COMPUTER MEDIATED COMMUNICATION

and the Online Classroom

VOLUME III: DISTANCE LEARNING

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Chapter
Thirteen

Education in the Matrix:
BBS Networks*

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When J.C.R. Licklider developed ARPANET, one of the first large computer networks, he used the term *virtual community* to describe his vision of how computer communications—known as online-communications—could link people together electronically (Licklider, Taylor, & Herbert, 1978). In a virtual community, the community members are geographically separated, but share the same area of interest. Thus, the people one interacts with online are selected by one's goals, not by one's physical location.

Over the past decades, computer networks have grown both in size and number. Many individual networks have been linked together through the vast telephone and satellite networks that encircle the globe. This network of networks has been termed *the matrix* (Quarterman, 1990; Wagner, 1986). The matrix is an international medium that crosses cultural, socioeconomic, and academic boundaries. No longer are the infor-

mation dissemination channels of the academic networks limited only to professors and university students. Now, mail and files can be transmitted among institutions of higher learning and computers owned by private individuals, public and private school systems, commercial information services, and governmental agencies (Aboba, 1992; Chew, 1990).

An online community can be a tremendous human resource that is easily tapped by anyone equipped with a computer, a modem, and a telecommunications program. For example, in Medford MA, students at the Lewis J. Hobbs Junior High School use computers to connect to the SpaceMet BBS, which is linked to the Fidonet BBS network:

> Our names are Matt, Jami and Laura. A bunch of us are planning to teach recycling to the elementary students as a project. We have planned out five lessons to teach that should be fun for them. We're doing all sorts of fun projects like paper making. Another project we're doing is we are gathering responses (via computer networks) from around the country, and making a report out of them. It's kind of like an update around the country on recycling. —(Lewis Hobbs Junior High School, 1991)

This message was distributed, or echoed, to some 40-50 other Fidonet BBSs across the country. By using a BBS that was networked to FidoNet, Matt, Jami, and Laura were able to address an online virtual community that included an estimated 20,000 to 30,000 people, instead of only the 1,200 registered users on the SpaceMet BBS.

Although it might at first be perceived as a disadvantage, the anonymity of online systems can be an advantage in a virtual classroom:

> K12Net [a BBS network—see below] is a "great equalizer." Online discussions transcend social stigmas based on age, learning disabilities or other handicapping conditions which might otherwise tend to limit dialogue. No one needs to know that you may be 12 years old or in a wheelchair or have dyslexia. All anyone else will see is your words. —(Crawford, 1992)

> I have a dream that rapidly expanding worldwide telecommunication networks will facilitate better understanding between and among students who will learn to respect each other as individuals, overcoming their cultural biases toward racial, ethnic, religious and political groups, in favor of a global electronic "virtual village." —(Murray, 1992a)

BBSs are an ideal medium for creating virtual communities and classrooms: They operate on inexpensive microcomputers that are sim-

ple to use, they can be easily customized and networked together, and any type of computer can dial into a BBS system. Capitalizing on these features, several BBS networks have been developed specifically for use in K-12 education.

Bulletin Board System Networks

In January 1978, the first privately owned and operated Computer Bulletin Board System (CBBS) came online (Anis, 1991). BBSs are similar in principle to physical bulletin boards but are operated electronically by people who call the BBS with a computer and modem.

It is currently estimated that over 30,000 publicly accessible BBSs are in operation in the United States (Rickard, 1991) and over 65,000 worldwide (Rickard, 1992); the majority of these are operated as hobbies by computer enthusiasts.

In 1984, two BBS operators, Tom Jennings in San Francisco and John Madill in Baltimore, linked their BBSs together so that a private message entered on one system could be transmitted to a user on the other system (Rickard, 1992). They termed this special type of mail, *Netmail*. This network was later expanded so that public conference messages could be exchanged. The exchange of public conference messages over a network was termed *Echomail*. (This first BBS network evolved into FidoNet.) Because Echomail is an open forum that is transmitted between BBSs, it allows the users of a BBS to have access to not only the local online community, but also to an additional group of geographically dispersed users, a virtual community.

BBS Networking Principles

All BBS networks work on the same basic set of principles. Files (both messages and programs) are transmitted from one site, called a *node*, to another. Files may be transmitted either directly or through one or more intermediate computers. For this transfer to occur without errors, the files must be sent in a format that is understood by all the computers on the network. Within a particular network, all files are transferred and distributed in the same way, following a set of structural guidelines that are referred to as protocols.

Unlike the Internet (see Ellsworth's chapter, Volume 1), in which a connection is constantly maintained between the nodes of the network, BBS nodes connect with each other only once a day. This is because BBSs use regular telephone lines for transfers and therefore have to pay for connection time. All files (both incoming and outgoing)

for a particular day must be exchanged during this temporary connection. For this reason, BBS networks are classified as store-and-forward networks, that is, mail is stored in one location until a connection is established, and the mail can be forwarded to another computer in the network for distribution.

Most of the files transmitted over BBS networks are mail files; as previously noted, mail files can be either Netmail or Echomail. Netmail is personal mail that is transmitted from one individual to another. Only the sender, recipient, and BBS operator can read this mail. For legal reasons, the BBS system operators, known as sysops, must have access to every piece of mail on their systems; thus, electronic mail should never be considered private (Electronic Communications Privacy Act of 1986; Rose & Wallace, 1992). Echomail is a message in a public conference about a specific topic. Although it might be addressed to an individual conference member, Echomail is distributed to every BBS that wishes to participate in the conference. There are currently over 400 conferences, also called Echos, distributed throughout the FidoNet network.

All messages sent on BBS networks must contain a message header in a standard format. The header gives information about the message's source, destination, type (Echomail vs. Netmail), and subject. In order for a message to be delivered correctly, it must find its way through many different computers on the network. Fortunately, this routing information is handled by mailing programs and is invisible to the BBS user. Although Netmail requires that a sender enter detailed information about the location of the recipient on the network, EchoMail does not. Instead, all that is required to send an Echomail message is to select the desired conference area on the BBS and address the mail to either a specific person in the conference or to "all." The BBS software will transmit the message to the EchoMail coordinator, who will coordinate its distribution to every BBS that is participating in the conference.

FREDMAIL

Since its inception in 1986, the Free Education Mail (FrEdMail) network has been developing virtual classrooms. FrEdMail was founded by Al Rogers, a former elementary school teacher and education technology consultant to the San Diego County Office of Education. Mr. Rogers is currently the Executive Director of the FrEdMail Foundation, a nonprofit group that was created to manage FrEdMail after it grew so large that it was impossible for one part-time person to maintain.

Mr. Rogers has described FrEdMail's mission as follows:

The FrEdMail network is an informal, grass-roots, telecommunications network that helps teachers and students exchange information freely and simply. With over 150 nodes, it lets teachers share experiences with student assignments, distribute teaching materials and curriculum ideas, promote the development of effective reading and writing skills, and obtain information about workshops, job opportunities, legislation affecting education, and new nodes of the growing network. —(Rogers & Estrada, 1990)

Its primary function is to transmit student writing from one place to another, thereby opening up distant audiences for students. FrEdMail is more properly thought of as a writing tool, one which can be used effectively at any grade level and in any subject. The purpose, and emphasis behind FrEdMail is to provide real audiences and real purposes to motivate writing! —(Rogers, 1992a)

A Teaching Tool

There are over 150 FrEdMail BBSs (in the United States, Australia, Puerto Rico, the United States Virgin Islands, and Ireland). In 1991, approximately 5,000 teachers used this network to conduct classroom learning projects (Rogers, 1992b).

Many teachers use the FrEdMail network to compliment their classroom lessons. For example, the FrEdMail network distributes lesson plans, worksheets, and handouts for the CNN Newsroom program, a short news program that teachers can tape to show their students. San Diego teacher Dennis Cowick explained how he used the CNN news program and FrEdMail:

I have been using the daily broadcast of CNN Newsroom for several years now and have found it extremely beneficial to my 7th and 8th graders, especially when I have the daily lesson plans that are available on FrEdMail. I set my VCR to record the fifteen minute Newsroom when it comes on at 12:45 AM and then view it in the morning before class. One of my students calls a FrEdMail board at the beginning of the day and downloads the 4-6 pages of lesson plans, worksheets and handouts that go with the video segment for that day.

One particular lesson involved a special feature on an episode of CNN Newsroom that showed students visiting their parents in prison. We used several of the suggested discussion topics from the lesson plan we downloaded for that day. The writing assignment suggested that students write to their own parents and describe what they, as children, really wanted and needed from their parents. The resulting letters were so heartfelt and insightful that they were published in our year-end literary magazine. —(Cowick, 1992)

In another project, called "Experts Speak," a group of students assumes the persona of an historical figure. Other students on the network then direct questions to the group in an effort to identify the historically important person.

In the "Acid Rain" project, students collect rain and snowfall, measure the acidity of the precipitation, and then upload their data to compare it with the measurements entered by students in different areas of the country.

Students participating in the "Commercially Speaking" project collect data about the television commercials that they watch. These data are then entered into a database that is transmitted through FrEdMail to other classes. After several classes have uploaded their databases, students can learn about demographics by analyzing when certain commercials are broadcast in different regions of the world.

These are just a few examples of the hundreds, if not thousands, of learning projects that have been successfully shared through the FrEdMail network.

The Network

Although any computer can be used to dial in to a FrEdMail BBS, all FrEdMail BBSs are Apple II computers. The Apple II computer lineage may seem primitive by today's standards, but it is well suited to this education-oriented network for several reasons. First, almost every school in the nation has one or more Apple IIs; because school districts can use existing hardware, it is not expensive to set up a FrEdMail BBS. A school that does not have a spare Apple II can purchase one cheaply. In addition, most sysops on FrEdMail are teachers who are already familiar with the use of Apple IIs (Andres, Jacks, & Rogers, 1991).

The network was named the Free Education Mail network because there are no charges for dialing up a local FrEdMail system or for sending netmail (although the BBSs pay an annual subscription fee, see below). The FrEdMail network is constructed along the lines of other BBS networks. The network is divided into regions and subregions. Regional and subregional mail hubs coordinate the distribution of mail, and echo coordinators oversee the distribution of network conferences.

Connecting to a FrEdMail BBS

As mentioned earlier, there are no charges for using a FrEdMail BBS, except for the phone charges. If you are calling a FrEdMail BBS in your local area, the call is free; otherwise you will have to pay normal long-distance charges. Table 13.1 lists several FrEdMail BBSs. You can call any of these BBSs (modem settings: 8-N-1) in order to search a list of additional FrEdMail BBSs to find one close to you. We have verified all of these numbers but cannot guarantee that all of these BBSs will still be active when this book is published.

Setting up a FrEdMail System

All FrEdMail BBSs must use the FrEdmail BBS software produced by the FrEdMail Foundation. The latest version (1.3) costs $149 and runs on Apple IIe, Apple IIgs, and Apple IIplus computers. It will not work on an Apple IIc computer because of a problem with the IIc's serial port.

Each BBS on the FrEdMail network pays an annual consortium subscription fee of $150 to the FrEdMail Foundation for network maintenance, technical support, and software updates.

The FrEdMail Foundation has designed their BBS software to be easy to use. The software is also designed to accept calls from people who use a Telecommunications Device for the Deaf (TDD) to communicate. (TDDs operate at 110 and 300 baud.)

SCHLnet

The FrEdMail Foundation has recently initiated several moderated newsgroups that are distributed through the Internet, FrEdMail, UUCP, and other networks. These newsgroups (seven so far) are collectively referred to as SCHLnet and are distributed together as a "boxed set" of newsgroups. SCHLnet was created to distribute "ideas, resources,

TABLE 13.1. FrEdMail Bulletin Board Systems as of January 1993

Number	BBS Name	Location
201-705-3787	Newark School District	Newark, NJ
217-333-2246	College of Education U of I	Champaign, IL
309-263-2168	Morton Unit School District	Morton, Il
313-858-1873	Oakland County Schools	Pontiac, MI
314-894-5592	Regional ConsortiumSt.	Louis, MO
404-251-4904	Heritage School	Newman, GA
501-460-1965	Univ. of Arkansas	Monticello, AR
619-472-5732	FrEdMail Central	Bonita, CA
703-841-9598	Long Branch School	Arlington, VA
714-997-6387	Orange County Office of Ed.	Orange County, CA
904-329-0627	Jenkins Middle School	Palatka, FL
919-757-4154	East Carolina University	Greenville, NC

opportunities, and information of specific relevance to teachers and their students, without the extraneous and sometimes offensive distractions posed by Usenet newsgroups" (Rogers, 1992c).

Because the conferences are moderated, the foundation charges a fee for receiving SCHLnet. The current fee structure is based on the number of teachers and adult users that will have access to the SCHLnet newsgroups: $25 per year for 1-4 people, $250 per year for 4-300 people, $450 per year for 300-700 people, and $750 per year for 700-1,500 people. The FrEdMail Foundation will give free 1-month trial subscriptions to those who are interested in receiving SCHLnet.

Internet Connections

The FrEdMail network is linked to the Internet by means of *gateways* that operate between individual FrEdMail BBSs and UNIX computers at institutions of higher education. These UNIX computers are in turn connected to regional networks, which provide access to the Internet. The first network to establish a gateway with FrEdMail was the California Education and Research Federation network (CERFnet). CERFnet links over 300 of the leading research and education centers in California at data transfer rates of up to 1.544 megabits per second (T1). The National Science Foundation (NSF) awarded a $226,000 grant for the development of the gateway between CERFnet and FrEdMail.

This collaboration between schools and colleges has been supported by members of the higher education and scientific communities. Stephen Wolff, Director of NSF's Division on Networking and Communications Research and Infrastructure, said:

> The NSF is committed to improving the performance of students in math and science, and CERFnet is serving as a conduit for education. The National Research and Education Network (NREN) is pushing the development of gigabit speeds for academia and industry and, at the same time, pulling all levels of education towards the inherent benefits of connectivity to the national infrastructure. The development of this gateway will facilitate a national network of academic computing hubs that act as local file servers to their regional K-12 FrEdMail sites, via existing facilities and transportation networks. (Rogers, 1992d)

Sid Karin, Director of the San Diego Supercomputer Center (SDSC), also commented on the gateway between FrEdMail and CERFnet:

> While the SDSC and CERFnet are quite correctly identified with the higher education and high technology communities, we are the per-

> fect springboard for this initiative with FrEdMail. Classrooms across America should have access to the computational tools of the Information Age to stimulate the minds of American youth. The needs of educators, scientists and engineers have driven the development of this technology which is now available to K-12 teachers and students on an affordable basis. (cited in Rogers, 1992d)

The FrEdmail Foundation estimates that there may be 50,000 teachers on the Internet (Rogers, 1992c). By uniting the Internet community of teachers with the K-12 teachers on FrEdMail, a FrEdMail-Internet link allows both groups of teachers to share resources and collaborate on projects. Besides CERFnet, several other networks and computing sites are now serving as conduits for mail between FrEdMail and the Internet.

How The Gateway Works

A FrEdMail-Internet connection works by using college and university UNIX computers as mail servers for local FrEdMail BBSs. Instead of separate accounts being maintained on the UNIX computer for every user on the FrEdMail BBS, all the mail for people on the BBS is stored in one account on the UNIX computer. Once a day, the FrEdMail BBS dials up the UNIX computer, receives a mail packet from the UNIX system, and sends an outgoing mail packet to the UNIX computer. The FrEdMail BBS software then sorts the mail packet it received and distributes the mail to individual user accounts. The UNIX computer extracts mail from the packet it received from the FrEdMail BBS and sends the messages out through the Internet.

To set up a UNIX-FrEdMail gateway, the college or university must install the UNIX-FrEdMail gateway software on its UNIX computer (the BBS requires no additional software). The UNIX software consists of two files: freduucp.tar.Z and fredux.tar.Z. The files are available through the Internet via anonymous FTP from nic.cerf.net (in the fredmail directory). These files are copyrighted by Gregg D. Brekke (greggb@profred.cerf.fred.org) and the FrEdMail Foundation. There is a $250 licensing fee for the software, which helps cover costs of technical assistance.

FrEdMail Contacts

In addition to the FrEdMail BBS software, the FrEdMail Foundation sells several good teaching materials. The foundation's book, *Telesensations: The Educators' Handbook to Telecomputing* ($34.00 as of this writing), is an excellent resource that contains over 100 telecomputing activities for students and lots of helpful technical information. The foundation also offers a prepackaged teacher training workshop called "T 'n T: Telecomputing

and Teachers" ($249). This package includes: syllabi, overheads, 150 pages of handouts, three video tapes, and a FrEdMail simulation program. (The simulation program is available separately for $25.) The foundation also publishes a quarterly FrEdMail newsletter ($10 per year).

To order the FrEdMail BBS software or for information about FrEdMail, SCHLnet, and the UNIX gateway software, contact: FrEdMail Foundation, P.O. Box 243, Bonita CA 91908; or at 619-475-4852 (voice), 619-475-4852 (data), or through the Internet at arogers@bonita.cerf.fred.org.

K12NET

As previously noted, the first BBS network was FidoNet. FidoNet has grown from a network of two BBSs to more than 15,000 BBSs based in 180 of the world's countries (Rickard, 1992). This network is not owned or administered by any one person or organization. Instead it is loosely administered and maintained by people in different regions of the FidoNet network (Aboba, 1992).

One of FidoNet's advantages is that people can selectively distribute moderated conferences, or echos, to a particular list of BBSs on the network. This feature has been utilized to build K12Net. K12Net is a set of conferences for K-12 students and educators (see Table 13.2) that is privately distributed through the FidoNet network. Currently, over 200 BBSs subscribe to K12Net conferences, and roughly 800 to 1,100 messages are exchanged within these conferences every week (Reilly, 1992)

Because K12Net utilizes the existing FidoNet network, it has several advantages. First of all, a school that wants local access to K12Net does not need to set up its own BBS, but rather can ask any local FidoNet BBS to subscribe to the K12Net conferences for the school (see "Setting up a K12Net System" below). Because K12Net is distributed over FidoNet, teachers and students can also have access to FidoNet's abundant conferences; there are over 400 public conferences on FidoNet (Rickard, 1992). In addition, FidoNet is a well-established "public domain" network for which there is already much technical support and help available from hobbyists throughout the world.

A Teaching Tool

As with FrEdMail, K12Net conferences allow students to coordinate with each other on various learning projects. Table 13.2 lists conferences devoted to discussions in a number of subject areas. Each conference is moderated, or "animated," by a teacher "who is familiar with the subject matter, sensitive to the needs of new users, and adept at steering conversation in an educationally appropriate environment" (Murray, 1992b).

TABLE 13.2. K12Net Conferences (Echos)

Conference	Description
K12_ART_ED	ARTS & CRAFTS EDUCATION (excluding music)
K12_BUS_ED	BUSINESS EDUCATION
K12_COMP_LIT	COMPUTER EDUCATION: Technical assistance and exchange for computer educators and students.
K12_HLTH_PE	HEALTH & PHYSICAL EDUCATION
K12_LIF_SKIL	LIFE SKILLS EDUCATION; Home economics, career skills, legal issues, safety education.
K12_LANG_ART	LANGUAGE ARTS EDUCATION: reading, writing, literature, grammar, composition, etc.
K12_MATH_ED	MATHEMATICS EDUCATION
K12_MUSIC_ED	MUSIC & PERFORMING ARTS EDUCATION
K12_SCI_ED	SCIENCE EDUCATION
K12_SOC_STUD	SOCIAL STUDIES EDUCATION: History, Civics, Social Sciences, etc.
K12_SPEC_ED	COMPENSATORY EDUCATION: learning disabled, etc.
K12_TAG	TALENTED & GIFTED EDUCATION: challenges specific to educating intellectually and/or artistically gifted students.
K12_TECH_ED	TECHNOLOGY EDUCATION: Robotics and engineering, industrial & manufacturing technologies, drafting, design, CAD/CAM, and Vocational Education.
K12_FRANCAIS	French-only discussion.
K12_RUSSIAN	Russian language discussion.
K12_SPAN_ENG	Spanish-English "practice" echo. Native Spanish speakers are urged to correspond in English and native-English speakers are urged to write in Spanish providing exciting, interactive "practice" for beginning and intermediate-level students.
K12_GERM_ENG	Same format as K12_SPAN_ENG but for German language
K12_ELE_CHAT	ELEMENTARY SCHOOL CHAT: All-purpose chat echo for K-6
K12_JR_CHAT	MIDDLE SCHOOL CHAT: All-purpose chat echo. Grades 7&8
K12_SR_CHAT	SENIOR HIGH SCHOOL CHAT: All-purpose chat echo. 9-12
K12.SYSOP	K12.SYSOP: **This is for sysops-ONLY**. ·
K12.TCH_CHAT	TEACHER CHAT: **For ALL professional educators ONLY**
K12.PROJECTS	TELECOMMUNICATIONS PROJECTS: **for ALL professional educators.**
K12_NEWS	K12Net NEWS (all should read): A place for announcements at the network level.

The moderator sets the tone of the conference that he or she moderates, therefore each conference takes on a "personality" of its own.

Besides the conferences listed in Table 13.2, K12Net allows students to collaborate on projects through "channels"—conferences temporarily devoted to a single project. One such project was an experiment to measure the earth's dimensions:

High school physics students in Oregon, California, Nova Scotia,

and Maryland attempted to replicate Eratosthenes' experiment to measure the size of the earth by measuring the length of a shadow cast by a stick at "true" noon on three successive Mondays in October, 1991, posting their data, and performing the necessary calculations in the "Physics Challenge" echo in K12Net Channel 5. Their calculations were accurate to within 7%. —(Murray, 1992b)

This particular project was repeated during the winter of 1992 with participants from a broader geographic area.

Other examples of K12Net learning projects include: exchanging news stories and analyzing local and regional differences in news reporting, a "CO2 Challenge" project in which students learn about global warming and what they can do to reduce greenhouse gas emissions, and a "Brown Bag Science" project in which students exchange information about science projects that can be conducted with common household items.

K12Net File Libraries

Sysops of BBSs that carry K12Net conferences have collected over 200 megabytes of educational programs and text files. All of these files are in the public domain and are stored at 19 different K12Net library sites (Murray, 1992b). Any K12Net BBS can obtain files from a K12Net file library by issuing a File Request (FREQ) command (Aboba, 1992; Reilly, 1992).

The files in the K12Net file library "range from administrative software (such as gradebook programs and crossword puzzle makers) to tutorials in English, math, science, and foreign languages at all grade levels, to text files and lesson plans in a variety of subjects, to reports published by the U.S. Department of Education" (Murray, 1992b).

Connecting to a K12Net System

Table 13.3 lists BBSs that subscribe to the K12Net group of conferences. Some of these BBSs are operated by schools, whereas others are operated by individuals. As with FrEdMail, you can call these numbers (modem settings: 8-N-1) to search for a BBS in your area. Although we verified these numbers before publication, we cannot guarantee that all of these BBSs will still be active when you read this book.

Setting Up a K12Net System

Unlike FrEdMail, a K12Net BBS can be set up on a wide variety of microcomputers. Public domain Fidonet BBS programs (no cost) are available

TABLE 13.3. K12Net Bulletin Board Systems as of January 1993

Number	BBS Name	Location
402-471-0897	Nebraska Dept. of Education	Lincoln, NA
405-728-8228	The Teacher's Pet	Oklahoma City, OK
413-536-7526	SpaceMet South	Amherst, MA
501-631-3618	Rogers Public Schools	Rogers, AR
503-996-6203	Taft Middle School BBS	Lincoln City, OR
504-897-9204	Resource Access BBS	New Orleans, LA (?)
607-324-3785	The School Board	Hornell, NY
615-883-3585	Metro-Net BBS	Nashville, TN
716-526-6495	K12 Central	Stanley, NY
719-472-0745	Rivendell	Colorado Springs, CO
813-359-5808	Global Vision	Sarasota, FL

for IBM-PC compatible, Amiga, Atari ST, and Macintosh computer systems. The best place to get a FidoNet-compatible BBS program for your particular computer is from a local BBS or a commercial online service (America Online, Compuserve, Genie, The Well, etc.). As mentioned previously, schools do not always need to set up their own systems; they may instead ask a local BBS run by a hobbyist to subscribe to the K12Net conferences. In this case, schools might want to ask the sysop to restrict access for callers from the school to K12Net conferences only. This will prevent students from exploring conferences and file areas that contain adult subject material. There is no consortium fee for K12Net.

K12Net Contacts

For information on K12Net and K12Net Usenet newsgroups contact: Jack Crawford, Teacher Resource Center, 3501-K County Rd 20, Stanley, NY 14561, or call 716-526-6431 (voice) or 716-526-6495 (data). You can also send e-mail to Jack Crawford through the Internet: jack@k12net.org. All K12Net BBSs (see Table 13.3) have information files on K12Net and how to set up a K12net system. These files can also be obtained through the Internet via anonymous ftp to ftp.uu.net, retrieve the file k12net.tar.Z from the /doc/directory, or by UUCP from uunet!~/doc/k12net.tar.Z (Reilly, 1992).

OFFLINE MAIL READERS

BBSs can receive hundreds of new mail messages every day. BBS callers often find it hard to read and reply to such a volume of information in

the time available (most BBSs limit callers to 30 or 60 minutes of online time). Offline mail readers help alleviate this problem. Kim Tekinay, an author of an offline mail reader, explains how these programs work: "Rather than force the user to read the mail in every conference he was interested in while connected over the phone, the BBS 'packed' all the messages into a file that was then sent to the user via a fast file transfer. The user could then hang up the phone and use an 'offline mail reader' to read the messages contained in the packet" (Tekinay, 1991).

After a user has written replies (offline), a reply packet can be prepared and transmitted back to the BBS, where it is "unpacked" and the messages are placed in the appropriate conferences.

There are several advantages to using an offline mail program: messages can be searched, sorted, and indexed; one has time to write a well thought-out reply; a user can quickly download and upload mail packets, which saves in long-distance phone charges; and the BBS is not tied up by users that are writing messages while online.

Most K12Net BBSs either offer offline mail processing or have this capability. If the K12Net BBS that you are using does not offer this type of message compression, ask the sysop to install this feature. (The sysop should be able to obtain the software for free or for less than $50.) Unfortunately, FrEdMail BBSs do not yet have the capability for offline mail processing.

CONCLUSION

FrEdMail and K12Net offer an inexpensive and easy way for students and teachers to explore a wealth of online information and to establish collaborations among classrooms throughout the world. Virtual classrooms are a significant motivating force for offline activities and provide an excellent forum for the exchange of ideas between students from different areas of the globe.

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