# Promoting Cooperative Learning for Preservice Teachers Through Information Technology

**Eugenia M. W. Ng**
*The Hong Kong Institute of Education, Hong Kong*

## INTRODUCTION

Cooperative learning means students working together to accomplish shared learning goals and to maximize their own and their group members' achievements (Johnson & Johnson, 1999), and stresses the importance of shared dialogue and inquiry (Littleton & Hakkinen, 1999). The concept of cooperative learning has been around for a long time. Sometimes cooperative and collaborative learning are used interchangeably, but Lehtinen, Hakkarainen, Lipponen, Rahikainen, and Muukkonen (2007) have suggested that cooperative work involves dividing work among the team members, whilst collaborative work means all the team members tackle the problems together in a coordinated effort. In a traditional setting, cooperative learning occurs when there is human interaction, but cooperative learning can transcend cooperation from someone that you know to virtually everyone in the world if they have a Web-connected computer. Does information technology foster or stifle cooperative learning?

## BACKGROUND

David Johnson and Roger Johnson are probably the most consistent advocates of cooperative learning. They found that social skills and competencies tended to increase more within cooperative situations, as working together increases students' abilities to provide leadership, build and maintain trust, communicate effectively, and manage conflicts constructively (Johnson & Johnson, 1989). Similarly, a study conducted by Slavin (1996) showed that when students were engaged in student interactions and activities when working in small teams and the activities frequently required high-order thinking and critical reflections. Johnson and Johnson (1999) further elaborated that those cooperative efforts promote positive relationships among group members. They had higher morale, were more likely to commit effort to achieve educational goals, and were more willing to endure pain and frustration for their learning, as well as to listen to and be influenced by classmates and educators. Johnson, Johnson, and Stanee (2000) conducted a meta-analysis of cooperative learning and confirmed that there are over 900 research studies supporting the use of cooperative learning over competitive and individualistic learning. However, the question remains: What specifically is the role of information technology in supporting cooperative learning?

Using information technology as a collaborative learning tool has stemmed from work by Scaramalia and Bereiter who developed computer supported intentional learning environment (CSILE) in the early 1990s. The purpose of the system was designed to support learning in a purposeful, intentionally and collaborative learning environment. With the rapid development of the Internet in the mid-1990s, information technology has presented a new arena for learning and teaching. Specifically, various communication channels such as e-mails, wiki, online chat, and discussion forums provide a simple and convenient arena for a single or multiple user(s) to discuss asynchronously or synchronously. The Internet exchanges are highly flexible and convenient when compared to other means of communication such as face-to-face or telephone communication. Furthermore, messages can be stored and retrieved easily at the discretion of users without requiring sophisticated software. Learners from different background and diverse locations can share their personal and team experience, and construct their ideas together in order to solve problems in the learning process.

The effectiveness of online collaborative learning has been confirmed by various studies. For instance, students were able to discuss in greater depth and their critical thinking skills were enhanced (Tan, Turgeon, & Jonassen, 2001) and learners' levels of involvement and incentive to learn have also increased significantly

with a wider and more complete understanding of the subject knowledge (Eleuterio & Bortolozzi, 2004). Lipponen (2003) has summarized how information technology can enhance learning (1) by removing the physical and temporal barriers of schooling by eliminating time and space constraints, (2) the delay of asynchronous communication allows time for participants to reflect, (3) it makes thinking visible by allowing students to represent their own and others' ideas and share their expertise, (4) the shared discourse spaces and distributed interaction can offer multiple perspectives for students with varying knowledge and competencies, which can offer greater opportunities to share and solicit knowledge, and (5) the database can function as a collective memory for a learning community that allows the knowledge to be revised for future reference. Indeed, a number of researchers (Applefield, Huber, & Moadllem, 2000; Muukkonen, Hakkarainen, & Lakkala, 2005; Scardamalia, 2002; Scardamalia & Bereiter, 1994; Turvey, 2006; Woodruff, Brett, MacDonald, & Nason, 1998) have proposed using the information-technology-supported learning environments to facilitate student-centred learning so that they are able to construct knowledge in authentic and collaborative settings.

## PROBLEMS

There are a number of published successful cases of using the technology to support cooperative learning, although some of these are focused on K-12 school context (Barron, Vye, Zech, Bransford, Goldman, et al., 1995; Collins, Brown, & Newman, 1989; Scardamalia & Bereiter, 1996; Stahl, 2004; Turvey, 2006), some are related to business studies courses, especially in Information System discipline (Lee, Vogel, & Limayem, 2003; Martin, Hatzakis, & Lycett, 2004; Rutkowski, Vogel, Genuchten, Bemelmans, & Favier, 2002; Vestal & Lopez, 2004), and some are for teachers as professional development (Parr & Ward, 2005; Treweren & Lai, 2001) but there is not much research in the specific area of student teachers education. The community of teachers (CoT) is one of the few communities for preservice teachers at Indiana University (Barab & Duffy, 2000). Indeed, a number of studies have indicated that preservice teacher education does not adequately prepare teachers to teach with technology (Pope, Hare, & Howard, 2002; Selinger, 2001), and it was suggested to integrate content, pedagogy, and technology (Hughes, 2005; Koehler, Mishra, & Yahya, 2005).

## THE MAIN FOCUS OF THIS ARTICLE

"An irony is that, within teaching, much learning aimed at extending teachers' pedagogical content knowledge has been taken outside the workplace rather than within the logical venue" (Parr & Ward, 2005). Koschmann (2000) suggested that teacher-educators have an obligation "to make explicit our theories of teaching and learning … that motivate our work and that are embedded in our designs. " In view of the current needs, this paper will discuss how to use information technology, in particular, the discussion forum of a learning platform, to support various cooperative activities for student teachers. At the same time, whether information technology can enhance learning proposed by Lipponen (2003) is also examined. There are three underlying rationales when designing such learning activities. Firstly, there is a need to infuse technology into our module design so that information technology provides a supportive environment for learning and teaching rather than just as an add-on tool. Secondly, the different cooperative practices can be easily implemented and sustained with few resources. Lastly, there is a need to relate assessments with different learning activities so that students are informed of their learning process and to improve learning.

The study was conducted at the Hong Kong Institute of Education, which is the largest teacher education institute in Hong Kong. Participants included both undergraduate and postgraduate students studying an information technology module concerned with how to use IT to support learning and teaching. There were about 70 students enrolled on the undergraduate course and about 10 studying on the postgraduate course. The respective modules have similar content, but the levels of expectation are slightly different, and the activities are modified in order to cater for the level of study and the number of participants enrolled. Due to the time constraints of a three-credit module, it would be impossible to put all the elements into one module. Both levels of students conducted student-led discussion, but the undergraduates had online debate and communication with student teachers of an Australian university