential school). This chapter specifically tests whether early timing of face-to-face teaching (small group learning experience) in a problem-based learning activity can enhance collaborative online discussions of a problem-based learning activity by comparing it with the collective learning experience. This chapter also explores the variation in group functioning and whether it is possible to determine the characteristics of a functional learning group. The change in timing of face-to-face instruction in the problem-based learning activity to before the commencement of the teaching period provided the instructor with an opportunity to evaluate three changes in the teaching approach. Firstly, the formation of small peer student groups for subsequent communication on Discussion Boards that had already met each other at the residential school. Secondly, those same students had, in a classroom situation, practiced the problem-based learning activity, and used the structured learning guide. Thirdly, the students met, and were taught by the instructor at the residential school and became familiar with instructor expectations and style of teaching prior to the semester starting. None of these changes to the teaching approach were possible, prior to 2004, as the timing of the residential school was fixed at eight weeks into the semester, and student groupings, especially small peer groups, for online discussions could not be created as students still had not confirmed their attendance at the residential school.

**BACKGROUND: PROSPECTS AND PROBLEMS FOR ONLINE COMMUNICATION IN A LEARNING ACTIVITY**

The literature review focuses specifically on the benefits of and difficulties in using asynchronous computer-mediated communication to provide an interactive learning environment, one which facili-