

### Why Computers in Distance Education?

In recent years, educators have witnessed the rapid development of computer networks, dramatic improvements in the processing power of personal computers, and striking advances in magnetic storage technology. These developments have made the computer a dynamic force in distance education, providing a new and interactive means of overcoming time and distance to reach learners.

Computer applications for distance education fall into four broad categories:

**Computer Assisted Instruction (CAI)** — uses the computer as a self-contained teaching machine to present discrete lessons to achieve specific but limited educational objectives. There are several CAI modes, including: drill and practice, tutorial, simulations and games, and problem-solving.

**Computer Managed Instruction (CMI)** — uses the computer's branching, storage, and retrieval capabilities to organize instruction and track student records and progress. The instruction need not be delivered via computer, although often CAI (the instructional component) is combined with CMI.

**Computer Mediated Communication (CMC)** — describes computer applications that facilitate communication. Examples include electronic mail, computer conferencing, and electronic bulletin boards.

**Computer-Based Multimedia** — HyperCard, hypermedia, and a still-developing generation of powerful, sophisticated, and flexible computing tools have gained the attention of distance educators in recent years. The goal of computer-based multimedia is to integrate various voice, video, and computer technologies into a single, easily accessible delivery system.

### Advantages of Computers

Computers can facilitate self-paced learning. In the CAI mode, for example, computers individualize learning, while giving immediate reinforcement and feedback.

Computers are a multimedia tool. With integrated graphic, print, audio, and video capabilities, computers can effectively link various technologies. Interactive video and CD-ROM technologies can be incorporated into computer-based instructional units, lessons, and learning environments.

Computers are interactive. Microcomputer systems incorporating various software packages are extremely flexible and maximize learner control.

Computer technology is rapidly advancing. Innovations are constantly emerging, while related costs drop. By understanding their present needs and future technical requirements, the cost-conscious educator can effectively navigate the

volatile computer hardware and software market.

Computers increase access. Local, regional, and national networks link resources and individuals, wherever they might be. In fact, many institutions now offer complete undergraduate and graduate programs relying almost exclusively on computer-based resources.

### Limitations of Computers

Computer networks are costly to develop. Although individual computers are relatively inexpensive and the computer hardware and software market is very competitive, it is still costly to develop instructional networks and purchase the system software to run them.

The technology is changing rapidly. Computer technology evolves so quickly that the distant educator focused solely on innovation — not meeting tangible needs — will constantly change equipment in an effort to keep pace with the "latest" technical advancements.

Widespread computer illiteracy still exists. While computers have been widely used since the 1960's, there are many who do not have access to computers or computer networks.

Students must be highly motivated and proficient in computer operation before they can successfully function in a computer-based distance learning environment.

### The Internet and Distance Education

The Internet is the largest, most powerful computer network in the world. It encompasses 1.3 million computers with Internet addresses that are used by up to 30 million people in more than fifty countries. As more and more colleges, universities, schools, companies, and private citizens connect to the Internet either through affiliations with regional not-for-profit networks or by subscribing to information services provided by for-profit companies, more possibilities are opened for distance educators to overcome time and distance to reach students.

With access to the Internet, distance educators and their students can use:

**Electronic mail (e-mail)** — Like postal mail, e-mail is used to exchange messages or other information with people. Instead of being delivered by the postal service to a postal address, e-mail is delivered by Internet software through a computer network to a computer address.

**Bulletin boards** — Many bulletin boards can be accessed through the Internet. Two common public bulletin boards on the Internet are USENET and LISTSERV. USENET is a collection of thousands of topically organized "newsgroups", covering everything from

supercomputer design to bungee cord jumping, and ranging in distribution from the whole world to single institutions. LISTSERV also provides discussion forums on a variety of topics broken out by topic or area of special interest.

☐ **World-Wide Web (WWW)** — The WWW is an exciting and innovative front-end to the Internet. Officially WWW is described as a "...wide-area hypermedia information retrieval initiative aiming to give universal access to a large universe of documents" (Hughes, 1994). The WWW provides Internet users with a uniform and convenient means of accessing the wide variety of resources (pictures, text, data, sound, video) available on the Internet. Popular software interfaces, such as Mosaic and Netscape, facilitate navigation and use of the WWW. The central organizing feature of the WWW is the "home page". Every organization and even every individual user of the WWW can create a home page that contains whatever information they want to present. The hypertext capabilities of the WWW facilitate linking of information within your own home page and with all other home pages on the WWW.

### **Instructional Possibilities of the Internet**

Distance educators can use the Internet and WWW to help students gain a basic understanding of how to navigate and take full advantage of the networked world into which they will be graduating. Some instructional possibilities of the Internet include:

☐ Using e-mail for informal one-to-one correspondence. Feedback from the instructor can be received more quickly than messages sent by mail. Students can read messages at their convenience and easily store them for later reference.

☐ Establishing a classroom bulletin board. Distant students often work in isolation without the assistance and support of fellow students. Setting up a class bulletin board can encourage student-to-student interaction. With a class computer conference, individual students can post their comments or questions to the class, and every other individual is free to respond. The conference can also be used to post all modifications to the class schedule or curriculum, assignments/tests, and answers to assignments/tests.

☐ Engaging students in dialogue with other students, faculty, and researchers by encouraging them to join a bulletin board(s) on topic(s) related to the class.

☐ Developing a classroom home page. The home page can cover information about the class including the syllabus, exercises, literature references, and the instructor's biography. The instructor can also provide links to information on the WWW that would be useful to students in the class (e.g., real research data on agricultural markets, global climate change, or space missions). Other links could access library

catalogs or each student's individual home page.

### **Teaching Considerations**

When incorporating the Internet into a distance delivered course, remember that:

☐ All students in a course must have Internet and WWW access to ensure equal opportunities for computer interaction and feedback. Also, convenient access to a computer at home or work may influence student success.

☐ Students may face the concurrent challenges of learning basic computer skills, new software, and appropriate online communication skills. Troubleshooting student computer problems will probably become a part of normal instructional responsibilities. Setting up a specific classroom conference for ongoing discussions of specific hardware and software problems may help students to work through these problems on their own.

☐ Some students might hesitate to contribute to computer conferences or to send e-mail because of a lack of familiarity with the proper protocols. Encourage students to use e-mail, classroom conferences, electronic bulletin boards, and the WWW early in the course so they overcome inhibitions. Specifying a minimum number of e-mail communications per week will encourage active participation.

☐ Using e-mail can help the instructor provide feedback more quickly than surface mail or telephone. Prompt response generally increases student motivation and performance.

☐ Prompt responses might not always be appropriate. Computer conferences can foster student-to-student interaction. To ensure that this interaction is sustained, work towards a facilitative role. It might be appropriate to delay response to a query in a classroom conference in order to allow students to respond to the issue and to each other.

☐ Becoming familiar with the resources available on the Internet and the most effective ways to use them will be part of the instructional challenge. A number of helpful guides to the Internet and WWW are available (see Kochmer, 1995; Hughes, 1994).

### **References**

☐ Kochmer, J. (1995). *Internet passport: Northwestnet's guide to our world online*. Bellevue, WA: NorthWestNet and Northwest Academic Computing Consortium, Inc. (<http://info.nwnet.net/passport>)

☐ Huges, K. (1994). *Entering the World-Wide Web: A Guide to Cyberspace*. Enterprise Integration Technologies (<http://www.acu.edu/userhelp/guide.61.html/guide.toc.html>)

### **For Further Information Contact**

Director of Engineering Outreach,  
College of Engineering, University of Idaho,  
Moscow, ID 83844-1014  
Phone: (208)885-6373 FAX: (208)885-6165  
Internet: [bwillis@uidaho.edu](mailto:bwillis@uidaho.edu)