

## Chapter 16

# The Study of Computers as Communication Media: A Course Overview

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*Course Description, Objectives, and Major Concepts:* In this course, the main focus is on the use of computers and networks in the creation, control, content, flow and interpretation of communication processes. Students are expected to have a firm grasp of the new technologies at the end of the course. Emphasis is placed on research and evaluations of computing applications for communication. The main theoretical themes include: the convergence between computers and transmission networks, information society and economics, objective and perceived characteristics of media, convergence of communication across media forms and content, implications of the reprocessibility of documents, and organizational theories about adoption, use, and outcomes of computer-mediated communication.

*Students/class size:* Computers as Communication Media is a course for senior majors or master's students, with the corresponding prerequisites. Class size is dependent on lab space.

*Materials and Methods:* Lecture and discussion with computer lab sessions to reinforce course material through usage of the technology. Overheads, handouts, demonstration software, and videotapes are also necessary to explain hardware and software used.

*Assignments, Readings, and Evaluation:* Reading and lab packets. Assignments and exams include two electronic discussion notes (10%), a printed note with style- and spell-checked output (10%), a complex uploading/downloading exercise that results in a printed information search and comparison of databases (15%), two short answer and essay midterms (50%), and a take-home final (15%).

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TEACHING UNDERGRADUATE

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## COURSE: COMPUTERS AS COMMUNICATION MEDIA

## Description

*Computers as Communication Media* is designed for senior communication majors and/or Master's students. It focuses on how computers and networks can be involved in the creation, control, content, flow and interpretation of communication processes. The course emphasizes research and evaluations of computing applications for communications, including electronic mail, voice services, computer conferencing, online information databases, videotex and teletext, office automation, text processing, hypertext, and optical media. Main theoretical themes include: the convergence between computers and transmission networks, information society and economics, objective and perceived characteristics of media, convergence of communication across media forms and content, implications of the reprocessibility of (possibly multimedia) documents, and organizational theories about adoption, use, and outcomes of computer-mediated communication.

This chapter may help those intending to teach such a course, or develop their own course on computer-mediated communication, by providing:

1. the rationale for a course that specifically focuses on the roles computers and telecommunications networks play in human, organizational, and public communication,
2. a description of the methods, contents, and materials used in that course,
3. a description of the computer laboratory that parallels the course content,
4. some examples of assignments to evaluate the activities and performance of the students, the course, and the teacher,
5. a step back to consider "online" education, and
6. references and additional sources.

## Justification

With the continuing development of a wide array of computing systems, applications, and telecommunications networks, "new media" are being used throughout organizations, agencies, homes, and public life.

To indicate the increased coverage of such topics, four databases available through DIALOG Information Services were searched for entries with words related to new communication technologies:

1. *Sociological Abstracts* covers over 1,200 sociology and related social and behavioral science journals, with about 178,000 records.
2. *Magazine Index* covers over 435 popular magazines, with about 1,800,000 records.
3. *Management Contents* covers over 120 business and management-related journals, with about 260,000 records.

4. *Social Science Index* covers over 1,500 social science journals, along with selected articles from 3,000 natural, physical, and biomedical science journals, with about 1,700,000 records.

Table 16.1 shows the terms searched for in each database, the absolute frequency of "hits" in the databases without regard to year, and the percentage of hits for each term relative to the total of hits using any of these terms, from each of the four databases. Figure 16.1 shows the absolute number of times any word from the set of terms shown in Table 16.1 was found in that database for each year as the percent of that set of terms over the 1972-1987 time period for that database. While the absolute coverage is greatest in the popular and management journals, and lowest in the social sciences (especially sociology journals—see Rice & Associates, 1984, Chapter 1), the general proportional trend of increasing coverage has been similar across the four index databases. The lesson

**Table 16.1. Distribution of Topics Across Four Dialog Journal Databases, 1972-1987**

Topic Search Terms	Sociological Abstracts		Magazine Index		Management Contents		Social Science Index	
	#	%	#	%	#	%	#	%
Cable	85	.30	3268	.25	1205	.23	432	.23
Cable(W)Television	56	.20	2198	.17	861	.16	150	.08
Cable(W)TV	6	.02	487	.04	119	.02	41	.02
Catv	1	.00	73	.01	12	.00	27	.01
Communication?(W)Satellite?	14	.05	761	.06	134	.03	34	.02
Computer(W)Conferenc?	9	.03	148	.01	28	.01	43	.02
Decision(W)Support(W)System	12	.04	66	.01	264	.05	204	.11
Electronic(W)Mail	8	.03	599	.05	363	.07	50	.03
Electronic(W)Messag?	0	.00	26	.00	23	.00	6	.00
Facsimile	14	.05	337	.03	175	.03	57	.03
Fax	0	.00	175	.01	69	.01	7	.00
Fiber(W)Optic?	4	.01	632	.05	107	.02	19	.01
Hypertext	2	.01	68	.01	5	.00	11	.01
Office(1w)Future	0	.00	8	.00	5	.00	4	.00
Office(2w)Future	3	.01	97	.01	143	.03	34	.02
Office(W)Automation	0	.00	0	.00	0	.00	0	.00
Optical(W)Dis?	2	.01	196	.01	74	.01	64	.03
Subscription(W)Television	0	.00	1228	.09	19	.00	4	.00
Subscription(W)TV	0	.00	20	.00	5	.00	1	.00
Teletex?	6	.02	105	.01	62	.01	71	.04
Videodis?	6	.02	262	.02	173	.03	120	.06
Videotex?	6	.02	328	.03	202	.04	170	.09
Viewdata	0	.00	31	.00	44	.01	51	.03
Voice(W)Mail	0	.00	78	.01	57	.01	4	.00
Voice(W)Messag?	1	.00	23	.00	12	.00	2	.00
Word(W)Process?	44	.16	1903	.15	1183	.22	247	.13
<b>Total Topic Entries</b>	<b>279</b>		<b>13117</b>		<b>5344</b>		<b>1853</b>	

updating of syllabi. The diversity of applications, research orientations, and disciplinary affiliations of researchers, makes it difficult to even know where to look for research and readings (in spite of the by now vast literature on the subject). The lack of prior training presents psychological and practical obstacles for educators new to the area. And the need for accessible and up-to-date equipment (even if for demonstrations) requires personnel, financial, and technological resources that are often more expensive and technical than communication department committees used to traditional lecture classes and traditional content are willing to tolerate. The following sections provide some advice—based on considerable experience—on how to overcome some of these obstacles, while meeting the clear need for such courses in the communication curriculum.

### Methods

The course includes a lecture/discussion session and a computer lab session (ideally one before the discussion for half the class, and one afterwards for the other half). Discussions of computer-mediated communication should both reinforce, and be reinforced by, use of the technology and applications for communication processes. So the course readings provide theoretical and research foundations as well as descriptions of technologies and applications. The lab activities parallel these readings, and are constantly reconsidered in class discussions of the course readings. The assignments require the student to understand the underlying conceptual themes, be familiar with the readings, complete prior assignments in a successful and timely manner, and apply the readings to discussing the use of computer-mediated communication applications. Midterms and final projects refer to all these forms of experience and learning.

### Suggested Syllabus Topics and Readings

**Overview.** This section briefly summarizes each week's topic and provides selected representative readings included in the course syllabus. A more specific syllabus would also include updated trade, technical, or topical readings. Each week's section in my actual syllabus includes:

1. a summary of the topics and principles,
2. a listing of the required readings,
3. a series of review questions that provide the basis for midterm questions,
4. detailed explanations of the assignments due that week, and
5. the computer lab topics.

There are usually four readings for each class, varying in length and complexity. Typically, they include an introductory chapter from the required book (for Master's students: Rice, R.E. and Associates. (1984). *The new media: communi-*

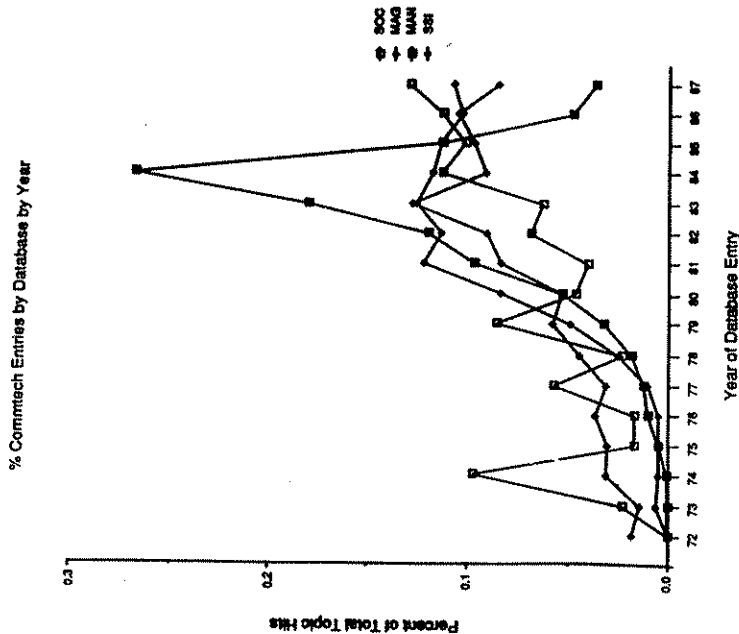


Figure 16.1. Percent of Communication Technology Entries by Database by Year, 1972-1987.

is clear: communication curricula that do not cover new media issues are ignoring topics of great interest to both popular and business publications.

However, both in the design of, and in courses about, telecommunications, the emphasis is typically on technological, marketing, or financial aspects. Indeed, More's (1988) survey of 113 new media courses (65 from the United States, 14 from Canada, 22 from Europe and 12 from Australia) found that few courses included consideration of important social issues such as: legal and ethical responsibilities, social and international issues, and social science approaches. The courses included little psychology, few communication-centered models, low concern with theoretical and research issues, little concern with philosophy of technology, little integration of new media in other communication courses except media management, little consideration of new media as interpersonal media, little treatment of writing and graphics for electronic media, conflicting meaning of terms such as telecommunications/new media/information and communication, and a fundamental confusion between teaching about technology and using technology to teach.

But developing and teaching courses in this area create considerable challenges. The relative newness of the subject area, and the dynamic nature of technologies and applications, require constant scanning of the literature and

ation, research, technology. Newbury Hills, CA: Sage [referred to as NM]; for undergraduates: Williams, F. (1987). *Technology and communication behavior*. Belmont, CA: Wadsworth [referred to as FW], a trade/industry/technical piece, a conceptual piece, and a research article. Other and more recent books that might replace these two required books are provided in the reference section.

Each of the following sections summarizes the main focus of each week's readings and discussions, and provides sample required readings.

**Information Society.** This topic focuses on forces behind, alternate perspectives on, and consequences of, the rising importance of information work. We also discuss problems related to the economics of information and why it is difficult to evaluate the cost, price, and worth of information.

#### Readings:

- FW. Chapter 8, pp. 114-117. The changing information environment. Chapter 12, pp. 202-218. Communication technologies and economic development.
- Smith, A. (1985). Introduction. Chapter 1, pp. 3-13. *Goodbye Gutenberg*.
- Schement, J. & Lievrouw, L. (1988). Chapter 1. The fundamental assumptions of information society research. In: *Competing visions, complex realities: Social aspects of the information society* (pp. 1-10). Norwood, NJ: Ablex.
- NM. Rice, R. Development of new media research. Chapter 1, pp. 15-31.

**Basics of Computers and New Media.** This topic focuses on the importance of the processing capabilities of the computer as applied to communication structure and content, on various ways in which information can be entered into and presented by the computer, on components of computer systems, and on the significance of ASCII coding to the convergence of content and formats across media.

#### Readings:

- FW. Chapter 3, pp. 36-41. The technologies. Chapter 5, pp. 58-72. Computing. Glossary, pp. 254-263.
- NM. Chen, M. Computers in the lives of our children: Looking back on a generation of television research. Chapter 11, p. 269-286.
- Knight, K. (1990, March). The road to the global village. *Scientific American*, pp. 83-94.

**Basics of Transmission and Networks.** Focuses on importance of digital transformations of text, numeric, voice, and video, and forms of transmission networks, especially packet-switched computer networks.

#### Readings:

- FW. Chapter 3, pp. 22-36. The technologies. Chapter 4, pp. 45-57. Telecommunications.
- Kahn, R. (1987, October). Networks for advanced computing. *Scientific American*, 136-143.
- NM. Rice, R. New media technology: Growth and integration. Chapter 2, pp. 33-54.

**Communication Theories.** This topic provides conceptual foundations from traditional communication theories for alternate explanations of uses and consequences of new media, considers recent theories such as social presence and information richness, and discusses media characteristics such as the extent to which traditional and new media allow the content to be processed, structured, distributed, and combined.

#### Readings:

- FW. Chapter 2, pp. 10-20. Communication processes and contexts. Chapter 3, pp. 76-79. Personal and social communication. Chapter 13, pp. 221-237. Extensions of gratifications theory. Chapter 14, pp. 238-248. Dimensions for new research.
- Rice, R. (1987). Computer-mediated communication and organizational innovation. *Journal of Communication*, 37(4), 65-94.
- Brand, S. (1987). The politics of broadcast. Chapter 11, pp. 201-223. In *The Media Lab: Inventing the future at MIT*. New York: Viking.
- NM. Rice, R., & Williams, F. Theories old and new: The study of new media. Chapter 3, 55-80.

**Electronic Mail, Voice Mail, and Audio Services.** This topic focuses on common and distinct characteristics of these media, describes how they work, applies some of the prior theories to them, and discusses applications in organizations.

#### Readings:

- Grosvenor, E. (1987). The fax guide. *Hotel Magazine Network*, pp. F1-F16.
- *Business Week*. (1988, October 10). Special report. The portable executive, pp. 102-112.
- Finnigan, P., & Meade, J. (1986, November). Audiotex: The telephone as data-access equipment. *Data Communications*, pp. 141-153.
- *Telephone Engineering and Management*. (1987, September). Special report: Electronic/voice mail, pp. 80-81.

- **FW.** Chapter 3, pp. 84-86. Personal and social communication.
- Rice, R.E., & Steinfield, C. (1991). New forms of organizational communication via electronic mail and voice messaging. In J.H. Andriessen & R. Roe, (Eds.), *Telematics and work*. New York: Wiley.
- **NM.** Rice, R., & Bair, J. New organizational media and productivity. Chapter 8, pp. 185-216.

**Office and Home Contexts for New Media.** This topic focuses on a general understanding of potential changes associated with new media in communication structures, managerial practices, and uses in organizational contexts, and considers how new media may influence, and be influenced by, the home and social context.

**Readings:**

- **FW.** Chapter 8, pp. 103-112, 117-122. Communication in organizations. Chapter 9, pp. 133-145, 149-151. The public media.
- Olson, M., & Lucas, H., Jr. (1982). The impact of office automation on the organization: Some implications for research and practice. *Communications of the ACM*, 25, 838-847.
- Baer, W. (1987, March). Information technology comes home. *Telecommunications Policy*, pp. 3-22.
- Kaplan, S. (1990). Communication technology and society. In G. Phillips & J. Wood (Eds.), *Speech communication: Essays to commemorate the 75th anniversary of the Speech Communication Association* (pp. 205-234). Carbondale, IL: Southern Illinois Press.

**Group Media.** This topic focuses on theories about the role of media in group communication, describes a wide variety of new group support systems, considers changing forms of social interaction, and questions traditional assumptions about group decision-making.

**Readings:**

- **FW.** Chapter 7, pp. 89-99. Group communication and teleconferencing.
- Kelly, K. (1984, October). The birth of a network nation. *New Age Journal*, pp. 31-42.
- Rice, R.E. (1980). Computer conferencing. In B. Dervin, & M. Voigt, (Eds.), *Progress in communication sciences*, (Vol 2, pp. 215-240). Norwood, NJ: Ablex.
- Johansen, R. (1988). Current user approaches to groupware. In *Groupware*. (pp. 12-44). New York: Free Press.
- **NM.** Rice, R. Mediated group communication. Chapter 6, pp. 129-154.

**Text Management** This topic focuses on the important concept of the reprocessibility of text, summarizes issues in managing organizational word processing, and widens traditional concepts of "word processing" to include formatting, desktop publishing, and document processing.

**Readings:**

- Rosen, A. (1987). Word processing. In *Office automation and information systems* (pp. 157-170). Columbus, OH: Merrill.
- Johnson, B., & Rice, R.E. (1987). Word processing features and forms. and Trends in word processing. In *Managing organizational innovation* (pp. 11-25). New York: Columbia University Press.
- **FW.** Chapter 8, Communication in organizations, pp. 112-114, 122-135.
- A recent overview of desktop publishing capabilities.
- **NM.** Johnson, B., & Rice, R.E. Reinvention in the innovation process: The case of word processing. Chapter 7, pp. 162-169, 175-183.

**Text, Indexing, and Hypertext.** This topic focuses on traditional conceptualizations of files and data fields, then considers the concepts of structuring, indexing, retrieving, and processing variable-length text, leading to new developments such as hypertext and hypermedia.

**Readings:**

- Humphrey, S., & Melloni, B. (1986). Chapter 2, pp. 17-32. Records, fields, files. Chapter 3, pp. 33-40. Records in a computer. In *Databases: A primer for retrieving information by computer*. Englewood Cliffs, NJ: Prentice-Hall.
- Pfaffenberger, B. (1988). The professional writer's workstation: Software for managing information. *Research in word processing newsletter*, 6(2), 2-13.
- Saffo, P. (1987, December). What you need to know about hypertext. *Personal Computing*, pp., 166-173.
- Masters: Conklin, J. (1987). Hypertext: An introduction and survey. *IEEE Computer*, pp. 17-41.

**Online Information Services.** This topic focuses on the diversity of online information, differences and information economics of various services, and policy aspects of videotext.

**Readings:**

- **FW.** Chapter 10, pp. 167-170, Videotex. Reread Chapter 3, pp. 33, Teletext and videotext. Chapter 9, pp. 146-149, Videotext in Japan.
- Branscomb, A. (1988, Winter). Videotext: Global progress and comparative policies. *Journal of Communication*, pp. 50-59.
- Hewes, J. (1985). Dialog: The ultimate on-line library. *PCWorld*, 1(6), 10 pages.

- NM. Dozier, D., & Rice, R. Rival theories of electronic newsreading, Chapter 5, pp. 103-128. Also review pages 47-55 of Chapter 2 in NM on videotex.

**Optical Media and Interactive Video.** This topic focuses on developments in and the significance of optical media, explains how data are stored and processed optically, and how these media are converging with other media and affecting our notions of interactivity.

#### Readings:

- Sullivan, N. (1988, February). As interactive audio-video machines, computers will help us absorb information in new ways. *Family and Home Office Computing*, pp. 49-53.
- A recent overview of CD-ROMs and other optical media.
- Cook, P. (1989). Multimedia technology: An encyclopedia publisher's perspective. In S. Ambron & K. Hooper, (Eds.), *Interactive multimedia* (pp. 218-240). Seattle: Microsoft Press.
- NM. Penniman, W., & Jacob, M. Libraries as communicators of information. Chapter 10, pp. 251-268.

#### Materials

**Reading Packets, Overheads, and Handouts.** Students must obtain a reading packet updated each semester (and prepared by a copying service that attends to copyright requirements). I also prepare a separate computer lab packet that contains all the lab notes, maps, manuals, and schedules. Students are required to read the relevant sections before each lab, and bring the lab packet with them to each lab, so they (and I) can write in additional notes to update it after each time the course is taught—and often after each lab session!

Because of the newness, abstractness, and complexity of many technological aspects of computer-mediated communication, it is essential to use many visual aids such as overhead transparencies and handouts. The students' reading packets always contain copies of any of these used in class, so that they can refer to them again later. Many technical books, vendor materials, and trade magazines are inappropriate for such a course, but often provide very clear and useful diagrams.

**Hardware, Software, and Videotapes.** Macintosh or IBM-compatible is not really the issue; either can serve the purpose and each will have its own flavor. The important aspects include having enough well-maintained computer terminals, ready access to the lab, and at least one dedicated lab/teaching assistant.

The course requires a computer lab with modems to connect both to the university mainframe and to outside services.

Things will go much more smoothly if the computers have hard disks with a security program that limits access to portions of the harddisk, and a standard menu interface. Or, you can configure the terminals with a local area network to a central file server. Both solutions avoid maintaining and copying separate diskettes, illegal copying, running out of space on the hard disks because people store unofficial things there, suffering from intentional or unintentional damage to programs, and so on. Also, you can load all the demonstration software under one submenu, so that students can become familiar with a wide variety of other programs. Anticomputer virus programs that are activated upon computer boot-up are, unfortunately, becoming more necessary as well.

For lab instruction and demonstration, it's helpful to have a computer projection device. These are flat screens that plug into a personal computer and lie on top of an overhead projector; then you can project the screen's image onto a regular large projection screen. Several large monitors connected to the computer will also serve this purpose, but less easily.

Choosing software is not easy and not cheap. I have found it best to use the program that's already widely supported on campus. This does not always guarantee the best program, but it does mean that students can also go elsewhere to do their assignments and to obtain help. Some programs, such as style-checkers or indexing programs, will not be available elsewhere—such are the benefits of being an innovator.

You can actually obtain nearly all your software for free or for very little if you choose public domain software or shareware or programs distributed at educational conferences. The long-term price of this strategy, however, is lack of support, lack of compatibility with some other programs on campus, and lack of preparation for the computer programs students will find in their workplaces.

Review your choices in regular evaluations by magazines such as *PC Magazine* or other publications about computer software, and seek out good mail-order prices of the most current version. Be sure things don't become incompatible—such as buying color graphics software when you have only monochrome monitors, or programs that cannot read in or write out ASCII files or formatted files from your other chosen software, or different versions of DOS on different computers, or 3 1/2" drives on some machines and 5 1/4" on others, or only high density drives on new computers, and so on.

The minimum software needed for this particular course includes:

1. mainframe electronic mail,
2. mainframe bulletin board (or public computer network bulletin boards),
3. personal computer communication programs (ideally one that supports whatever the mainframe file-exchange protocol is),

4. word processing,
5. grammar/style-checker, and
6. online database (it could be the University library catalog, a classroom account on Dialog, local public bulletin board services, or CD-ROMs in the library).

It's useful to be able to demonstrate many other kinds of programs. While it's often impossible to obtain and learn a wide range of programs, most vendors do have demonstration diskettes, which are easy to display on a personal computer in class, or can be provided for students to review on their own. Every time you see an advertisement for a product that seems interesting, write or call for a demonstration diskette. Some vendors actually support academic institutions by providing a full software package and will be happy to send a representative to make a presentation to your class (sometimes the university computing center will also do this). Others provide exceptional academic discounts and site licenses. Advanced students can prepare a software evaluation report for extra credit.

And when you do write or call a vendor, also ask for a demonstration videotape. Sometimes these will cost \$10 or so, but they are well worth it. Many applications cannot be easily explained without hands-on experience, or at least seeing it in action. Other sources include government-funded development projects (at universities or research centers) that have produced demonstration videotapes. When you read an article about an interesting prototype system, call or write. Information system conferences, system vendor conferences, and educational computing conferences are especially good places to become aware of, and inspect, such videotapes. There is now even a CD-ROM that includes hundreds of demonstration versions of software.

Finally, write as much of the lab documentation as you can by yourself, while using the *exact* lab computers and software that the students will use. Always have your T.A. (better yet, a naive, new user) use the draft documentation and, while trying out the procedures, write questions or problems on the documentation for revision. It will take several semesters to work out all the problems. By then, systems and software will change, and you can start over.

**Public Systems.** You should definitely include the use of Bitnet in the course. Approximately 500 academic institutions in the United States, and nearly the same number elsewhere in the world, are "nodes" on the Bitnet university computer network. Bitnet is one important way to send and receive electronic messages as well as text and data files throughout the world. Bitnet also provides access to many other computer networks (including CompuServe and MCI mail), and a wide variety of services such as other universities' library catalogs, databases, newsletters, and discussion conferences. To obtain preliminary information, write to EDUCOM (see information on journals and societies, below), or talk to your academic computing representative.

One of the most useful services relating to communication education available through Bitnet is COMSERVE. It provides a wide variety of communication-related materials for use in research, course materials, or curriculum development (such as job postings, bibliographic database of communication journal articles, and other users' course materials). To obtain materials, write to Comserve, Department of Language, Literature and Communication, Rensselaer Polytechnic Institute, Troy, NY 12180 (or send a Bitnet message to SUP-PORT@RPPIECS).

Local nonprofit computer-mediated information systems can also be integrated into regular course content and assignments. Besides learning about practical and social aspects of computer-mediated communication, students could also learn about many aspects of business, education, and public service through such systems.

One example is "Big Sky Telegraph" in Montana, which provides a wide-ranging set of online services for extremely low costs through a PC-based computer bulletin board system, with connections to worldwide Unix networks (Dillon, MT 59725; phone numbers: modem 406-683-7680, voice 406-683-7338). Big Sky provides systems, services, online instruction, and online expertise for community support services, distance learning opportunities, economic development experts, local businesses, global communities, and more.

Another example is PEN (Public Electronic Network) in Santa Monica, California, which provides free accounts to residents, and places public terminals in libraries, shopping malls and elsewhere (1685 Main Street, Santa Monica, CA 90401; 213-458-8383). It provides bulletin board services (such as information about pending legislation, city council meetings, recycling, rent control, cultural and recreation events, city news and services), computer conferences (such as about crime watch, city planning, homeless, education, etc.), access to the public library circulation and catalog system, and electronic messaging among residents and with any listed staff of the city government.

### Computer Lab Activities

Table 16.2 summarizes the topics and sequence of the computer lab activities. Table 16.3 provides an outline of the contents of the computer lab manual. Of course, the specific details for each will depend on the hardware, software, assignments, content arrangement, and the teacher's personal preferences.

### Assignments And Evaluation Approaches

Final grades are based on six sets of assignments.

1 and 2. Two electronic discussion notes, submitted online (5% each). Each is

**Table 16.2. Topics and Sequence of Computer Lab Activities**

Lab 1:	Logging into Mainframe Accounts, Changing Passwords, and Introduction to Electronic Mail.
Lab 2:	Electronic Mail.
Lab 3:	Electronic Mail and Computer Bulletin Boards.
Lab 4:	Personal Computer/DOS Workshop (This is a special workshop given on a Saturday provided for anybody who is not comfortable with basic PC and DOS operations).
Lab 5:	Introduction to Wordprocessing.
Lab 6:	Editing.
Lab 7:	Printing.
Lab 8:	Spell-Checking; Style-Checking.
Lab 9:	Formatting with the Wordprocessor.
Lab 10:	Downloading from the Mainframe.
Lab 11:	Free Lab to Work on Assignments.
Lab 12:	Uploading to the Mainframe.
Lab 13:	Free Lab to Work on Assignments.

just a two-screen electronic message that summarizes the student's opinion about topics from the class discussions or readings. The first is sent just to me, to give students time to become moderately comfortable; the second is sent to all class members, via an electronic distribution list, to motivate them to write to a real audience, and to illustrate one form of group communication.

3. A printed note, with style- and spell-checked output (10%). This is a summary of the student's experience with one of the online bulletin boards. It also serves to make them familiar with basic word processing functions, style-checking, and printing early on. We discuss the pros and cons of computer-based style-checking.

4. A printed information search and comparison of databases (15%). First, using the overhead computer screen display, I demonstrate how to search an online database, using Dialog. I retrieve enough citations about a new medium (such as voice mail) to have one for each class member. Then I upload each separate citation and mail it to the student's account. The student must download and print the citation. They must then search for a similar citation on one of the library's CD-ROMs, preferably capturing the CD-ROM output directly to computer diskette. Then, the student must merge the two citations in the word processing program, and write a short paper critiquing and comparing the two citation formats. They must then use their spell-checker (printing out a sample screen using the "print-screen" command) and style-checker (printing by using the DOS "print" command) to revise the analysis. Finally, they must upload the analysis and mail it back to me, and hand in all the printed outputs. This particular assignment is quite complex, and encourages the student to tie together many otherwise abstract concepts, such as ASCII text, online abstracts, various forms of printing, and the "reprocessibility" of electronic text.

**Table 16.3. Outline of Computer Lab Notes**

1	Computer Locations Using The Terminals; Logging In To Your Account
2	Electronic Mail Finding Out Who's Using the Computer; Sending A Message; Viewing Message Headers; Read, Reply, Forward, Delete; Exiting Mail And Logging Out; Show And Type External Files; Setting Up And Using Your Distribution List; The Computer Bulletin Board
3	DOS Introduction; Loading DOS On A Personal Computer; Handling Your Diskettes; Formatting A Diskette; Selecting A Default Drive; Showing The Directory Of Files; Copying Individual Files; Renaming Files; Deleting Files; Using Wildcards; Displaying The Contents Of A File; Copying An Entire Disk At Once
4	Word processing 4.1 Introduction. Locations On Campus Where You Can Use Wordprocessing; Starting Up; Help; Main Features; Function Keys And Template; Cursor Movements And Entering Text; Saving Files; Creating A File 4.2 Word Processing Function Keys And The Template—Again; Editing Commands; Centering Text; Deleting And Undeleting A Line; Bold; Underline; Moving Blocks Of Text; Revising Your File; Exiting; Verifying Your File 4.3 Ways Of Printing With The Word processor And DOS Objectives; Starting The Program; Retrieving A File; Ways Of Printing—A Conceptual Overview; Printing From Document Mode; Printing From File List; Writing Out An Ascii File; Printing In DOS; Screen Dumping In DOS 4.4 Spell-checking In The Word processor Style-checker User Notes
5	Terms; Starting; Example Summary; Show And List Output Files; Provide A Profile Of Your Word Usage; Change To And From ASCII File Input Formatting Your Text In The Word processor
6	Starting The Word processor; Retrieving A File; Headers, Footers, And Pagination; Changing Margins; Double Spacing; Merging Files Communication Software
7	Purposes Of Communication Software; Starting The Communication Software; Downloading; Leaving Communication Software And Viewing The Downloaded File; Reading Downloaded Ascii Files Into The Word Processor; Uploading
8	Electronic Mail Using The Communication Software
9	Using Optical Databases At Campus Libraries

5. Two midterms (25% each), consisting of a series of questions requiring single-sentence answers, and a series of questions requiring page-long answers.

6. The take-home paper (15%) asks the student to select a news story from the past week's newspaper, and, using course theories, concepts, and applications, analyze how the story would be different if either the writer or the subject had used any of the new media considered during the last two weeks of the course. This keeps the applications and contexts current, and encourages the students to reconceptualize familiar media.

### CONCLUSION: ONLINE EDUCATION

Experience in teaching such a course as *Computers as Communication Media* may provide a valuable springboard to offering courses either partially or entirely online. A motivation for discussing several of the topics online is to have students (and the teacher!) gain personal experience in the use of, and reactions toward, computer-mediated communication. Motivations for offering complete courses online include the increasing effort to provide education to those for whom traditional in-class education is difficult (such as speech, hearing, sight, or emotional problems), the need to overcome problems of long distances and

#### Table 16.4. Some Advantages of Online and Distance Education

- Participants freed from time and location constraints.
- Allows working or distant students to become more involved.
- Participation is more equal; individuals can contribute independent of racial, gender, appearance, speech, or other visual and oral differences.
- There is much more communication among participants, and much less content directed from teacher to students.
- Supports "peer learning" and "group learning" processes.
- Can validate participants' experiential knowledge by having them involved as peer experts.
- Forces participants to take responsibility for their contributions.
- Group and discussion processes may be more realistic, thus providing better preparation for work situations.
- Responses to individuals can focus on specific needs, without taking class time.
- More frequent student contact with instructors.
- High level of course approval by students.
- Group output that equalled that of traditional courses.
- Can be more economical than traditional courses.
- Allows participants to reflect more before commenting. This is especially useful for those with weak communication skills, for whom English is not their native language, and for hearing- or seeing-impaired individuals who have access to speech processing peripherals.
- Allows participants to comment "anonymously", increasing the potential for brainstorming and nonpersonal critique.
- Enables the use of online simulations or experiments.
- Allows for multiple reviews of comments, unlike traditional lectures.
- Can increase focus on content rather than irrelevant interpersonal and other issues.
- Can increase consistency of syllabi and content across course sections.
- Can improve ability to monitor group activities and assess performance.
- With online surveys and feedback, can increase individual feedback without embarrassment or threatening criticism.
- Can provide consistent and centrally maintained text, such as syllabi, assignments, discussion readings, documentation, study questions, sample debates, etc., accessible to all.
- Text can be indexed and thus retrieved in a variety of ways, such as key word, sender/receiver, date, topic, text strings, etc.
- Allows users to develop own communication styles.

Sources: Hiltz (1986), Harasim (1986), Phillips and Santoro (1989).

limited course offerings in rural areas, the increasing need for students to work while attending college, and the increasing competition for students from other institutions as well as from corporations.

Course modules or full courses can be offered using just electronic messaging (involving private messaging, broadcast and distribution list processing) and bulletin boards, as suggested in the sample course provided above and described

#### Table 16.5. Some Disadvantages of Online Education

- The lack of visual and other nonverbal cues can create a sense of depersonalization and possible misunderstandings.
- Responses from others may take too long for some users.
- Asynchronous contributions by several participants creates "multiple conversational threads", so that it may be difficult to track specific discussions. This is more likely on electronic mail and bulletin board systems; computer conferencing systems can provide separate "conferencing" or "forums".
- Information overload for both students and instructors is possible, without system-supported message handling functions or a well-organized approach.
- Group-decision making is time-consuming, and consensus is less likely.
- Potential health problems, such as eye or back strain, and repetitive motion syndrome, should be considered, discussed, and alleviated.
- Equipment, connect time, and computer storage and usage fees may be too expensive, though some systems are very inexpensive or free.
- There will always be expected as well as unforeseen problems; some of them will be solvable or explainable at the time, while others will require investigation, and some will never be understood or solved.
- Requires rapid feedback from consultants or instructors to students.
- Instructor and assistants must devote considerable time to developing initial content, providing feedback, trouble-shooting.
- Requires customized user manuals, specifically designed for the course and for the users. Documentation provided by university computer systems is often out-of-date, incomplete, and incorrect; it presumes considerable prior knowledge, including who and how to contact for help; and is rarely oriented toward social science or day-to-day communication-based activities.
- Need to develop a "training diffusion network," such as designating a volunteer from each group to be the "official communicator".
- Typical university mainframe systems—and library systems—are not usually designed for a large number of students using communication components and storing text documents.
- Regular and convenient access to terminals and the system is necessary, including late-night use.
- Support personnel must be easily available; online, via a phone hotline, in the lab, and for scheduled face-to-face appointments.
- The system must provide real benefits.
- Users must be highly motivated.
- The course and instructions must begin with the basics, starting slowly; the course activities must be clear, and planned to focus on specific activities and materials.
- Both instructors and students must adjust to new classroom roles, with increased equality for both, less control by instructors, and more responsibility by students.

Sources: Hiltz (1986), Harasim (1986), Phillips and Santoro (1989).

elsewhere (see Harasim, 1989). The next level of complexity uses electronic mail on the university mainframe computer along with locally developed mainframe menu systems, specially written software, and word processors and databases, for uploading, downloading, and group discussions (see Phillips and Santoro, 1989). Increased sophistication involves using computer conferencing systems that can maintain structured communication flows, private joint workspaces, and voting mechanisms (Harasim, 1986). The most sophisticated computer conferencing system, EIES II (Electronic Information Exchange System), has been especially designed for teaching a diverse range of courses, and provides a wealth of functions, applications, menus, sequenced discussions and commentaries on course modules, grading programs, integration of graphics and text, and so on. (Hiltz, 1986).

Based upon just a few of the published articles on online and distance education, Tables 16.4 and 16.5 summarize some of the advantages, and disadvantages, respectively, of online education.

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### Journals and Societies Emphasizing Online Education

- *Academic Computing*
- *Boardwatch Magazine* (bulletin board systems; Littleton, Colorado)
- *British Journal of Educational Technology*
- *Canadian Journal of Educational Communication*
- *Computers and Composition*
- *Computers in the Schools*
- *Distance Education*
- *Educational Libraries*
- *Educational Technology*
- *EDUCOM Bulletin*
- *Instructional Science*
- *Journal of Distance Education*
- *Journal of Educational Computing Research*
- *Media in Education and Development*
- *PC Magazine*—especially good for product comparisons, tutorials, and figures that are useful for course readings, and access to free software utilities.
- *Research in Word Processing Newsletter* (South Dakota School of Mines and Technology, Rapid City, SD, 57701-3995). This is a must—it provides

incredible bibliographies, pedagogical advice, software comparisons, and thought pieces about processing text and images for communication, composition, and analysis. It is, however, not currently being published.

- *Technology and Learning*
- *The Computing Teacher*
- And, of course, an online journal: The Online Journal of Distance Education and Communication (University of Alaska Southeast, 11120 Glacier Highway, Juneau, AK, 99801; Bitnet: JADIST@ALASKA.BITNET)

A sort of clearinghouse for computer-based speech recognition and synthesis systems, for hearing- and sight-impaired computer users, is The Center for Special Education Technology, 1920 Association Dr., Reston, VA 22091.

The International Society for Technology in Education's Special Interest Group for Telecommunication exchanges information on instructional telecommunication (especially computer-based). Its address is ISTE, University of Oregon, 1787 Agate St., Eugene, OR 97403.

The Institute for Academic Technology, University of North Carolina, Chapel Hill (P.O. Box 12017, Research Triangle Park, NC 27709), provides forums, briefings, and symposia on instructional technology and software.

EDUCOM organizes the primary annual university-oriented educational computing conference. Their address is EDUCOM, Suite 600, 1112 16th St., N.W., Washington, DC 20036.