Noting that journalism and mass communication educators have experimented broadly with computer applications since the 1970s, this paper suggests that momentum is building in the 1990s in three areas (industry imperative, social significance, and pedagogic promise) to integrate computer-mediated communication (CMC) into the journalism and mass communication curriculum. The paper first defines CMC and discusses its development. The paper then notes that knowledge of and facility with CMC is becoming a requirement for the computer literate professional of the 1990s. Two general approaches toward the pedagogic use of CMC are outlined in the paper: adoption of CMC in every course as a supplemental means of student-professor and student-student communication; and introduction of CMC into target core courses (such as media law, reporting, and media management) where CMC would facilitate communication with and among students, and also enhance the instruction of a number of topics already addressed in various courses. The paper also discusses general points to consider when putting a class "online," such as: establishing students' computer accounts; creating a new bulletin board or participating in an existing board; motivating usage of CMC; and developing a student guide for the e-mail and bulletin board technology. The paper concludes that educators must find ways to overcome initial resistance among students and colleagues to CMC, and must locate niches in the curriculum in which CMC could be usefully integrated. Sixty-nine notes are included. (RS)
BECAUSE IT'S TIME:   
TEACHING COMPUTER-MEDIATED COMMUNICATION

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Introduction

Three forces have driven the increasing prominence of the computer in journalism and mass communication in the last 25 years. The first has been the transformative application of the technology in many sectors of the media industries. For example, shortly after computers were introduced at newspapers to streamline the production process, journalism instructors began changing the way some professional skills were taught to keep their graduates competitive in the job market: reporting students received instruction in typing in "OCR" style on IBM Selectrics, and editing students took turns doing exercises with "pencil, glue pot and scissors" and at "CRTs."

Second, the diffusion of the computer into ever larger spheres of American society has occurred. For example, as government activities became increasingly computerized, and thus monitorable only via analyses of electronic data, journalists recognized that they would need new kinds of training to effectively work their beats: computer-assisted reporting.

Third, the pedagogic usefulness of computers has been recognized by instructors. The early emphasis was on using computers to escape the drudgery of teaching. For example, journalism educators saw an opportunity to delegate to the
computer repetitious tasks such as writing the same correction over and again. They also began to off-load instruction in remedial areas such as grammar and spelling and rudimentary topics. Later the emphasis shifted to using the computer to help create a more "realistic," and thus more stimulating, learning environment. For example, through reporting simulations such as William Smith's "Bayshore Blast," instructors of beginning reporting courses were able to forsake the tired pedagogic tool of fact sheet and role-play for "an engrossing computerized race against the clock to gather information from sometimes reluctant sources."8

Although journalism and mass communication educators have experimented broadly with computer applications since the 1970s, one application remains on the periphery--computer-mediated communication9--due to a deadly combination of lack of industry interest,10 lack of social significance,11 and lack of awareness by educators.12

But momentum is building today in each of the three key force fields of industry imperative, social significance, and pedagogic promise to integrate computer-mediated communication into the journalism and mass communication curriculum. The purpose of this article is to review the developments that are making knowledge of and facility with computer-mediated communication necessary for professional competence in the 1990s, to explore the opportunities that exist in the journalism and mass communication curriculum
for such an introduction, and to offer some practical suggestions drawn from the authors’ experiences in putting their classes "online."

**Definition of Computer-Mediated Communication**

We define computer-mediated communication as communication among individuals facilitated by computer hardware, software, and a hardwire or telecommunications link. Such communication, conceptualized by Dominick as "machine-assisted interpersonal communication" has been described as "a new medium for building and maintaining human relationships." It lies in a blurred territory "between 'mass' and individual communication as well as between private and public spheres of communication."

Software design has shaped computer-mediated communication into several different forms, including:

- Electronic mail (e-mail), in which messages meant for private perusal are distributed electronically to an individual’s computer account or to a "mailing list" of specified individuals’ accounts;

- Bulletin boards (BBS or boards), in which individuals post a jumble of public messages for the perusal of others with similar interests by dialing into a computer whose memory has been designated to serve as the equivalent of a cork board;

- Conferencing, in which ongoing discussions on specified topics by a group of individuals take place by
organizing participants' asynchronous queries, responses and statements into a file distributed to individuals' accounts or accessible at a designated computer;

* Chats, in which "real-time" impromptu or pre-arranged conversations take place between participants online as if on a CB radio.17

Development of Computer-Mediated Communication

The momentum that is building to embrace computer-mediated communication as a professional competence is due to the diffusion of this form of communication into ever-broadening spheres of American society in the last 25 years.

The beginning of computer-mediated communication dates to the early 1960s, when message-passing programs were developed for multi-user mainframe computers that allowed an operator logged in on the system to pose questions, tell jokes or just say "Hi!" to another logged-in operator. At first, this was only a novelty because all computer users sat in the same refrigerated room, but when terminals began to migrate down the hallway and across the campus, such programs, along with rudimentary mail and bulletin board programs, helped foster user communities.18

The creation of the nation's first computer network was the next significant development in computer-mediated communication. The U.S. Defense Department's Advanced Projects Research Agency funded a network in 1967 to serve as a laboratory for cutting-edge ideas in defense-oriented
computer science and to get more bang for the research buck by having its contract researchers share computer resources. The first node of the ARPANET was established at UCLA in 1969; by 1971 the number had grown to 15 nodes, and by 1973, more than 35. Early usage data showed that the heaviest traffic on the network was electronic mail. To be "on the net" in the 1970s was to be a member of the computer science elite, and connections were highly coveted. Early hackers credit mailing lists developed on the ARPANET for turning geographically isolated, computer-obsessed individuals into a "worldwide hacker community."

The appropriation in the 1970s of computer-mediated communication by government, business and researchers outside the defense nexus marks a third stage in the diffusion of computer-mediated communication. As Cross and Raizman noted, "the pioneer users were financially strong organizations that depended on swift, efficient communications. These included airline, transportation, insurance, and publishing companies, as well as the U.S. Government." Some notable advances during this period included:

* The development of the first computer conferencing system, in 1970, by a researcher in President Nixon's Office of Emergency Preparedness, implemented as a means of inter-office coordination during the wage-price freeze of 1971;

* The launch of the first public packet-switched network, Telenet, in 1975, by Bolt Beranek and Newman, the
think tank hired by the government to create the ARPANET, offering an infrastructure for private networks and computer-mediated communication services for business;\textsuperscript{25}

* The development of new networking technologies at corporations such as Xerox, IBM, Digital Equipment and AT&T, initially used to link up their own employees, but later offered to commercial customers;\textsuperscript{26}

* The organization of a number of new wide area networks to serve the communication needs of academics, many of whom were interconnected through the use of "internet" protocols to the privileged ARPANET users, creating what became known as the Internet.\textsuperscript{27}

After 1975 computer-mediated communication became a "convivial tool" available to members of the general public who owned the latest technological gadget, a personal computer.\textsuperscript{28} Hobbyist clubs such as the famous Homebrew Computer Club put their computers to use keeping up with other hobbyists through accounts with firms offering time-sharing services.\textsuperscript{29} Within a couple of years, this activity shifted to bulletin boards run on individual computers.

In 1978, the first hobbyist computer bulletin board was available in Chicago using a personal computer and a home phone line. It is estimated today that more than 32,000 hobbyist bulletin boards are operated today in the United States.\textsuperscript{30} Beginning in the 1980s, many bulletin boards became linked into networks large (such as FidoNet with more
than 2,500 boards) and small (such as Gaycom with about 20 boards).\textsuperscript{31}

At the same time "information utilities," in which computer-mediated communication was one of the core activities, were being marketed to personal computer users of services such as Delphi, the Source, CompuServe, and GEnie.\textsuperscript{32}

CompuServe Information Services, whose corporate roots are in the time-sharing business, launched MicroNET in 1979, after doing research of the European videotext services. Initially offered free to the 1,200 members of the Midwest Affiliation of Computer Clubs, CompuServe by 1980, had 2,500 subscribers. This grew to 10,000 by 1981; 100,000 by 1984; 500,000 by 1989, and 940,000 by 1991.\textsuperscript{33}

The result of all of these developments in the short span of 25 years is a complex weave of computer networks--many interconnected to span the globe, but just as many limited in scope--labeled by various observers as "the matrix," "Worldnet," or simply "the Net." Through these networks, millions of people have overcome not insignificant technological obstacles to engage in computer-mediated communication for purposes ranging from advancing knowledge and advancing political agendas, to making deals and making friends. As one librarian noted in 1990, "Computer networks are no longer just for computer scientists and hackers."\textsuperscript{34}
Significance of Computer-Mediated Communication to Journalism and Mass Communication Professionals

Knowledge of and facility with computer-mediated communication is becoming a requirement for the computer literate professional of the 1990s because computer-mediated communication is becoming increasingly adopted by media organizations (as by other business organizations) and is being diffused among media professionals (as among other professionals) along with other forms of information technology such as word processing, spreadsheets, databases, expert systems, decision support systems, etc. For example:

* Media companies are among those firms supplying computer-mediated communication services in the market;\(^3\)

* News, public relations and advertising organizations are adopting computer-mediated communication as a means of internal coordination;\(^4\)

* Computer-mediated communication has become an increasingly important means of networking and professional development for professionals;\(^5\)

* Journalists are using computer-mediated communication as a means of information-gathering;\(^6\)

* Computer-mediated communication has relevance for advertising professionals as a means of communicating with clients;\(^7\)

* Among the uses public relations professionals are finding for computer-mediated communication are corporate
communications, transmittal of news releases, and management of crisis communication programs.40

These developments suggest it is time journalism and mass communication educators determine a strategy for giving students an understanding of computer-mediated communication.

Teaching Computer-Mediated Communication

The typical reaction of journalism educators to arguments that yet another computer application must be squeezed into an already tight curriculum is resistance. But there are special circumstances in journalism education today that suggest educators should try to give students as broad an education possible in the applications of computers in professional work.

Demographic surveys of journalism students have shown for some years that the majority of majors are women.41 It has been argued that women, due to persistent socialization that technology and mathematics are the province of men, are less likely to achieve computer literacy than men.42 In a computer-driven industry such as the mass media, being unskilled in computer applications is no small handicap. However, educators can help empower their students become functionally literate with computers by incorporating computer applications of all kinds into journalism education. As Judy Smith wrote:43

Literacy is an empowerment tool for the disenfranchised; that's why so many Third World
liberation groups have literacy campaigns. Computer literacy can be the same type of liberating force for women in a technological society. Computers can give women an opportunity to manage technology: to gain a new competence in an area where many women are reluctant to enter.

If it is agreed that computer-mediated communication is a computer application worthy of journalism and mass communication professionals' acquaintance, survey data on user demographics suggest that computer-mediated communication especially should be incorporated in some fashion into the curriculum as women are an extremely small minority of present online communities.44

It is our aim to advance the idea that the pedagogic promise that some educators have already seen in computer-mediated communication can be extended effectively into many areas of the journalism and mass communication curriculum.45 Toward this end, we outline two general approaches toward the pedagogic use of computer-mediated communication. The first approach is to adopt computer-mediated communication in every course as a supplemental means of student-professor and student-student communication. The second approach is to target some core courses in the curriculum where the introduction of computer-mediated communication not only would facilitate communication with and among students, but also could serve to enhance the instruction of a number of topics already addressed in various courses in the curriculum.
Class Communication Approach

The premise behind the first approach is already widely accepted in journalism and mass communication education: each course in the curriculum should contribute in multiple ways to the development of students' professional skill. One example of this premise is the requirement that even if the course is journalism history the written work submitted should meet the minimum professional standards of accuracy, clarity, brevity and punctuality. Thus, any and every course might be tapped as an opportunity to give students experience with computer-mediated communication by establishing it as a means for communication between student and professor and among students, and by encouraging its use through incentives such as extra-credit points or through required assignments.

Besides giving students an orientation to the phenomenon of computer-mediated communication, our experiences suggest that adopting e-mail and bulletin boards as a mode of classroom communication provides benefits similar to those discovered in the business environment.

The introduction of computer-mediated communication has been shown to result in increased communication, particularly between those in different levels of the organizational hierarchy. Such a hierarchy describes the typical relationship between students and instructors in a large lecture class. One author who put an introduction to
the media course with more than 150 students online found computer-mediated communication helped overcome the limits of face-to-face communication in the large lecture setting. In the beginning of the term, several students used their e-mail connection to issue an ironic critique about the poor learning conditions in a class of that size by engaging the instructor in a "guess who I am" game, sending a new clue via e-mail before each class session. Over the course of the term, critical comments on lectures, jokes, advising questions, requests for appointments, apologies for absences, and the occasional cries from a young adult in existential crisis, were sent from a good cross-section of the students. Far-ranging dialogues developed between the instructor and a core group of e-mailers. In general, students were enthusiastic about having e-mail as an alternative to crowding around the instructor at the podium, waiting in a long line at office hours, or playing telephone tag.47

The introduction of computer-mediated communication in business organizations also has been shown to foster efficiency in team work situations "by providing people with a 'place' to meet whenever necessary and a way to access common files."48 Another author, who used e-mail and an electronic bulletin board in a television news reporting class to communicate with students about story assignments, upcoming events of interest, and general class management issues, found that the technology was particularly helpful
for students to communicate with one another about scheduling camera gear or helping on story shoots. For example, if a student working on a story needed a photographer, he or she could place the request for assistance on the class board.

Computer-mediated communication has proven useful in the business environment in facilitating problem-solving among colleagues. One of the authors uses e-mail to facilitate peer evaluation of student news stories. Previously, accomplishing this goal required cumbersome coordination of photocopied texts. Now, a document can be sent through electronic mail to all classmates or a selected group of classmates by invoking a simple send command. The classmates can then edit the document and electronically return the new version to the student author as a mail reply.

Computer-mediated communication also has been shown to be an excellent tool in business organizations for people who have trouble expressing themselves or being understood in face-to-face situations. Included among this group may be the very shy; people who cry easily when they are upset and are embarrassed by this; people with disabilities that affect their speech; and non-native speakers who are not fluent English conversationalists. Adopting computer-mediated communication as a medium of student-faculty communication and class interaction may provide liberating options for some students because it gives them more control.
over their messages than they have in face-to-face encounters.

Topic Illustration Approach

The introduction of computer-mediated communication can serve as a useful means of communication in any class. But in some courses it can serve an additional pedagogic function by illustrating topics that are being introduced into the journalism and mass communication curriculum in light of the diffusion of computer-mediated communication in society.

Introduction to the Media

It has become commonplace for textbooks for media survey courses to devote some attention to computer-mediated communication as part of an overview of future trends. This is a topic that students without computer-mediated communication experience often find difficult to grasp. As Hiltz and Turoff noted, "Just as it would be difficult to explain to someone who has never observed or participated in a face-to-face discussion or decision-making group the communications processes and social dynamics involved, so the best way to learn about computerized conferencing is to participate."53

Hands-on experience with e-mail and a bulletin board, and ideally a demonstration of an electronic information delivery service, would give students the same level of context for readings on computer-mediated communication that
they bring to the readings for newspapers, magazines, radio, television, etc.

**Media Law**

The leading textbooks in media law have yet to address the issues that are emerging with respect to computer-mediated communication. Among the issues are free speech rights and the application of libel, privacy, and obscenity laws.

The long-standing free speech debate has been framed not only by traditional First Amendment theory, but also by what has been termed the "Hacker Ethic." A specific controversy that has emerged in the debate is whether computer forums should be considered "electronic analogues to the parks and streets," or whether "system operators" or "moderators" of conferences should have "editorial discretion" with respect to other participants' messages. One significant development in the electronic free speech debate was the formation in 1990 of a civil liberties group, the Electronic Frontier Foundation, whose goal is to "preserve, protect, and extend Constitutional rights to the realm of computing and telecommunications technology."

Putting students online to study the importance of the communication that is at stake in the legal debate about electronic free speech rights would provide a basis for a more informed discussion of this important issue.
Reporting

Exposing students to different techniques of information gathering is one of the traditional tasks of reporting. This includes such prosaic topics as how to organize a notebook or present one's self on the telephone and more glamorous topics such as how to mine public records or search databases.

Along these lines, computer-mediated communication could be introduced as a means of "interviewing." Students' interest might be piqued by first reading a selection of journalistic pieces that involved information gathering via e-mail and bulletin boards. Then, they could be assigned a story that would require their utilizing the technique. An idea appropriate for beginning students would be to assign students to interview selected faculty across the university about how the new information technologies have changed their work.

Mass Media and Society

The expanding use of computer-mediated communication among Americans is a phenomenon with social and political significance that textbooks for courses in mass media and society are beginning to address both because of attention given the topic in the media and a growing body of research.

The most common issue to be addressed concerns political communication. Does computer-mediated
communication foster a more democratic society by providing a new outlet for discussion and mobilization among citizens? Or does it undermine democracy by enhancing the power of elites through the widening of the information gap, and by increasing the opportunities for "big brother" surveillance?

Discussion of such issues would be enriched by projects that engage students in direct examination of the phenomenon of computer-mediated political communication. One approach would be to adapt some of the questions posed in research articles about computer-mediated communication for class projects. Ogan's content analysis of the messages on a BITNET mailing list for Turkish expatriates during the first four weeks of the Gulf Crisis in 1991 could serve as one model.65

Media Management

A major theme in media management is the blurring between print and electronic media that is occurring with the rise of new communication technologies.66 One way the lines is blurring is through newspapers' launching of electronic services that combine information delivery, bulletin boards and e-mail capabilities.67

Students could be grouped into teams to develop a feasibility study for computer-mediated communication services to be offered by the local newspaper. A requirement of the project could be that there may be only a
certain number of face-to-face team meetings and that all other group communication should be via e-mail.

**Practical Considerations: Some Tips**

The logistics of putting a class online must be carefully considered. In this section we present some general points to consider drawn from the authors' experiences working both with local area and academic wide area networks.

Incorporating computer-mediated communication for the first time may require up to a term's headstart. Many details will have to be discussed with various technical and administrative personnel within the instructor's department and at the campus computing center. At a typical school, two approaches are available for getting students online: students may individually sign up for accounts on the host mainframe, or the instructor may seek a temporary project account for a course.

With a project account, an instructor may request a bulk number of accounts in advance of the first class meeting. At the first class meeting, the instructor coordinates the assignment of individual students to accounts and the creation of individual passwords. The instructor would then send this information back to the computing center for entry and can keep a copy to compile a master list of student names, computer addresses, and initial passwords.
Several advantages exist to signing up students via a project account rather than having them individually go to the computing center. First, students do not have to stand in yet another line; this increases the chances of getting everyone in the class on the system. Second, it is probably the quickest way to get students on the system, as course projects typically receive priority for posting. Third, complete records simplify troubleshooting for students who cannot log on, identifying "unsigned" messages and tracking down harassers. Students should be encouraged, however, to change their passwords once they have successfully logged on several times in order to protect their privacy.

Introducing a bulletin board into a course typically may require a separate set of negotiations with computer center personnel. A typical university system is interconnected with several wide area networks as well as local area networks. Students who are able to e-mail can participate in most of the bulletin boards on both the wide area and local area networks (with the caveat that posting on an international bulletin board system such as USENET will quickly deplete computer funds).

But a much more dynamic way to use bulletin boards is to request a course-only bulletin board on the university’s local network (sometimes called "electronic classrooms"). When the computing center creates the bulletin board, the instructor can ask to be programmed as the board moderator.
Moderator status allows the instructor to limit access to class members only, and to delete any messages, if desired.

The most time-consuming task awaiting the instructor, however, is developing a student guide for the e-mail and bulletin board technology. A complete guide, which may run between five and eight pages, single-spaced, should include the following information tailored to your university's system:

a) how to write a password and how to rewrite it;
b) where to e-mail on campus, including details on whether special passes are needed and the cost of the passes;
c) how to log on to the host mainframe from each of the machines in the different locations on campus and by a modem-equipped personal computer;
d) how to access e-mail and the bulletin board;
e) how to read and send messages on e-mail and read and post bulletin board messages;
f) how to log off;
g) e-mail and bulletin board "etiquette."

Educators should be prepared to deal with some pockets of resistance in learning this new computer application. In our experience, there are a large number of students who are very uncomfortable with computers. Special measures are called for to get such students off to a good start. For example, one of the authors invited any student who had one unsuccessful log-in inexperience to come during office hours
for a quick one-on-one tutorial. To make the manual seem less intimidating, a series of simple exercises for the different skills was devised. Another approach would be to ask students experienced with e-mail and bulletin boards if they would make themselves available at a designated hour at the computing center and provide tutorials for their classmates.

Educators should also try to leverage the enthusiasm that many students will have for learning about computer-mediated communication. Providing a reading list of popular press articles about computer-mediated communications with special reference to their use in journalism and mass communication professions is one suggestion. Another is to include a directory of e-mail addresses for departmental faculty and other university officials, if available. In the packet given by one of the authors, a photocopy of an ad run in the student newspaper by the president of the university publicizing his e-mail address and inviting correspondence from students, faculty and staff, generated considerable enthusiasm among students.

Perhaps more critical in motivating usage of computer-mediated communication is for the instructor to provide incentives for students to use it. One author sent twice-a-week mailings to all students, and answered all personal e-mail promptly to show that it was a useful medium for communication. Extra credit was awarded for participation in discussions on the class bulletin board, and if
particularly interesting dialogues took place, mention was made in class. In addition, the instructor required one short assignment to be e-mailed during the term.

Conclusion

More than 20 years has passed since the introduction of computers to journalism education. Despite initial resistance, many journalism programs incorporate the use of computer technology in courses, particularly in reporting, writing and editing courses. As we approach a new century, journalism educators must now take the next step, and, as Byron Scott has argued, provide journalism students with the knowledge of how to use the computer as a tool for interpersonal communications. We believe that if journalism educators are going to teach that lesson, they must take two steps.

First, educators must continue to find ways to overcome initial resistance to the computer-mediated communication, both among students and colleagues. They must become familiar with the computer-mediated communication, a process increasingly underway among AEJMC members through exchange of e-mail correspondence with journal editors and colleagues, participation in electronic forums, publication of e-mail addresses in the AEJMC directory, the development of online academic journals, and increased interest in research in computer-mediated communication.
The second step is to locate niches in the curriculum in which computer-mediated communication could be usefully integrated. We have attempted to contribute to this second step by suggesting strategies that would exploit the pedagogic usefulness of computer-mediated communication.

Using the computer as a communication tool in the classroom can be painstakingly hard work, especially at the outset of a course. Students who are not computer literate may not only resist the computer-mediated communication, but also the computer altogether. Simple, required exercises, however, can go a long way toward overcoming the resistance and demonstrating to students that using the computer as a communication tool can enhance interpersonal relationships with both the instructor and other students.

Once the instructor has established the importance of computer-mediated communication and has created an environment where students feel comfortable using it, the possibilities for its use as a teaching tool seem limitless. The technology offers an opportunity for educators to take learning outside our experiences and the four walls of a classroom: It creates chances for students to participate in continual open dialogue and to receive constant feedback. Perhaps most significantly it allows exploration of critical social and legal issues that face a world increasingly reliant on the very technology itself.


9. In our literature search, fewer than a half-dozen direct and indirect references to computer-mediated communication in journalism and mass communication were located.

10. American publishers who experimented with videotext in the early 1980s deliberately excluded the communication features that had made videotext popular in France.

11. The diffusion of computer-mediated communication in American society is detailed in a later section.

12. As late as 1986 it was observed that "communication educators have been noteworthy by their absence from the world of computers, information utilities and telecommunications." See E.W. Brody, "AEJMC Members Urged to Use New CompuServe SIG," *Journalism Educator* 41 (Summer 1986): 29-31; Elliott S. Parker, "Computer Conferencing Offers Boundless Geography, Time," *Journalism Educator* 45 (Winter 1991): 49-55.

13. Computer-mediated communication is distinguished from computer-assisted information retrieval, such as searches of online data bases, and from computer-assisted transactions such as ordering an airline ticket or doing electronic banking.


25. Brad Schultz, "The Evolution of ARPANET," Datamation 34 (August 1, 1988): 73. Most of the other firms which followed in subsequent years in offering computer-mediated communication services to businesses, and later, to the general public, were either players in the telecommunications industry--Western Union, AT&T, ITT, MCI, GTE, etc.--or in the time-sharing industry--General Electric, Tymshare, CompuServe, Source Telecomputing, etc. (See Trudell et al., Options for E-Mail, pp. 57-61).


27. Quarterman, The Matrix, pp. 277-345. The Internet, a "network of networks," is comprised of more than 5,000 networks across 26 countries with more than 3 million users (Beverly T. Watkins, "New Group to Promote Internet's Role in Global Computer Networking," The Chronicle of Higher Education (September 11, 1991): A25). The backbone of the Internet today is the CSNET
(Computer Science Network) and NSFNET (National Science Foundation Network). The ARPANET was shut down in 1989 because it was technologically obsolete for research purposes (Schultz, "Evolution," pp. 71, 73).

28. For a concise history of the development of the PC, see Levy, Hackers, pp. 155-278.


35. For example, the Whole Earth Review offers the popular WELL conferencing system, and the Utne Reader organized an electronic salon on PeaceNet; some newspapers are bundling electronic information delivery with computer-mediated communication services, such as the Fort Worth Star-Telegram, or sponsoring bulletin boards, such as the Middlesex News of Framingham, Mass.; computer magazines have long sponsored forums for readers on information utilities such as CompuServe, GEnie and America Online, and the BIX service originally was started to cater to readers of BYTE magazine; the Reader's Digest Association operated the Source in the 1980s; and CBS was one of the investors for the project that became the information utility Prodigy, until it pulled out in 1987.


44. User demographics reported for the major information utilities show the percentage of male users as between 85 and 95 percent. See Frederick Matos, "Information Services," in NTIA Telecom 2000: Charting the Course for a New Century (Washington, D.C.: U.S. Government Printing Office, 1988), pp. 414-418. Those who are familiar with the world of hobbyist bulletin boards also have observed that there are very few women online. See George Campbell, "How To Be a Good BBS Citizen," Compute 13 (March 1991): 82.

45. We located only one article on applications of computer-mediated communication in journalism education, Thom Lieb, "Computer Conferencing Offers New Way to Think About Writing," Journalism Educator 45 (Summer 1990): 32-37. While it is impossible to review the literature here, educators in other professional programs, such as in education and business, have explored the possibilities more extensively.


47. In an extra credit assignment students, appointed members of a mythical committee on campus computing, were asked to propose how e-mail could be used on campus to better the student’s lot. At least one third of the class proposed an application aimed at ending the frustration involved in getting in touch with their professors.


52. Researchers who attempted to survey the general public about their interest in politically oriented computer-mediated communication reported that people who were


62. Credit for this application idea goes to Byron Scott of the University of Missouri who has used such an exercise in a feature writing course.


68. For example, not to write in all capital letters, how to signal a comment was meant in a joking manner, avoiding "flaming," etc. For a list of items to consider, see Campbell, "BBS Citizen," p. 82; Norman Z. Shapiro and Robert H. Anderson, Towards an Ethics and Etiquette for Electronic Mail (Santa Monica: The Rand Corp., 1985); Schepp and Schepp, CompuServe, pp. 170 and 178. In addition, some universities have rules pertaining to offensive speech in their user manuals which should be called to the students' attention.