Computer-Mediated Communication and the Online Classroom in Distance Learning

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The following is the introductory chapter of Computer-Mediated Communication and the Online Classroom in Distance Learning, *the third volume of a three-book series,* Computer-Mediated Communication and the Online Classroom, *published this year by Hampton Press (Cresskill, NJ).*

Introduction: From Marks in the Sand to Computer Conferencing Via Fiber Optics

Throughout the history of human communication, advances in technology have powered paradigmatic shifts in education (Frick, 1991). Technology changes both what we can do and what we decide is best to do; big shifts in culture cannot occur until the tools are available. The printing press is an example. Before its invention there were people who could read and write; yet not much reading and writing took place because, for one thing, books were costly and scarce. The press enabled widespread literacy, with books accessible and more affordable for all. The spread of literacy in turn changed both the educational system and the class structure, with consequences that still shape our attitudes today.

When people began to accumulate knowledge through the technology of writing and reading, they found a way to preserve it through succeeding generations without relying on memory -- greatly changing the way education was conducted. The impact of the printing press on students of the time has been analyzed and

reanalyzed. No longer did students have to write or remember everything the teacher delivered; students could use books. But they did not completely give up the oral/aural connection; witness the popularity of lecture classes even now. As new technology enables shifts at the level of delivery, old technologies are augmented, not totally replaced. Even though many of us have computers at our disposal, we still use books, speech, and pen or pencil writing in education.

More recently, the general availability of electricity has fostered an almost universal use of such inventions as radio, television, and, increasingly, computers. For decades, educational technologists have likened the impact of television and other electronic ways of presenting information to the impact of the printing press on learning. Although to date television has not had nearly the impact on school learning that books have had, we have yet to determine whether its impact on education as a whole will be as great and long lasting. Schooling is only a part of education.

Much of education takes place outside of schooling, both as planned activities and unplanned learning. We may not understand the instructional goals of the Music Television (MTV) channel broadcasts, and those goals may differ from those of educators, but that does not mean MTV viewers do not learn anything. Ultimately we must consider what kind of world we as educators want to build. If we envision the merger of computers and telecommunications as a new tool for teaching and learning, now is the time to clearly articulate and promulgate our goals in order to shape future uses of instructional technology.

Educational Systems

For communications to take place, at a bare minimum, there must be a sender, a receiver, and a message. If this message is intended as instruction, then besides student, teacher, and content, we must also consider the environment in which this educational communication occurs -- an environment that benefits the educational system in some ways and constrains it in others. Part of this learning environment can include various technologies and media. If "the medium is the message," that is, if technology changes what we can do and how we think about it, then the various media enabled by instructional technology also change both what we can do in education and how we conceive of it.

For many years, educators have been exploring ways to combine theories of differing learning styles and student- constructed knowledge with the theory of practice-centered learning. Instead of being passive recipients of knowledge, we now consider students capable of constructing their own knowledge with guidance from the teacher. We can offer part of this tutorial guidance by setting up an environment that will provide students with the resources necessary for independent exploration. In using emerging computer-based technology as a resource, students are encouraged to explore their own interests and to become

active educational workers, with opportunities to solve some authentic problems.

As an agent for socialization (Margolies, 1991) and collaboration, the networked computer has an even greater potential in education than does the stand-alone, knowledge- server type of computer. The active environment of social learning provided by a computer with access to local, national, and international networks increases interaction and communication among students, their teachers, peers, parents, and other members of the world community. Although there are some differences between distance education and classroom education, the significant issues concerning the use of computer networking and other emerging technologies to promote learning in both are similar.

From Distance Education to Distance Learning

In addition to being entertained, viewers seem to learn from the Music Television (MTV) channel's eclectic mix of music videos, news, instruction, and information on the world of popular music and performers. Broadcast at a distance, MTV's educational content appears largely unplanned in the sense that educators are not directly involved. However, the distance education now originating from universities and colleges attempts to plan educational content and activities for students removed in place and time from their instructors.

Historically, we have not done a very good job of implementing the concept of learner-centered education in distance education. As Thornburg (1991) points out, it is difficult, at best, to instill a mindset of lifelong learning in others if we do not understand it and demonstrate it ourselves. One of the reasons that we have failed in this area has been that the tools were not available to do much besides deliver education (as opposed to enable learning) at a distance. Now, computers and telecommunications have opened the way to formats other than pen- and-paper correspondence courses and allow for a more interactive, integrated learning environment.

The type of change enabled by computer-mediated communication (CMC) does not just involve adding new technology to old ways of organizing teaching and learning (Moore, 1993). Although the perennial problem is still one of instructional content and design, we must not pave over old cow paths. In the following chapters, we discuss how education is changing. The paradigm shift is from a teaching environment to a learning environment.

Another notion current in educational circles is that we need to develop motivated, skillful, lifelong learners. As knowledge in many fields increases exponentially, we cannot hope to fill up students as if they were passive, empty vessels. During formal schooling, aspiring professionals can only begin to take in the amount of information that they will need during their career life times. The knowledge base of certain fields may have appeared static for decades, but we can

no longer accept that view. Therefore, we must teach students to become lifelong learners by helping them locate the resources to continue learning.

Distance educators are now beginning to focus on a related set of notions: (a) there are different learning styles, (b) students create their own meaning when learning new things, and (c) what makes a difference in content retention and transfer is not so much what is done by teachers, but what students as learners can be encouraged to do themselves.

Much has been written about the importance of accommodating the learning styles of different kinds of students. Suffice it to say here that too often students have little choice in what to learn, how to learn it, or when to learn it. The body of literature on constructivism which has emerged over the past few decades has also contributed to our understanding of learning styles. When content is meaningless to the students' world view, when they are taught as if they were passive recipients of knowledge, or when they have little engagement in the instructional tasks, students have no incentive to construct their own knowledge and little motivation to retain information or transfer its use to novel situations.

The notion of practice-centered learning (PCL) is also important to distance learning. As we learn more about how learning occurs, it becomes increasingly clear that the educational process takes place in a complex internal and external environment. One of the teacher's roles is to become the creator of an effective external learning environment that stimulates the environment within. How do teachers and developers of instruction create environments that are conducive to and enhance student learning?

The technology that can help provide these new environments for education is emerging. This technology allows us to utilize such methods as cooperative learning, to recognize such concepts as interdisciplinary needs in education, and to provide an environment in which collaborative efforts are rewarded. These methods foster a view of knowledge in which expertise is distributed and created among the different participants (Collins, 1991). Now there is no shortage of technology, only a shortage of the educational vision necessary to use the technology to create new educational environments.

How Computers and Telecommunications Fit In

What we have been discussing is a reengineering of education, not only in the sense of rethinking the organization of site-based schools, but also in the sense of finding ways to unite computers and telecommunications and bring down the schoolhouse walls; to deliver instructional content when and where it is needed-whether in the home, the workplace, or the school.

Computer-mediated communication (CMC) promotes a type of interaction that is often lacking in the traditional teacher- based classroom. It allows learners the

freedom to explore alternative pathways-to find and develop their own style of learning. What if content could be delivered in the form of graphics, text, and/or full-motion video, whenever and wherever in the world it is requested? How do we, as teachers and educators, responsibly participate in and make use of the inevitable technological changes at hand?

Computers are not a threat to the teacher (although the role of the teacher must change when using them), but computers may threaten the chalkboard. Computer technologies allow professionals to share with students tools that we use daily. Further, as educators, we can provide guidance to help students develop meaningful ways to construct their own knowledge, much as we ourselves do.

Technology enables us to implement these new visions in distance learning. Berge (in press) points out that: "[T]echnology makes it possible that these investigations are not limited to students from one classroom, school, grade, or country necessarily-nor to exclude experts in the field of inquiry from the collaboration. Effective learning hinges on active engagement by the student and the construction of knowledge on their own leads to understanding (Sheingold, 1991). This learning is not a solitary process. Rather, it occurs in a larger world of people and technology."

CMC and networking in general can promote long-distance collaboration among students and content specialists in many different areas. The integrated use of technology offers many educational opportunities and possibilities when driven by sound visions of learning. The students' ability to create knowledge can be enhanced when their instructors use varied instructional delivery formats to provide a richer environment than is used in most distance education practiced today. However, as Sheingold (1991) points out, these ambitious new goals for student learning, along with radical changes in the students' roles those goals bring about, must be met with radical, ambitious changes in the educational process. Indeed, information technology offers options for reorganizing and refining distance education. But our new visions of distance learning must drive our decisions about our use of technology, not vice versa.

Although major cultural shifts do not occur without the tools that make them possible, once those tools are at hand, the shifts are inevitable. Emerging technologies, such as interactive television and the "superhighway" for information exchange, may look different depending on who builds them (e.g., telephone companies, cable television companies, federal governments), but we may be assured that they will be built by someone. How we as educators will participate in this enterprise is a issue that deserves our closest attention. More than merely a shift within education, our participation in this movement will bring about major shifts in society and culture. As the number of students outside the ages of 18 to 25 increases, and the number of persons requiring off-campus classes rises, the very existence and future of a university or college may

hinge on serving this newly defined and diverse population. In this book, we hope to show how CMC can help serve that population.

In combination with other media, computers can utilize an instructional design that teaches to the multiple intelligences that Gardner (1983) speaks of in *Frames of Mind* (linguistic, logico-mathematical, intrapersonal, spatial, musical, bodily kinesthetic, and interpersonal). The idea behind this instructional design is to use as many methods and formats for instruction (e.g., small group discussion, graphics, lecture, hands-on labs, writing/reflection, sound, CMC, and conferencing) as possible, provided that instructional goals and design dictate their use.

Examples of CMC in Distance Learning

The authors in this book use technological advances that enable them to start implementing some of the educational ideas we have been discussing with their students. Instead of unwittingly supporting isolated efforts by individual distance learners, they encourage discussion and collaboration. Rather than an institutional or teacher-centered approach to instruction, these educators take a more learner-centered approach.

Educators around the world are experimenting with and laying the foundation for new opportunities for learners to access education through connections and technologies that did not exist 10 years ago. How will these new options affect our understanding of the educational process? What provisions should we be making now to prepare ourselves and our students to use this new technology of CMC in the most pedagogically sound and cost effective ways? To begin to answer some of these questions, Justus Lewis, Janet Whitaker, and John Julian in Chapter 1 identify models for distance education and discuss some of the issues raised and opportunities provided by computer communications within distance-learning environments.

Morten Paulsen in Chapter 2 presents an array of illustrative CMC applications for online classrooms and distance education programs. Each application is classified according to its predominant communication paradigm: one-alone, one-to-one, one-to-many, and many-to-many. Included in the one-alone section are applications that utilize online resources: information (online databases and online journals), software (online applications and software libraries), and people (online interest groups and individual experts). As examples in the section on one-to-one CMC, Paulsen includes learning contracts, mentorship, apprenticeship, and correspondence study. These applications are characterized by one-to-one relationships and by individualized learning.

In discussing one-to-many applications, such as lectures and skits, Paulsen differentiates them from other forms of CMC by their use of presentation

techniques in which learners are not usually invited to interact. With many-to-many CMC applications, all participants have the opportunity to take part in the kind of interaction that can be facilitated in computer conferencing systems. In this section, Paulsen discusses such techniques as debate, simulation, role play, discussion groups, transcript- based assignments, brainstorming, the delphi technique, the nominal group technique, and project groups.

In conclusion, Paulsen notes that the applications presented are by no means meant to constitute an exhaustive list. They represent, however, a comprehensive set of examples that show the range of techniques available for designers of CMC courses.

Effective design is essential to the success of an online course, and the next chapter focuses on design. Using their recent experience designing an online adult education graduate seminar as an example, Dan Eastmond and Linda Ziegahn (Chapter 3) outline essential issues, considerations, and tasks for instructional development with CMC to which the course designer must attend. These considerations include overall course design issues, resource allocation, syllabus creation, activity selection, online structure production, and evaluation planning. Appropriate attention to these items during the design phase informs the development and delivery phases of the online course, thereby creating a "good learning experience" for adult college students.

Morten Paulsen's second chapter (Chapter 4) presents a review and analysis of the literature relevant to moderating educational conferences on computer networks. He suggests that moderators should identify their preferred pedagogical styles, based on their philosophical orientation, their chosen moderator roles, and their preferred facilitation techniques. The author assigns the moderator role three functions: the organizational, the social, and the intellectual. To help moderators improve their moderating skills, Paulsen organizes facilitation techniques recommended in the literature according to these three role functions. Finally, the author assists moderators in finding their pedagogical style by identifying some possible philosophies, roles, and facilitation techniques discussed in the literature.

Rae Wahl Rohfeld and Roger Hiemstra (Chapter 5) draw on their experience teaching in the Syracuse University Distance Education Program to examine the experiences of both course facilitators and students in courses delivered via CMC. They found that effective courses via CMC are based on a learner-centered approach to education in which facilitators and students share responsibility and participation in learning and teaching. To initiate such a process, facilitators must make sure they and their students have adequate training and support on the electronic system. They must also do a great deal of advance planning to teach a course via the new medium. By initiating a variety of activities, both on and off-line, facilitators can encourage an active, challenging learning environment. As the class conference progressed, Rohfeld and Hiemstra found that different strategies

were necessary to keep energy high.

Those involved in the Syracuse University Distance Education Program were highly satisfied with this mode of learning once they got past initial difficulties with technology. Because the courses were delivered by CMC, students were able to take considerable control over their learning in terms of how they scheduled both personal study time and group-interaction time, how much personal contact they had with the instructor and other learners, and how they contributed to the class. Rohfeld and Hiemstra are confident that courses delivered via CMC can meet immediate learning needs as well as help learners increase self- direction in their ongoing learning.

In the sixth chapter, Morton Cotlar and James N. Shimabukuro describe their use of electronic guest lectures to stimulate thinking and interaction among students. This technique, like other applications of CMC in education, shows promise. However, the degree to which students interact in meaningful ways with the guest lecturers seems to be related to the style of the lecture. Three different lecturers addressed a graduate course (through text documents posted to the class discussion group, with the invitation for follow-up questions and discussion) and evoked markedly different degrees and types of responses. The authors analyzed the style of each lecture to explore the relationship between style and responsiveness. Extraordinary findings showed that the extent of personalization and readability in the lectures strongly influenced responsiveness. Cotlar and Shimabukuro invite others to replicate this kind of study to validate their findings.

Rachelle Heller and Greg Kearsley (Chapter 7) describe their experiences using a combination of instructional television and a computer bulletin board system (BBS) to teach graduate students in computer science and education. The television component provided a medium for lectures, guest interviews, and software demonstrations, whereas the bulletin board was used to stimulate interaction among students and the instructors. Heller and Kearsley used a variety of different strategies to encourage interaction on the BBS, including assignments, discussion questions, and team activities. Based on the evaluations completed by the students in their courses, the authors concluded that the combination of media works very effectively.

In Chapter 8 Alexander McAuley describes an innovative use of CMC to support cost-effective communication links across wide distances in the Baffin area of the Canadian North West Territories. The region's 3,100 kindergarten to Grade 12 students attend 20 schools, and approximately 90% of the students are Inuit and speak Inuktitut as their first language. The current heart of K-12 CMC on Baffin Island is an electronic bulletin board, with electronic mail and a conferencing system (supporting both synchronous and asynchronous communications) called "Takujaksat," which translates roughly from Inuktitut as "things you might like to see." One of the most interesting and successful projects to make regional

use of Takujaksat is an electronic newsletter called TGIF. Made up from contributions submitted by students from around Baffin, it is compiled, edited, and distributed electronically every Friday by students at Takijualuk School in Pond Inlet.

The Baffin School District's efforts to increase the use of CMC include providing an online component intended to follow up all face-to-face staff in-services and sponsoring projects that require student interaction via the online environment. The district also encourages interested teachers to coordinate and plan a project together through CMC and present it in the classroom. They then identify those teachers who are predisposed to work in this collaborative manner and attempt to match them with people and projects they will find rewarding and exciting.

In justifying the support for CMC in Baffin schools, McAuley's examples also indicate a number of requirements for success: (a) CMC must have a strong user base at the local level before it can be widely used at a distance, (b) effective use of CMC demands specific conditions and skills, and (c) teachers and students must be supported in acquiring those skills. The author notes that future work will focus on all three of those areas.

Claire McInerney (Chapter 9) explores a method of integrating CMC within the curriculum of a course on communications technology designed for nontraditional students studying information management. Through anecdotal evidence drawn from student and faculty experiences, McInerney looks at some of the anticipated outcomes of CMC as well as the unanticipated benefits and limitations of CMC.

Ken and Carrie Loss-Cutler represent a growing group of homeschooling parents who are incorporating CMC into their curriculum and taking advantage of the resources available on the Internet. In Chapter 10 the Loss-Cutlers provide details on the various electronic discussion groups that deal specifically with alternative schoolers' interests and describe some of the beneficial network-supported activities available to homeschooled students.

Since 1986 Jason Ohler has directed a Master's degree program in Education Technology at the University of Alaska, Southeast. Although the program seeks to empower teachers to be effective, creative, and socially responsible users of a wide range of new technologies, one area of instructional technology receives particular emphasis: educational applications of telecommunications and CMC. During the past six years, Ohler has taught, worked with, provided in-services for, and consulted on numerous projects by K-12 teachers and students in the field of educational telecommunications. This is the experiential base that informs Chapter 11.

Ohler provides a vision as well as a practical road map for educators wishing to offer extended training in telecommunications to fellow K-12 teachers and their

students. As the basis of this chapter, Ohler uses the syllabus of a 15-week course on educational telecommunications for the classroom teacher he has been teaching for the past five years.

In Chapter 12 Christopher Baker and Thomas Buller observe that primary and secondary school systems are so burdened by a lack of funding that they usually cannot afford the tools and connections needed for CMC. Dedicated, wide-area computer network connections offer many features ranging from e-mail to peer discussions and have the potential to revolutionize education, but these dedicated connections are currently too costly for struggling K-12 schools. However, specialized access services such as NGS Kidsnetwork, CompuServe, and Argonne's NEWTON offer teachers and students a chance to experience the "global classroom" without the global price tag.

Ava L. Fajen and J. Scott Christianson examine the use of Bulletin Board System (BBS) networks as an educational resource, specifically in primary and secondary classrooms, in Chapter 13. BBS networks are distributed group conferencing systems (Santoro, 1993) that allow teachers and students from around the world to interact with each other electronically in "virtual classrooms," sharing information and collaborating on learning projects. This chapter presents a brief history of BBS networks, explains the basic principles of BBS networking, and explores two BBS networks devoted to K-12 education: the Free Education Mail (FrEdMail) network and K12Net (a subdivision of the Fidonet BBS network). The authors also present a short summary of off-line mail readers, electronic mail tools used to decrease online time and costs.

Jill Ellsworth (Chapter 14) discusses not only specific sources of information useful to distance educators, but also covers some of the principle information management tools available on the Internet: Archie, Gopher, Veronica, and Worldwide Web. Scholars on the net can use these tools to locate a variety of information resources available through the Internet.

Online information about distance education comes from many sources and is available in many forms. There are several scholarly discussion groups distributed via LISTSERVs, for example, that focus on issues of concern to distance educators. In addition there are archives of papers, conference announcements, calls for papers, electronic journals, literature reviews, software, books, guides, library catalogs, resource databases and more-all accessible with a few keystrokes .

The key to accessing Internet information, says Ellsworth, is to gain familiarity with the sources and to use them regularly. Users need to take the time to keep up with the Internet, a dynamic system in which the resources can change every day, and to which new, more user-friendly search tools are constantly being added online. ¤

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