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ABSTRACT

Distance learning and collaboration software is beneficial to on-site students as well as off-site students. Collaborative learning (CL) allows students to work together in small groups to help each other master academic material. CL helps teachers by exploiting the ability of students to communicate with each other, and more actively engages students in academic content. It is often difficult, however, for students to find a place and time to work together. Certain students end up doing most of the work, with all of them receiving the same grade. Collaboration through computers would alleviate these problems because work can be done asynchronously, and students can create and access files at their own convenience. Texas A&M has developed and tested a collaboration software called FORUM. Proven advantages include: (1) development of writing skills; (2) teachers can see and respond to what everybody is thinking; (3) shy students are heard, while aggressive students are less able to dominate; (4) slow students are less embarrassed; (5) everybody has time to do good work; (6) their work is more efficient; (7) work can be anonymous; and (8) students can feel pride of ownership. Contains 17 references. (YKH)

Benefits of Collaboration Software for On-Site Classes

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BENEFITS OF COLLABORATION SOFTWARE FOR ON-SITE CLASSES

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In distance education, everyone recognizes the usefulness of e-mail, bulletin boards, and collaboration software for helping isolated students reinforce their learning by working together. However, teachers may mistakenly conclude that computer-mediated collaboration is superfluous or irrelevant for on-site students.

This paper will present arguments for using computer-mediated software even for on-site students. The paper will emphasize using the formalisms of cooperative/collaborative learning in a computer environment. Teachers who want to use collaborative learning techniques with on-site students often find that the out-of-class work in producing academic deliverables is often unequally performed, because students have trouble in finding ways to work at the same time and place. Computers offer major advantages in such situations. From my experiences using the collaborative learning software called FORUM, at least 10 advantages seem clear: 1) writing skills are honed through practice, 2) the teacher can see and respond to what everybody is thinking, 3) shy students have a better chance to influence the group's product, 4) aggressive students are less likely to dominate, 5) slower students are less embarrassed, 6) everybody has time to think, look things up, etc., 7) there are fewer social stresses and conflicts 8) work is more efficient, with fewer distractions, 9) work can be anonymous, where that is desired, and 10) students can have a pride of ownership in their product and have a better chance to develop competence and confidence.

COLLABORATIVE LEARNING IN THE COMMUNITY COLLEGE

Collaborative learning (CL) is a widely practiced learning style in which small student groups work as teams to help each other master academic material (Cooper, McKinney, & Robinson, 1991; Goodsell, Maher, Tinto, Smith, & MacGregor, 1992; Johnson & Johnson, 1989; Kadel & Keehner, 1994; Kaye, 1991a; Kaye, 1991b; Long, 1988; Robinson & Cooper, 1993). CL is effective because it thoroughly engages students in learning activities and leverages the teacher's efforts by involving students in helping each other learn. CL even promotes better thinking

skills than competitive or individualistic learning environments (Gabbert, Johnson, & Johnson, 1986). Teamwork is a central element of this learning style. Effective CL requires that students be positively interdependent on one another (Johnson, Johnson, & Smith, 1991). Assigning complementary roles to each team member helps assure that learning objectives are understood and appreciated by everyone.

Teachers use CL for two main reasons:

1) to get students more actively engaged in academic content, and

2) to leverage the teacher's efforts by exploiting the ability of students to relate to and communicate with each other .

TRADITIONAL COLLABORATIVE LEARNING

In a typical community college setting, teachers may assign certain projects to learning teams. Projects may be problem sets, term papers, or other kinds of tasks, ultimately producing an academic deliverable that teachers grade. Because the work is ostensibly produced by equal contributions from each member of the group, the accepted practice is to award the same grade to everyone. This lies at the core of the principal problem with CL. The assumption of equal contributions from each person is seldom valid. This is especially true when the teacher and the students do not fully comprehend the importance of team roles and mutual interdependence. Moreover, our general educational system in K-12 and college is not designed to teach students how to work as a team. Individual responsibility and competitiveness form the dominant paradigm. Some teachers even think that the idea of cooperating is tantamount to cheating.

My thrust here is not to defend CL, which really needs no defense, but rather to help community college teachers who recognize the value of CL but are seeking better ways to make CL work. I will focus on the practical matter of uneven work contribution and the advantages of doing CL in a computer network environment.

In traditional environments, even when students do understand the importance of positive interdependence and know how to work together as a team, certain obstacles to success always exist. These revolve around schedule conflicts. When, where, and how are students supposed to get together to work on a team project? Students either have full class schedules or they have commitments outside of class that almost guarantee a lack of group cohesion and that some students will do more work than others. In the community college environment, many students are commuters, have part- or even full-time jobs, or have family obligations. All these things create schedule conflicts for group meetings. The times when students can get together are limited and often insufficient to assure quality group work. To compensate for these handicaps, the more ambitious members of a student group will "pick up the slack" and do more than their share of the work. This can create resentment (the same grade goes to those who did les work) and unequal learning (those who did less will learn less).

These problems are well recognized by community college teachers who have tried to use traditional CL. Such teachers may have given up on using CL. However, technology offers us an exciting solution. CL can be made to work in a community college environment by use of networked computers and software that supports group collaboration.

COMPUTER CONFERENCING AND COLLABORATION SOFTWARE

Problems of scheduling and geographic separation no longer exist if each group member can choose when and where to work because the team's work is done via computer. A host computer, usually at the college, houses and organizes the work of each student and each learning team. Students access the files created by fellow team members at a time of their choice. If the college computer is connected to a local area network, the students can log in to their team's files from another computer on the network. Or, if the host computer has a modem, students can call in from their own modems and personal computer. Or, if the host computer has a gateway to the Internet, students can access the team's files via their own Internet Services Provider.

The advantages of computer-based communication extend beyond the ability to overcome schedule problems. In my experience, having resident students work in a collaborative computer environment has several distinct advantages over the traditional classroom: social problems and stress decrease, information resources can be managed better, students and teacher work more efficiently, work quality improves, and assessment becomes more reliable (Klemm, 1997). Another professor (Partee, 1996), who teaches in a computer environment, has said that "Students usually find this kind of discussion not only non-threatening but exhilarating. Students may find typing an idea out at their own pace to be far easier than making a point in the heat of class discussion. ... What such written comments lack in spontaneity, they more than compensate for with intellectual merit. Instructors who create this form of class participation will find (to their amazement) a depth of commitment by seemingly uninterested, uninvolved students. Students who otherwise might remain silent in class will offer observations of impressive quantity and quality to the group." The quality and quantity of student work improves for two reasons: 1) they have more time for research and to reason, reflect, and construct, and 2) they benefit from the thinking and information provided by other students in the group.

I am suggesting that computer-mediated communication complement, rather than replace, the traditional classroom. But maybe the day is coming when the traditional classroom approach will have to change. One professor who teaches technical writing has pointed out that today's student tends to have a different approach to learning than those of us who grew up in the "lecture era". As she points out, "Younger students have grown up in environments where computers, video, and multi-media are part and parcel of learning and entertainment. These

students are less text oriented, more computer oriented, and less eager to listen to lectures and to study (read) for long uninterrupted periods. They have a shorter attention span and enjoy learning by doing" (Tebeaux, 1995).

Because each student can create files and see the files of other group members, the learning team has in effect the capability of conducting conferences asynchronously. This brings us to the matter of the software used to mediate asynchronous conferences. The software available today typically supports asynchronous conferencing, but generally does not support the true collaboration required of CL. In the non-computer realm, we all know from personal experience that there is a huge difference between holding a meeting and working as a team. The important point from a teaching perspective is that asynchronous conferencing can be used to collect e-mail messages or it can be extended to support the creation of group products. To me, it makes more sense to use software that will allow a teacher to capitalize on the advantages afforded by collaborative learning formalisms (Klemm, 1995).

E-MAIL, BULLETIN BOARDS, AND COLLABORATION SOFTWARE

Computer conferencing software differs from software collaboration systems. In an earlier paper, we elaborated the distinctions between e-mail, bulletin boards, and collaboration software (Klemm, 1994). Briefly, the distinction is that e-mail and bulletin boards are messaging systems, where notes are mailed from one person to the others or are posted on an electronic bulletin board for others to see. Such communication supports collaboration only in a primitive way. Students cannot directly edit each other's messages. Organization of documents does not occur in the case of e-mail, and bulletin boards organize information only in a rigid and limited way. E-mail is thus not suitable for meaningful conferencing. Bulletin-board organize messages by some arbitrary scheme, such as a topic outline. Specific places in the outline serve as fixed pigeonholes for each message. Moreover, a given student cannot change or create new or multiple associations (links) among the documents. Typically, the messages relatd to a given topic become displayed chronologically rather than logically. Messages attach as notes associated with other notes, rather than as notes associated with specific character strings within a given document. There may also be severe constraints on the use of graphics and multi-media materials, depending on the particular conferencing software. Such software collects and files messages but does not mediate the construction of an academic deliverable. I define academic deliverables as student-created products that can take the form of proposals, plans, reports/papers, case studies, debates, ideas from brainstorming, decisions, portfolios, brochures, kiosks, hyperstories, or a variety of special projects. My approach to CL requires groups to work together to produce such deliverables. Thus, I can use CL to complement my conventional "instructivist" teaching style (lecturing) with constructivist, student-centered learning(Klemm, 1997).

Computer-based CL clearly needs software that goes beyond messaging to promote and support collaboration. At Texas A&M, we have developed a collaboration software system specifically designed for CL. The system is called FORUM, in honor of the ancient Roman Forum, where people came together to conduct business and run government. Details on the software can be found at http://www.ForumInc.com, and application papers on the use of the software for teaching can be found at http://www.cvm.tamu.edu/wklemm/bioskh.htm.

ADVANTAGES OF COLLABORATION SOFTWARE FOR COLLABORATIVE LEARNING

We have tested the FORUM software in a variety of courses, including several graduate courses in the Colleges of Education and Agriculture, and undergraduate courses in the College of Veterinary Medicine. In my own courses, I have used the software specifically to support CL. The advantages I have seen include:

WRITING SKILLS ARE DEVELOPED

Whatever happened to the idea of "writing through the curriculum"? This philosophy is couched in hollow words, because so many courses fail to require much writing of students. Teachers don't have time to grade a lot of student writing. But in a collaboration software environment, most of the work occurs in the form of writing, and most of the reading is done by fellow students. Not only does each student get a lot of practice at writing, but there is ample motivation to write well. The student writes for peers and to help produce their group deliverable. Thus, writing is more than busy work. Some of a given student's writing will show up in the group deliverable and thus influence the grade.

TEACHERS CAN SEE AND RESPOND TO WHAT EVERYBODY IS THINKING

In a traditional classroom, the teacher has few opportunities to know what each student is thinking. Test time provides the best opportunity, but tests must be constructed for convenient grading, such as multiple-choice tests, which are notoriously inadequate for revealing what students understand.

In computer-mediated CL, the teacher can see every note from every student and see how the thoughts of each student contribute to the construction of the group deliverable. The process of generating the deliverable leaves a "paper" trail. The teacher is not obliged to see everything, because that responsibility falls on each student in the group as an integral part of their team role responsibilities. But the teacher has a unique opportunity to check on each student's thinking and to verify if everyone is doing their share in the team effort. Moreover, each student knows that all of the contributions to the group effort can be seen by the teacher. There is no place to hide, either from the teacher or other members of the group. My experience has been that this stimulates students to do their best.

SHY STUDENTS ARE HEARD

Social forces in CL are profound (Johnson, Johnson, Stanne, & Baribaldi, 1990; Saint & Lawon, 1994; Schmier, 1995). Shy students are particularly prone to avoid intense interactivity with a group. This denies the group the benefits of work that a shy student could otherwise produce and denies the shy student of recognition and opportunities to build self-esteem. But computer-mediated CL minimizes many of the problems. I have observed that the computer environment is less threatening for shy students, probably because the environment itself is impersonal. Each student's ideas are displayed on a level playing field, unencumbered by distractions of voice and body language. Also, shy students must participate to fulfill their designated roles in the team, because their absence will be conspicuous.

AGGRESSIVE STUDENTS ARE LESS ABLE TO DOMINATE

As a corollary to the above comments on shy students, it seems self evident that the impersonal computer environment makes it less likely that aggressive students will dominate group activity. Everybody gets a chance to participate, without having their dialog "stepped on" or "shouted down." The computer environment allows everyone's ideas an equal hearing, and the asynchronous nature of this kind of CL means that there is time to reflect on the merits of ideas that might otherwise be brushed aside in face-to-face interactions.

SLOW STUDENTS ARE LESS EMBARRASSED

In traditional classrooms, the slower-thinking students face inevitable embarrassment. But in computer-mediated CL, no one has to know how long it takes for any given student to generate the work for the group effort. Slow students now have a chance to do good work, to get recognition for it, and thus become motivated. The group deliverable can benefit from the work of slow students, work which could otherwise be lost in typical face-to-face team activity.

EVERYBODY HAS TIME TO DO GOOD WORK

Not only slow students, but every student in a group, has time to think in a computer environment. No longer must the group depend on whatever comes to mind during a face-to-face meeting. Each group member has time to gather information, integrate it, and reflect upon its relevance for the group deliverable. My own observations have been that quality of student work improves. Even discussions in a computer environment are more rigorous than those I used to get when I tried to conduct discussions in class.

BETTER FOCUS ON THE JOB

Social interactions can be distracting. They may also lead to stress and conflict. In the computer environment, students find it easier to focus on the tasks at hand. Social stress and

conflict may still occur, such as when a group member underperforms the expected role, but the remedial efforts can be less personalized and threatening in computer-mediated collaboration. In the on-line portion of my courses, for example, I provide a group-process work space where students can resolve problems they are having with the process or with one another. Discourse can be more dispassionate and objective than in face-to-face encounters, although the computer environment does not guarantee objectivity. Providing a special place for group-process discussion also reminds the students of the importance of developing team-working skills, and they teach that to each other.

WORK IS MORE EFFICIENT

In an asynchronous collaboration, students and teacher work more efficiently because they select when to participate and how long to participate in any given work session. Thus, they can accomplish productive work even in short periods where the time might otherwise be wasted. The automated organization of materials in the computer environment also make it easier to integrate documents, especially if they can be linked in context. Finally, the collaborative software provides fast and efficient searches of the files.

WORK CAN BE ANONYMOUS

Try being anonymous in a face-to-face group. Collaborative software can be set up so that participants can be anonymous all the time or only when certain kinds of input are being supplied. >From a pedagogical perspective, anonymous participation violates the spirit of team learning, and I thus would not encourage it as a general option. But anonymous input might be useful, for example, when a student feels that particularly harsh criticism is unavoidable for certain members of the team or for the teacher.

PRIDE OF OWNERSHIP

In collaboration software, students have equal opportunities to create a dynamically evolving academic deliverable. The contribution of each student is more tangible and documentable than in traditional face-to-face CL. Each student feels a sense of ownership, even for material written by other members of the group, because the student can see how everyone's thinking was reflected in the final deliverable. With ownership of a product that each student helped to create, students have verifiable evidence of their learning achievements. This evidence is motivating, helping to build confidence in the ability to do creative things and to nurture self esteem. Every experienced teacher knows that confidence and self esteem are essential elements for the most effective learning.

One last point: with collaboration software, class never has to end. Deliverables can always be extended at some later time. They may be used as starting points for new projects for other

student teams. As historical documents, the team deliverable becomes packaged in a way that shows how the deliverable came into being. Those processes can serve to guide future developments of the academic work.

Given all these advantages, it should be easy to see why I can never go back to my old instructivist approach to teaching. I hope, for the sake of your students, that the same paradigm shift will occur for you.

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