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ABSTRACT

One of nine brief guides for special educators on using computer technology, this guide focuses on utilizing the telecommunications capabilities of computers. Network capabilities including electronic mail, bulletin boards, and access to distant databases are briefly explained. Networks useful to the educator, general commercial systems, and local bulletin boards are discussed in terms of their capabilities and costs, and specialized systems, such as SpecialNet, are also described. Specific ways in which telecommunications can be of use to the disabled individual are noted; among these are decreased isolation, business transaction services, and computer compensation for physical or sensory disabilities. Specific applications for special education students include communication and joint curriculum projects with distant classes, increased opportunities for written communication, and cross-age tutoring. Name, address, and descriptive information is provided for six networks for educators, six networks for children, and seven projects which integrate computer telecommunications with school programs. Eight readings are recommended. (DB)

Center for Special Education Technology

# Tech Use Guide

## Using Computer Technology



## Telecommunication Networks

Telecommunications can be broadly defined as the electronic processes that permit the passing of information from one sender to one or more receivers with the output in a usable form. A communication channel or electronic pathway is used to carry the signals of voice, data, or video information. Channels are most often provided through wire cables and the newer fiber optic systems or high frequency radio beams, such as those transmitted by microwave systems or satellite.

The telephone system is one such communication channel. Telephone lines are no longer limited to the exchange of voice signals. Data in all varieties is transmitted through the telephone lines. Typically, the type of electronic equipment that is interfaced with the telephone will determine the specific application. The popular "fax" (facsimile) machine is such an interface. It allows text and pictures, rather than voice, to be transmitted via the phone lines.

Networking is another form of telecommunication. It merges the computer and the telephone system. In this case, a modem is the necessary interface. A modem is a device that allows computers to send and receive signals through the telephone line. It is estimated that over one-quarter of all personal computers are now equipped with a modem.

The use of the telecommunications capability of the computer ranges from point-to-point transfer between two computers to the use of wide area networks that link many users across the country and even abroad. Users can search and retrieve information from large on-line databases or exchange information with other users by electronic networks. More recent applications include electronic access to services such as banking and shopping.

### Network Capabilities

An electronic network is an interactive system that links a number of independent computers to a large central or host computer. Text, data files, and electronic messages are stored in the host computer. While networks vary in the information and services they offer, most have two common features: electronic mail and bulletin board services.

Electronic mail is a feature of most networks that permits private person-to-person communication. Messages are sent via a modem to another person's "mailbox." A mailbox is a designated space within the host computer's memory assigned to an individual, where messages are sent and stored. The recipient retrieves these private messages in the form of electronic mail.

Bulletin boards are used by individuals or agencies to post public information. In general, the purpose of the bulletin board format is to provide access to current information and developments of interest to multiple users. Information is displayed in a menu-driven format and grouped and listed by subject matter. Depending on the sophistication and purpose of the electronic network, there may be one to several hundred bulletin boards available.

Telecommunications capabilities of computers also allow the user to access distant databases. On-line databases are a format for storing and retrieving information. Unlike the bulletin board, the purpose of a database is typically to archive information and thus provide a comprehensive, searchable record of extant information on a subject. There are three types of on-line databases: 1) full text, with holdings as extensive as NEXIS's five major newspaper collections which date from 1977 to the present; 2) bibliographic, such as ERIC which is found on the Dialog system; and 3) nonbibliographic, such as the Bureau of Labor Statistics Data Bank.

### Education Networks

Educators can select from several different electronic networks. Specialized networks, such as SpecialNet, provide topical information of interest to special educators and other professionals working with students with disabilities. SpecialNet lists over fifty bulletin boards containing information on a variety of topics including: special education software, early childhood education, current legislation, technology, and assessment of students with disabilities.

Commercial systems, such as The Source or CompuServe, are international networks that provide a wide variety of information for thousands of users. Special interest groups, sometimes called SIGs or Forums, are common to these larger networks. SIGs provide a way for network users with a common interest to "meet" each other and share information and ideas within the larger network.

Networking costs can vary considerably. With most networks, a subscription fee is involved. Some networks also charge a minimum monthly usage fee to maintain individual accounts. The user is also charged for use of the telephone lines to connect with the host computer.



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Telephone charges can be reduced through the use of leased network lines that are now available in most cities. Users pay for a local rather than a long distance call.

While large national computer networks offer the greatest variety of services to consumers, local bulletin board systems (BBSs) have been established in hundreds of cities nationwide. These BBSs are usually operated on microcomputers, and many are available at no cost to the user when accessed through a local telephone call. These systems offer an excellent introduction to on-line computer networks. In fact, many are designed to function very much like the larger systems, with electronic mail and message areas that are typically organized to appeal to special interest groups.

## Applications for the Individual with Disabilities

People with disabilities, as well as parents and professionals involved in special education programs, are discovering the value of computer network services. A sense of isolation is often experienced by those who are restricted by a disability. Tapping into a national network of many thousands of users offers the opportunity to communicate with others. The support given and received through the exchange of messages on a computer network can be very rewarding. Specialized information is often available to meet the needs of people with disabilities. Access to electronic databases on computer networks can provide information about medical conditions, adaptive devices, educational resources, and many other topics. Although the typical costs for conducting searches of this type may be high, the rapid sorting and retrieval of references can save hours of research in the library.

Many people with limited mobility are interested in the new transaction services being offered on-line through computer networks. These services make it possible to conduct many routine activities directly from the home. Examples include electronic banking, shopping for consumer goods, and making airline or travel reservations. It is even possible to earn college credits through university programs conducted almost entirely on-line.

Microcomputers can be adapted to compensate for either physical or sensory disabilities when communicating over computer networks. For example, voice input of computer commands, alternative (programmable) keyboards, and synthesizers that convert text on screen to speech are all readily available for many microcomputers.

## Applications for Special Education Students

When the telecommunications capabilities of computers were first introduced to special educators on a large scale through SpecialNet, many felt that it was only a matter of time before students across the country began telecomputing with one another. At first, most schools did not have the necessary equipment for wide scale student telecommunication applications. But as the number of computers in classrooms increased and teachers and students began to explore the possibilities, more and more computers were enhanced with peripherals that expanded the capabilities of the machines. Today one out of twelve schools with micros report the use of modems (QED, 1988). The ratio, while still high, is steadily improving. Special education students and teachers in classrooms across the country are discovering the potential of microcomputers to learn with and about other students hundreds and even thousands of miles away. Students from different parts of the country are using their classroom computers, equipped with a modem, to engage in a variety of joint learning experiences.

Curriculum-based activities that promote joint learning in skill areas such as spelling and writing are increasing. Social studies and science projects focus on similarities and differences between communities in different parts of the country. Students are studying comparative geography and history with students in other states, while their economics projects compare costs of goods and services in different communities and science programs focus on climate and weather conditions in geographically different locations.

Writing and communication programs result in joint newsletters or databases. Cross-aged tutoring projects — where elementary-aged students with disabilities work with high school tutors in school and at home — build basic skills as well as positive social interactions between students. Educators report enthusiastic student involvement in these programs and gains in learning for many students. Researchers report that telecommunications programs can offer expanded possibilities for written communication with real audiences that change the context for writing and learning experiences for special needs students.

Computer networks, from the large national systems to the local BBS, represent a valuable new communications tool. The speed of electronic mail, the timely exchange of information through specialized bulletin boards, the efficiency of conducting computerized research, the convenience of working, shopping or banking from home, and the elimination of travel expenses through computer conferencing are all promising features that have led most industry analysts to predict a continued strong growth in the market for computer network services. The benefits of this new medium are gaining wide acceptance by people with disabilities and those who are involved in special education. Computer network services will very likely play an important role in how we live and learn in the future.

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## Networks for Educators

Wide-area networks vary in size and purpose. Large commercial networks provide a variety of information and services for users. Smaller, more specialized networks focus on one area of information of interest to a specific audience such as special educators or bilingual educators.

**AppleLink,** Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014, 408-966-1010. AppleLink is a national on-line service with two general information areas: Apple Community and General Services. Apple Community contains seven areas, such as on-line classes, reference library, special education database, software reviews, and forums. General Services provides information features, such as customer service, financial information, and shopping services.

**CompuServe,** CompuServe Customer Information Services Ordering Department, Box L-477, Operator 172, Columbus, OH 43260. The CompuServe Information Service (CIS), the largest computer-based electronic information system in the world, is designed to deliver services to homes and businesses. CompuServe provides electronic mail, topical databases, special interest groups, and forums. Each forum offers messaging, bulletin boards, and real-time conferencing capabilities. Specialized online databases, such as the Handicapped Users Database (HUD), EPIE, and ADCIS, provide resources for educators and students.

**DCI-DEAFNET,** Deaf Communications Institute, P.O. Box 247, Fayville, MA 01745, 617-872-9406 (voice and TDD). DEAFNET is a network for individuals with hearing impairments. Services include electronic mail and bulletin boards.

**National Clearinghouse for Bilingual Education (NCBBE),** Electronic Information System, 8737 Colesville Road, Suite 900, Silver Spring, MD 20910, 301-958-6898 or 800-647-0123. This electronic information system is designed for educators interested in bilingual education. The network, funded by the Department of Education, provides electronic mail (to NCBBE staff only), bulletin boards, and databases. This network contains literature in the field and curriculum material, including software.

**The Source,** Source Telecomputing Corporation, 1616 Anderson Road, McLean, VA 22101, 703-821-6660. The Source is a large computer-based electronic information system designed to deliver services to homes and businesses. The Source provides electronic mail, bulletin boards, computer conferencing, and databases.

**SpecialNet,** GTE Education Services, 2021 K Street NW, Suite 215, Washington, DC 20006, 202-835-7300. SpecialNet is a computer-based communication network designed to supply information and communication for special education professionals. Network services include: electronic mail, electronic bulletin boards, databases, and information management capabilities. Over 70 national and state bulletin boards are available.

## Networks for Students

Several networks have been created solely for student use. Some networks have bulletin boards reserved for student use and other systems encourage students to use the electronic mail feature for communication. While most are dedicated to local use, they offer examples of what can be done in a school district or community.

**Animal Farm,** School 59, 1 North Meadow Drive, Buffalo, NY 14214, 716-838-4844, 716-838-5591 (BBS). This bulletin board was established to encourage teacher and student involvement with telecommunications. Goals are to integrate telecommunications into the school curriculum and to establish a more efficient way of providing technical assistance for teachers in the district. The BBS is used by teachers, librarians, and students.

**BreadNet,** Bread Loaf School of English, Middlebury College, Middlebury, VT 05753, 802-388-3711. BreadNet is a small electronic network of students who use computers and telecommunications as tools to help them develop as writers. Teachers use BreadNet as an on-line forum for communicating ideas on writing and other areas of instruction.

**FrEDMail (Free Education Mail),** 4021 Allen School Road, Bonita, CA 92002. CompuServe 776167,3514. FrEDMail is a special bulletin board devoted to the transmission of student writing. With special software developed for the Apple computer, a local FrEdMail system can be established. All of the needed FrEdMail software packages are distributed by SoftSwap Project of California, CUE, P.C Box 271704, Concord, CA 94527.

**KidsNet,** KIDS.TALK, c/o SpecialNet, GTE Education Services, 2021 K Street NW, Suite 215, Washington, DC 20006, 202-835-7300. This bulletin board uses SpecialNet as the primary network to link students with handicaps from the United States and Canada with each other. Approximately 65 classes belong to this network. In addition to writing to pen pals, the system has been used successfully to improve curriculum related skills.

**KIDS NETWORK,** National Geographic Society, Educational Media Division, Washington, DC 20036, 202-775-6580. This network is a scientific telecommunications project developed by TERC and sponsored by the National Science Foundation and the National Geographic Society. KIDS NETWORK distributes software and curricular materials and provides access to the on-line network for each project. It uses electronic mail to connect teachers.

kids, and experts from around the United States and other countries to compare data, share expertise, and prepare joint projects and reports.

**MIX (McGraw-Hill Information Exchange),** EMS/McGraw Hill, 985 West 78th Street, Eden Prairie, MN 55344, 612-829-8200 (Minnesota only) or 800-622-6310. MIX is an international electronic mail and conferencing service featuring a broad range of services for K-12 teachers, students, and administrators. It supports student projects in most academic areas, teacher-to-teacher planning, conferences, and more.

## Projects in the School

There are a number of projects in the schools that integrate computers and telecommunication in their ongoing program. Some are cited here as examples of what schools are doing to involve special education students in computer-based learning.

**AT&T Long Distance Learning Network,** P.O. Box 716, Basking Ridge, NJ 07920-0716, 619-943-1314. This AT&T sponsored international electronic network uses 'learning circles' to organize student activities for primary through secondary grade levels.

**The Apple Classroom of Tomorrow (ACOT),** Memphis City Schools, Lester Demonstration School, 2597 Avery Avenue, Memphis, TN 38112. ACOT is an Apple Computer sponsored project involving fifth grade students in computing at school and at home. Secondary-aged students act as modem tutors to the younger students. An electronic bulletin board, which can be accessed 24 hours a day, links the ACOT students with their tutors. The school is located in the Memphis inner city and 80% of the students are from low socioeconomic backgrounds.

**The Austra-Alaskan Project,** Alascom, Inc., P.O. Box 6607, Anchorage, AK 99502, 907-264-7396. This writing project involves 35 schools from Australia and 15 schools from Alaska. Several schools in New Mexico will soon join the project. Writing goals include letter composition, reports on local culture, newspaper items, myths, and poetry. Students range from third grade to high school. ONLINE, the electronic mail service used for the project, is run by Alascom in Anchorage.

**GenKids Project,** The GISD Office of Marketing, Media and Public Relations, 6371 Samson Drive, Grand Blanc, MI 48439, 313-768- 4426. One of the first national telecommunications programs for students, GenKids in Flint, Michigan, has grown from a network of three schools in 1984 to over 52 participating schools in 23 states. In addition to the school-to-school programs, the network operates a national bulletin board called Kids.Talk on SpecialNet.

**Pals Across the World,** 2976 South West Galen, Lake Oswego, OR 97035, 503-697-4080. This international writing project matches classrooms in different countries in order to exchange electronic mail. Activities — which are geared for third grade and up — include poetry writing, electronic journalism, dialogue on social issues, and script writing.

**Project Orilla (From Shore to Shore),** 201 Hillside Avenue, Hartford, CT 06106 or 3019 Isben Street, San Diego, CA 922106, 610-292-1816. This project links classes in Mexico and Puerto Rico with bilingual classrooms of Latino students in the United States. The goal is to improve students' educational achievements, especially writing skills. Word processors are used to plan, compose, revise, and edit text. Telecommunications is used to send the text quickly to faraway readers.

**Telecommunications and Deaf Students,** New York University, 829 Shimkin Hall, New York, NY 10003, 212-598-2921. Deaf students in five schools are using telecommunications for reading and writing. Three components of the project include electronic mailbox correspondence, electronic bulletin board, and student-teacher conferences. The equipment and user on-line time are provided by GTE Laboratories.



Additional **Tech Use Guides** on the following topics are available from the Center upon request:

- Guide for Teachers
- Guide for Parents
- Guide for Disabled Adults
- Computer Access
- Selecting Software
- Selecting Hardware
- Preschool Children
- Learning Disabilities
- Hearing Impairments
- Physical Disabilities
- Visual Impairments
- Augmentation Communication

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