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ABSTRACT

Scholars and proponents of computer-supported learning advocate the use of collaborative learning as an important component of Internet courses. Advocates claim that computer-supported collaborative learning (CSCL) is an instructional strategy that can help instructors avoid the pitfalls of Internet correspondence courses that rely on information acquisition and regurgitation of rote answers that reflect low level learning. As educators transition their course from traditional to Internet learning, a paramount concern is maintaining the essentials of a collaborative learning environment. Following a brief theoretical background of collaborative learning as an instructional strategy, four panelists describe the use of collaborative learning in three different educational contexts: (1) an environmental education program for middle school science teachers in North Carolina; (2) a graduate project management course for individuals working full time in organizations throughout the United States; and (3) a graduate course in applications of information technology for military personnel throughout the world. (Author/AEF)

COLLABORATIVE LEARNING IN WEB-BASED INSTRUCTION

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Abstract

Scholars and proponents of computer supported learning advocate the use of collaborative learning as an important component of Internet courses. Advocates claim that computer supported collaborative learning (CSCL) is an instructional strategy that can help instructors avoid the pitfalls of Internet correspondence courses that rely on information acquisition and regurgitation of rote answers that reflect low level learning. As educators transition their course from a traditional to an Internet learning a paramount concern is maintaining the essentials of a collaborative learning environment. After a brief theoretical background of collaborative learning as an instructional strategy, the panelists will describe the use of collaborative learning in three different educational contexts:

(1) an environmental education program for middle school science teachers in North Carolina;
(2) a graduate project management course for individuals working full time in organizations throughout the United States; and,
(3) a graduate course in applications of information technology for military personnel throughout the world.

Introduction and Literature Review: Panelist: Comeaux:

Collaborative learning (similar to cooperative learning) is a well-established instructional strategy in the traditional classroom. Research suggests that collaborative learning increases student motivation and achievement, promotes greater use of higher-level reasoning strategies and critical thinking, creates a sense of social cohesion and creates a productive learning environment [Abrami et al., 1995; Johnson et al., 1991; and Slavin, 1991].

Effective collaboration involves much more than students working together; they must value and perceive the importance of working actively with their peers in an interdependent structure. Effective collaboration means students think and act in ways that promote their own learning and that of others. Collaborative learning is enhanced when students are fully engaged in the activities of the class, are engaged with each other and the subject matter and take risks.

Scholars and proponents describe the essentials of collaborative learning as positive interdependent purpose and cooperative goal structure, interdependent division of labor and resources, individual accountability, and equal distribution of rewards. Students working together should know why (purpose and goals), how (procedures and tasks), with whom (group composition), the ground rules (interpersonal and group skills), and be held accountable to the group (Abrami et al, 1995, Johnson et al, 1991 and Rothwell, 1998].

Similarly scholars and proponents of computer supported learning advocate the use of collaborative learning as an important component of Internet courses. Furthermore, advocates claim that computer supported collaborative learning (CSCL) is an instructional strategy that can help instructors avoid the pitfalls of Internet correspondence courses that rely on information acquisition and regurgitation of rote answers that reflect low level learning [Dede, 1996; Harasim, 1993; Pea, 1993; and Savard et al., 1995]. As Pea [1993] argues "combinations of new computer technologies that facilitate collaboration and communication among learners can support and enhance learning, particularly distance learning" [p 288]. Dede [1996] claims that "computer-supported collaborative learning (CSCL) enhances team performance through tools for communicating each person's ideas, structuring group dialogue and decision making, recording the rationales for choices and facilitating collective activities.... Such 'telepresence' enables mentoring across distance and provides a social context that reinforces and motivates learning, in addition to preparing students for telecommuting roles in the business environment" [p. 13].

As educators transition their courses from a traditional classroom to an Internet learning environment, a paramount concern is maintaining the essentials of a collaborative learning environment. The following applications all use collaborative learning in web-based or web-enhanced instruction. Huber describes a middle school environmental education teacher training program that uses collaborative learning as an essential component in their "Students as Scientists" project. Kasprzak describes the use collaborative learning in an Internet course for training military personnel throughout the world. Finally, Nixon describes an Internet course for graduate students in a Master's of Project Management degree program that capitalizes on the essential components of collaborative learning.

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Collaborative Learning in "Students as Scientists" Project: Panelist: Huber

The "Students as Scientists: Pollution Prevention through Education" is a three year teacher training program offered through the Watson School of Education, University of North Carolina-Wilmington for middle school science teachers throughout North Carolina. The specific objectives of this teacher training project are: (1) to update teachers on environmental issues affecting North Carolina, particularly water pollution prevention; (2) to engage teachers in collaborative learning and problem-solving methodologies they can use in their classrooms; (3) to provide teachers with environmental monitoring equipment and training in the use of this equipment, (4) to educate a cadre of teacher leaders who will educate other teachers in their districts; and (5) to teach the teacher leaders to learn to use the World Wide Web and the distance learning network so that, after the institute, they can continue information gathering and networking. The project will create Web Pages that teachers may use collaboratively; they will be able to download curricular information and environmental monitoring data from the web to use with their classes.

During the summer 1997 workshop teachers from New Hanover County Public Schools conducted environmental monitoring activities on the Cape Fear River. Working with University of North Carolina-Wilmington scientists, they performed water analyses and determined dissolved oxygen and solid levels, salinity, temperature differences, and pollution indicators. Participants graphed their data using spreadsheet software and compared their data to the river monitoring activities of the Cape Fear River Project, a consortium of local industries, environmentalists, and state environmental department experts. Guided by project staff, they learned to locate environmental science resources on the Internet. Discussions focused on presenting the project's activities in lessons that reflected the national and state science education standards. Participants developed lessons that incorporated cooperative learning strategies, hands-on science inquiry, and student discourse on river use.

During the following academic year, the teachers and their middle-school students spent one day per week on the Cape Fear River replicating the summer's monitoring activities and recorded their measurements on the project's World Wide Web site. The students learned how to graph their results, use environmental science terminology to describe their activities, and analyze local environmental conditions and water-quality tests performed by the state environmental department.

During the summer 1998, teachers from Clay and Graham County Public Schools and Charlotte Public Schools, as well as additional New Hanover County teachers, attended the workshop. After completing the same objectives as outlined above, these teachers will conduct water monitoring activities on waterways in their regions with assistance from Western Carolina University and University of North Carolina-Charlotte scientists and environmental education faculty. Participants and their students will enter their data on the project's Web site and compare their results throughout the year. In summer 1999, new teachers from the four school systems will participate thus completing the three-year project funded by Glaxco foundation.

The "Students as Scientists" project emphasizes hands-on science activities which require higher order thinking and problem-solving skills. The project challenges teachers to learn to use their surrounding physical environments and real problems as teaching tools. This expertise allows teachers to better implement the new State Science Curriculum (1994) and improve their students' State Science Test scores.

The students targeted for this project are a unique group. They are constantly searching to define themselves and the world around. They must interact with their environment to learn; simply sitting passively in a classroom does not stimulate their maturing intellectual curiosity. They flourish with hands-on activities, group projects, field trips and discussion groups. Their idealism is high; they want heroes and causes and will recognize saving the water, air and land as a goal for their generation. The activities and instructional methods in this project will promote high degree of collaborative learning.

The WWW provides a forum for the presentation of environmental education concepts. "Students as Scientists" created a number of interactive web pages where teachers track the project's development and growth, and participate by using interactive forms for the posting of data to the project's home page. Furthermore, the WWW component includes modules of information that can be downloaded by teachers for integration into the curriculum and for working collaboratively with other teachers in the project. Thus, it will be possible for teachers around the world to share "Students as Scientists" with their classes.

Collaborative Learning in the Master's of Project Management Distance Learning Degree Program: Panelist: Nixon

The Master's of Project Management degree program has been offered in the traditional classroom in Western Carolina University's College of Business since 1987. The College is fully accredited by the International Association of Management Education, AACSB and the Project Management Institute (PMI). Prospective students wishing to pursue this specialized degree are usually full-time employees in business or industry, have family obligations, and live outside of a reasonable commuting distance from the WCU campus. Transitioning the traditional program to the Internet format met the educational and the personal needs of these students and industry.

The issue of maintaining high quality, student-centered learning activities, involving small group interaction and experiential learning was of utmost importance. We did not wish for this to become an Internet correspondence course. Inherent in this process is the assumption that a conscious effort be made to assure collaboration among students and faculty.

One of the most difficult tasks at first was rethinking how pedagogically sound teaching and learning concepts could be transformed into distance learning. The old adage "garbage in, garbage out" applies to this transition. If the existing course activities do not facilitate active learning, if they rely totally on the passive "talking head" lecture method, "spoon feeding" information, and regurgitation of rote answers, the technology of Internet delivery will not translate into quality teaching and learning.

Activities that have limited interaction student to student, professor to student, and student to professor have a limited value in either forum. As a graduate course, curriculum and course design processes involve rapid transition to a higher cognitive level of activities. The level and type of activity designed for the Internet was structured according to Bloom's Taxonomy of Learning Objectives. As an example, the lower-level *knowledge-based*, "students will *identify* the phases of the project lifecycle" became a higher-level *evaluative* activity in restating the activity as "students will read the scenario, determine the phase of the project lifecycle in which the activity is taking place, and *justify* that determination."

We used the WebCT classroom setup and tailored it to include the following:

- assignment page with professor introductions to lessons
- chat rooms divided into password protected "study groups" for students to synchronously discuss activities
- bulletin board with password protected "study groups" for teams to asynchronously post information, cites, material, etc. for others in the group. This included posting "hot links" to relevant web sites and on-line materials
- presentation area, a general posting area for all final group work products to be posted for all classmates to read and comment upon if desired or required by the professor.
- Microsoft NetMeeting or CU-See Me software for synchronous video and voice streaming discussions/communication
- e-mail messages and attachments
- library reserves and electronic research
- fax
- telephone
- snail mail"

The technology provided the tools to enable a higher and more consistent level of communication and interaction. Additionally, individual student input into collaborative learning activities is easily monitored...no where to run and no where to hide. Every log-in and every contribution to group activities is recorded. To date, the professors have reviewed the posted student resumes and assigned students to study groups. This is done to ensure diversity in the teams: an even distribution of experienced and inexperienced students, a mix in various industries in which the students are currently employed, a mix of nationalities, genders, and ages. This also avoids total chaos of student self-selected teams and promotes international and cross-industry interaction.

Collaborative Learning in Military Distance Education: Panelist: Kasprzak

The Military have long been supporters of "group", "team" and other highly organized collaborative activities. The "staff" system was devised by military thinkers, and "war rooms", and "crisis action centers" are collaborative organizational structures based on military models. As electronic communication networks have developed, training and exercises have also been conducted in collaborative modes. For example, the War Gaming and Simulation Network of the Department of Defense allows military colleges, schools and training centers to conduct large simulated military exercises, with each Center playing the technical, support or leadership role that its personnel might actually fulfill in a real battle or crisis.

As distance education modes of learning are increasingly employed by colleges and universities, it is understandable that military personnel (and civilians employed by the military services) readily accept collaborative learning techniques that they already employ in varying forms in their work surroundings. At the University of Maryland University College, originally founded to support military and diplomatic personnel overseas, and at the National Defense University, the highest educational institution of the Defense Department, different collaborative learning techniques are being employed, using the Internet, video teleconferencing and educational television.

As bandwidth becomes less expensive and more readily available, the schools are conducting more experimentation with Internet video, Internet radio, Internet TV and even more exotic delivery mechanisms. Techniques include role-playing, production of group products, controlled group interactions, group study, and group use of resources.

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