DOCUMENT RESUME

ED 422 843 IR 018 984

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TITLE Collaborative Learning: A Critical Success Factor in Distance Education.
PUB DATE 1998-00-00
NOTE 5p.; In: Distance Learning '98. Proceedings of the Annual Conference on Distance Teaching & Learning (14th, Madison, WI, August 5-7, 1998); see IR 018 976.
PUB TYPE Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Mediated Communication; Computer Networks; Computer Uses in Education; *Cooperative Learning; Curriculum Development; Delivery Systems; *Distance Education; Educational Trends; Group Discussion; Higher Education; *Instructional Design; Interactive Video; Student Participation; Teacher Role
IDENTIFIERS *Collaborative Learning; De Paul University IL; *Learning Environments; Mercy College NY; Virtual Classrooms

ABSTRACT

This paper discusses the use of new technologies for distance learning-- including interactive video, computers, and the Internet-- at Mercy College (New York) and DePaul University (Illinois). The description of a course on discrete mathematics that is taught using the Mercy College Long-distance Instructional Network (MerLIN) focuses on the use of e-mail and student participation in online discussions. A course on ethical and social issues in computing that is offered at DePaul University using interactive video and the Internet is then described; highlights include student-delivered programs, the course World Wide Web site, and use of the HyperNews asynchronous computer conferencing system for required online discussions. General considerations for providing meaningful experiences in distance learning environments are addressed, including the instructor's role as model and facilitator, clarification of objectives and outcomes, and the importance of collaborative learning. The authors' current research on the effectiveness of student collaboration in online environments is summarized. (DLS)

Collaborative Learning:
A Critical Success Factor in Distance Education

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Two trends, one in pedagogy, and the other in technology are converging to make distance learning environments of the twenty-first century meet the needs of both the instructor and the student. The new millennium brings with it an innovative model of learning for the environment of all areas of education, in business and industry, in college and the university, in government and the military, and in vocational training, to name a few. The roles of the teacher and the learner will be changing and the need to incorporate collaborative learning into this model is fundamental to ensure educational success.

An integral component of education in the next century will be collaborative learning because it supports active learning and also, because the workplace, for which we prepare our students, requires collaboration. It is evident that as corporations become global, collaboration will be mediated by technology. Shifts in learning theory challenge the lecture-test-exam model of learning and indicate that learning is achieved when the learner is actively engaged in the creation of knowledge rather than the passive recipient of information. The new model contends that learning is best achieved by interaction between learners and instructors and between learners and learners.

Recent developments in instructional technology have led to new trends in distance learning that are suited to the active model of learning, provided their use is accompanied by appropriate shifts in teaching strategies. Both Mercy College and DePaul University support distance learning programs. The design of the courses within these programs is different, yet, the pedagogical shifts necessary for the achievement of successful learning outcomes in both these environments are similar. The link is so strong that the presenters will be measuring the effectiveness of technology mediated collaborative learning activities of their distance learners using the same instruments and similar activities. The presenters will reinforce the critical role collaborative learning plays in the distance learning environment and share their strategies and techniques.

MerLIN, Mercy College Long-distance Instructional Network has its courses' underlying framework as forums. For each forum, the professor can post public messages arranged in threads of conversation that include discussion of topics, homework assignments, answers to questions posed, etc. Private discussion between lecturer and student or students can take place via e-mail. Additional features of the system include teleconferencing for live type in sessions, including online office hours between professor and students, and file libraries, which are documents for users to read online or copy to their computers.

At DePaul University, many academic programs are committed of fully integrating the use of technology into the students' learning experiences. Computers and the Internet are used extensively to provide students with online academic resources; the ability to communicate with instructors, peers, and "visiting" content experts through the use of e-mail listservs, electronic discussion groups, and chat rooms, and a full set of online student support services. DePaul makes use of interactive video through a network of video room on four of its campuses. Many of the interactive video courses make extensive use of computers and the Internet of supplement the classroom experience.

The new technologies for distance learning described here—interactive video, computers and the Internet—have the potential to provide a learning environment that can support active learning, but only if they are married to important shifts in teaching styles, content delivery, and learning activities. Without these changes interactive video courses simply allow instructors to lecture to multiple sites simultaneously and Internet courses are just correspondence courses by e-mail.

At Mercy College, Ben-Jacob teaches Discrete Mathematics using the MerLIN system. E-mail is used for individual communication between students and the instructor. Discussions of how to solve problems, problem sets, partial solutions, and final solutions are posted in forums. For some problem sets, students are encouraged to post partial solutions to the forum for comment and review by their peers. This results in students learning multiple approaches to solving problems and in learning by teaching. Each major topic is introduced with a question that can be answered by the students without specific prior knowledge of the subject matter. Ben-Jacob has taught this particular course before both online and in the traditional classroom setting. In the past, in the traditional classroom, she has always been able to cajole the reluctant student to express at least an opinion with regard to the classwork; online, however, if a student is reluctant to post an opinion and chooses not to respond to the forum posting, it has proven difficult to get him/her to participate. Most of the students in this situation have admitted their reluctance stems from the fact they are not sure their responses would be correct. To overcome this, the initial common sense or "thought" question is posed. As a prime example, prior to introducing the subject of logic, the students are asked to discuss the differences and similarities between three very short logical arguments. Two of the arguments are logically equivalent but do not use any of the same words in their propositions. The third argument, which is different logically from both of the others, uses the same words that appear in one of the former arguments. The students are advised they do not need to read the text to respond, they are to use their intuition, and that we are looking for their opinions, not "right" or "wrong" answers. Another pedagogical tactic employed in the online course is that of posting a request for peer help with a problem before Ben-Jacob solves it. Discussion questions are well suited to a distance learning course. Ben-Jacob has found that the more technical the online course is, the more reluctance there has been on the parts of the students to engage in online exchanges, and the greater the need for her to facilitate the beginning of the discussions.

At DePaul University, Levin teaches Ethical and Social Issues in Computing. This course is taught at two of DePaul's campuses using interactive video and makes extensive use of the Internet. In order to make the classroom discussions interactive each class period has at least one planned student delivered program from each of the two class sites. This may be a summary of an article, a presentation of individual or group work, or a debate of an ethical issue with the proponents at different sites. The course has a web site that contains links to

many content resources that have been identified and annotated by students as well as the instructor. The course uses HyperNews, an asynchronous computer conferencing system, for required online discussions. We have two types of discussion: topic discussions and discussions of readings. Over the course of a quarter each student is required to summarize one reading assignment in the readings discussion group. Students are encouraged to post "I don't understand why the author says this" messages in this discussion. While students, especially the summarizer, are encouraged (awarded extra credit points) for posting good answers to these questions, the instructor usually answers these questions. Nevertheless, by using this time and space for initial discussion of the readings, students come to class well prepared.

The instructor posts opening questions in the topic discussions. These questions typically encourage students to take a position on an issue. In the course of the quarter each student is required to post a minimum of five initial responses to a topic question and respond to at least one topic thread (discussion initiated from an initial response) each week. A new topic discussion is started each week and lasts two weeks. After the first two weeks, the instructor does not directly participate in the topic discussion beyond posting the initial question. Instead suggestions, feedback, encouragement, and assessment are provided to authors directly by e-mail. This allows the students to take full ownership of the discussion. With a few minor exceptions students contribute far more than the minimum to these discussions.

In order to provide meaningful experiences in distance learning environments we believe instructors should act as models and facilitators. The distance learning environments, whether the Internet or interactive video, may not be a forums in which the student feels comfortable conducting an intellectual conversation or doing work. It is important that show the students how to do this. However, it is equally important that the instructor knows when, after modeling the behavior, to "step aside," allow the students to take ownership of the conversation, and assume the role of facilitator. We would like to model each course beginning with the professor acting as the hub of a wheel composed of students as the spokes. As the course progresses, the professor should remove him/herself from the center of the wheel and serve in a consultative or facilitator capacity to stimulate dialogue and to pose questions (Ben-Jacob & Tucciarone, 1997).

In general, of course, students need a clear understanding of what is expected of them and the objectives and outcomes of each activity. These needs are heightened in the distance learning context where nonverbal means of communicating uncertainty or discomfort are not possible.

Collaborative learning is one of the activities we believe critical to the success of students in the online learning environment. We are currently conducting a study of the effectiveness of student collaboration in online environments. Although Ben-Jacob has taught Discrete Structures both online and in the traditional classroom setting before, the Spring semester of 1998 will be the first time she will be teaching both the traditional and Internet sections concurrently. This will allow for a closer comparison of the two learning environments. She will be covering the same material and giving the same type of examinations and projects to both classes. This particular course at Mercy College is a junior level achievement course. As such, it is used to evaluate the students in the competencies of written communication, logical thinking and quantitative reasoning. To date, this has been done via a semester project that each student completes individually. This semester, however, Ben-Jacob will

assign two such projects to students in both sections. One will be done individually and the second project collaboratively. For the team project, students in the traditional section will meet face-to-face, while students in the Internet section will use e-mail for their collaboration. Students will be asked to describe and critique their own and their partners approaches to problems; they will be evaluated with regard to all the competencies. In the Winter Quarter at DePaul University, students in Levin's Ethical and Social Issues in Computing will work collaboratively in groups of three on projects. Half of the teams will meet face-to-face to work; while the other half will use e-mail, HyperNews, and the DePaul Annotator, a web-based tool to support annotation of text, graphics, audio, and video. The product can take the form of a traditional text document, a hypertext document, or videotape.

Future research plans include a distance learning course jointly offered by both Mercy College and DePaul University. Learning groups will be formed in such a way as to include a mix of students from both institutions. Of course, surveys to measure student opinions and levels of satisfaction will be administered.

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