Recess Could Have a Whole New Meaning As Children Travel the World on a Wire

by David F. Warlick

Several years ago, when I had only been using the Internet for a short time, I was experimenting with a service called Internet Relay Chat or IRC. It is like CB radio on the Internet, where people can talk with each other via their keyboards. I had subscribed to a chat channel and found myself in the midst of a conversation in progress among four computer science students. They were discussing a major exam they had just taken. I broke in after several minutes and introduced myself, explaining what I did for a living and my interest in the Internet. The students politely faked an interest in my work and we talked (keyboarded) for about 30 minutes about what school children might be able to do with the Internet. Finally, one of the students suggested that we meet for pizza and continue our conversation. I keyed, "Sure, where?" Another kid typed the name of a pizzeria that I'd not heard of (having only lived in Raleigh for a few months). I asked for the address, and was given the name of a street which I had not heard of. I finally keyed, "Where are you guys, anyway?" And they answered, "Reykjavik..., Iceland."

I took a rain check on the pizza, said good-bye, logged off, and patted myself on the shoulder for such an impressive feat of technology. However, it was several weeks later that I realized the true significance of this event. It was not that I had communicated with people from another country, but that I'd communicated with them for a half-hour without knowing that they were in another country.

This story suggests an important model for the world in which our current students will function. They will produce, contribute, consume, seek entertainment, and make friends in a world where their geographic location is not important when compared to their skills in accessing and processing information, generating ideas, and using technology to communicate those ideas. This is why it is important for us — educators —to begin to understand the potentials of global networking in the school and to teach students about the Internet, giving them opportunities to use the medium to access people and information.

The global network provides us with unique opportunities to enrich traditional instruction by allowing teachers and students to have access to information independent of time and space (two limitations of print), and to express their ideas and knowledge to an audience other than just the teacher's grade book. This article discusses some of the ways that classroom teachers might use the Internet to accomplish this.

For the sake of discussion, I will attempt to classify educational Internet activities into three categories: writing, information sharing, and information accessing. Many telecomputing projects have elements of more than one of these categories — actually making the educational experience a richer one for its participants.

Writing

Internet electronic mail (e-mail) and group mail services (mail lists and newsgroups) have given North Carolina educators the opportunity to communicate globally for a number of years. FrEdMail, since 1990, and Learning Link, for the past two years, have utilized gateways to the Internet, allowing teachers and students to send messages beyond these two networks to users of other telecomputing networks around the world. With the appropriate equipment, teachers have been able to compose messages, address them to colleagues in other states or nations, and send the messages through the network to recipients' electronic mail boxes.

This simple process also provides a large audience for student authors. Their writings (keyed into a computer and saved on a disk) can be uploaded into the electronic message and sent to a distant (or near) classroom for other students to read. This is extremely motivating to student writers, who know that their

work will be seen by unknown readers, and result in a substantial increase in the number of students with a positive attitude toward writing.[1]

One activity that is frequently used by teachers who are new to telecomputing is penpal projects — sometimes called keypals or telepals. Two teachers from different geographic locations match students to write introductory letters to each other. The writing can be based on an agreed-upon theme or simply can be designed to help students learn about cultural differences, thus providing an opportunity to integrate writing into other disciplines. A common activity is to have students impersonate someone else. In Person County, fifth grade students from Bethel Hill Elementary asked questions through e-mail of famous people in history. Person Senior High students, using a little research and a lot of imagination, pretended to be the historic characters, answered the questions, and replied with questions about the future impacts of their accomplishments.

Although a simple concept, student-to-student writing activities can be difficult to coordinate. For instance, students will be impatient to receive responses from their penpals, who are composing and editing their own letters. Teachers must schedule class or computer lab time and deal with students who are absent or slow at the keyboard. By the time students finally have heard from their penpals, they may have lost interest — a valuable commodity in the classroom.

Class-to-class writing projects are easier to coordinate and tend to run more smoothly than long-distance ones. Rather than working with the logistics of getting twenty plus electronic letters each to a specific student, the teacher merely publishes the student's writings to one or more classes for mass reading. Instead of personal letters, students are publishing to a greater audience. Classes typically write and transmit their files to each other at the same time, facilitating more interactions and less waiting.

The notion of publishing can be an explicit part of an Internet project. Two classes — or many classes — submit articles, poems, or creative writings to a central location, where the writings are compiled into a single publication for many to enjoy. The Newsday project on the *FrEdMail* and *SchoolNet* networks provides a newsgroup for classes around the world to submit writings. This newsgroup becomes a source of material from around the world for just as many classes to select and compile into their own publications, thus involving skills in writing, critical reading, planning, and desktop publishing.

Another example of a class-to-class activity is electronic story starters. Yvonne Andres, of the Global Schoolhouse Project, recently began a *Global Peace Poem*. The poem was sent out over the *FrEdMail* network where it was added to by classes along the way. Before its completion, the poem circled the globe six times.

Educators, too, benefit from e-mail by carrying on dialogs — or multilogs — with colleagues. Some teachers say that the greatest impact of e-mail is the ability to communicate with teachers in their own schools, where overwhelming schedules prevent them from collaborating face-to-face. Public messaging

with mail lists or newgroups provides teachers with hundreds or thousands of other educators, an invaluable resource. One mail list, *Kidsphere*, is distributed to 1,500 Internet addresses, many of which are distribution points to other regional networks for teachers.

As telecomputing stations become more numerous in schools and as more homes go on-line with services such as *Prodigy* and *America On-line*, children will gain more opportunities to use the Internet independently. It is important for those who supervise children to realize that Cyberspace is in many ways a mirror of the real world, that it reflects the good but also the bad of our society. Although the Internet provides libraries, museums, and playgrounds for children, it is largely the domain of adults and includes discussions of topics that would be confusing or controversial for children. There also remains some pornography for those with the perseverance to find it, as well as undesirable people lurking in electronic alleys. Although this aspect of the Internet has been somewhat overemphasized by the media, it should be an issue of concern; precautions must be made to protect children. Because of the democratic nature of the Internet it is difficult to impossible to censure material on the network and, to some, censorship is not an appropriate solution to the problem. A proactive course of action is to aim students in the direction of more educationally appropriate materials. In selecting on-line services, ask to have a preview of their Internet access point. Check the homepages for their links to the Internet to make sure that they do not point to inappropriate sites. Also check the complete list of newsgroups that are available to users. If there are inappropriate newsgroups, ask the service provider whether specific accounts can be prevented from subscribing to certain newsgroups.

Just like in the real world, there are rules that children must be taught to obey. Although Cyberspace is physically a safe place, children must understand that they should avoid links between the electronic and real world by following rules when talking with people on the Internet:

- Never tell your whole name (in fact, it is not a bad idea to have an on-line pseudonym)
- Never share your address, school, or even the city in which you live with on-line acquaintances.
- If an on-line partner makes you uncomfortable in any way, simply leave. No one is stronger than you are in Cyberspace.
- If a person is acting inappropriately for the particular Internet discussion site, write down his name and the time, and report this to the Internet service administrator. Many times the person can be tracked down electronically and confronted.

This opportunity also should be used to discuss appropriate behavior on the Internet. Help children to understand that the Network is a domain for communication much like the real world. And just like in the real world, users must remain sensitive to the feelings of others. This is especially true since e-mail does not provide the more subtle means of communication through facial expression and posture. Children also should be helped to understand that in the Infor-

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Internet Projects

ERIC – Those with direct access to the Internet can get to the ERIC gopher site at the University of New York in Syracuse. The site address is **ericir.syr.edu** port 70. Following the path, ..., you will find a listing of proposed projects and classes looking for penpals.

FrEdMaiUSchoolNet – The FrEdMail network (known as SchoolNet on the Internet) is probably the greatest source of proposed curriculum-based telecomputing projects. Those who have an account on FrEdMail can go to the newsgroups section and read project descriptions by subject area. Call your school system's computer coordinator to see if you have a local FrEdMail node.

Learning Link – Maintained by the UNC Center for Public Television, North Carolina's Learning Link has recently begun carrying the SchoolNet service, which is the Internet version of FrEdMail. Now teachers across the state can have access to FrEdMail projects through a free telecomputing service and a toll-free phone number. For an account application, call Robert Watson at 919-549-7192.

mation Age, information is a commodity, and the computers that store it are property.

Information Sharing

For centuries, students have learned about their world from within the walls of school houses, where their only sources for information were textbooks and school libraries. The Internet has provided schools with the opportunity both to solicit and contribute information to a global network of schools — a virtual school house. These information-sharing activities most frequently take the form of an electronic survey giving the soliciting class access to a wealth of real-life, peer-generated information that they can process into conclusions. These surveys can be simple and fun, such as the number of red, orange, and green M & M's per pack. They can also be quite serious with powerful consequences. Classes in North Carolina during the 1992 presidential campaign conducted electronic surveys on issues relevant to the election as part of the VoteLine project. The results of the surveys and conclusions made by the students based on media and demographic research were entered into computer spreadsheets that they used to calculate projected outcomes of the election and to test "what-if" scenarios. Teachers reported that they had never seen students discuss political issues with more enthusiasm.

Classes also can share and compile culturally significant information by asking for games, folktales, jokes, or proverbs, or what word others use to refer to a carbonated beverage. Classes in North Carolina shared cultural information with Australia by electronically surveying information and then creating travel guides. The guides were electronically published across the Pacific so that eleven-year-olds from both countries would know how to dress, talk, and act were they to visit each other's land.

Another project that demonstrates much of the potential of Internet-based information sharing is telefield trips. A class in Martin County might be planning a field trip to the Outer Banks to see the Wright Brothers' Memorial. They could announce this trip on the Internet so that other classes across the country who also are studying early aviation might e-mail to the Martin County class lists of questions about the first powered flight. The North Carolina students would become researchers for hundreds of other students, arriving at the park with many questions for the guides — who are surprised that the souvenir shop is less important than learning about aviation's most famous brothers.

Information Accessing

More and more schools are gaining "direct access" to the Internet. This means that once connected to an Internet service the teacher or student can use a variety of software tools (Telnet, Gopher, WorldWideWeb) to reach beyond that service provider's computer,

through the Internet, and into the information of thousands of other networked computers. With these information accessing tools creating hyperlinks between Internet documents, these teachers and students begin to realize a vast web of interconnected information that envelops the globe. This gives schools access to a wide range of information both historic and current, and in a variety of formats: text, graphics, audio, and video. They have a global library with resources greater than any school media center.

Government documents, as a result of legislation, are being posted onto the Internet before they are printed. The President of the United States and many House and Senate members are posting documents regularly on the Internet for public access. For instance, the full text of the 1994 State of the Union Address was on the Internet by 9 a.m. the morning after President Clinton made the speech.

There is another aspect of the Internet as an information resource that is particularly important to classroom applications. It is digital. Information that is retrieved from the Internet comes from computer disks and typically is saved to a computer disk. This enables teachers and students to utilize their own information processing tools to use the information that they retrieve in very powerful ways. For instance, organized data sets can be loaded into a database or spreadsheet program and analyzed to solve very specific problems. The Earthquake Center at the University of Washington contains files for every earthquake recorded in its labs since 1969 — by year. One could download the file for 1993, import it into a database program, and answer questions about the locations, magnitude, and times of earthquakes around the world.

Another powerful tool for using Internet-accessed information is the search function on standard word processing programs. As part of the VoteLine project, high school students had access to the complete texts of major speeches made by both presidential candidates. The students could load the speeches into a word processing program and search for key words (i.e., education, defense), easily comparing and contrasting the candidate's published positions on specific issues.

These aspects of on-line information can be particularly helpful in high school instruction. By nature, learning in the upper grades is more information intensive than the elementary and middle grades. One reason that the high school classroom remains a teacher-centered, lecture-based environment might be that much of this information is largely static. It is contained in text books, library reference works, periodicals, and newspapers. Even recent attempts at automation have merely provided more efficient access to print information. Internet-based information, however, is by nature more current, fluid, manipulative, searchable, and far easier to mold into unique information

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Information Oasis on the Internet

« Search the Internet User Glossary
  gopher://dewey.lib.ncsu.edu/7waissrc%3a/.wais/
  Internet-user-glossary.src
« Search the Computer Jargon Dictionary
  gopher://dewey.lib.ncsu.edu/7waissrc%3a/.wais/jargon.src
« Photographs of exhibits at the Smithsonian Institute in
  Washington DC
  ftp://photo1.si.edu
« ERIC's gopher home page
  gopher://ericir.syr.edu:70
« The Library of Congress gopher home page
  gopher://marvel.loc.gov:70
« The Library of Congress WorldWideWeb home page
  http://marvel.loc.gov/
« Access to libraries in North Carolina and around the globe
  gopher://merlin.nando.net/11/refshelflibraries
« Lots of gopher veronica search sites
  gopher://gopher.ed.gov/11/other_gopher/veronica
« The U.S. Department of Education gopher
  gopher://gopher.ed.gov:70
« The U.S. Department of Education WorldWideWeb site
  http://www.ed.gov/
« Search for statistics on the the countries of the world from
  the CIA World Fact Book
  gopher://merlin.nando.net/11/refshelf/ref/cia
« For information about the United States Government
  gopher://merlin.nando.net/11/refshelf/government/US
« For information about international governments
  gopher://merlin.nando.net/11/refshelf/government/world
« For information about North Carolina government
  gopher://merlin.nando.net/11/refshelf/government/NC
« For information about the governments of other states
  gopher://marvel.loc.gov/11/federal/state.local
« Searchable archive of lesson plans
  gopher://ericir.syr.edu/11/Lesson
« Archives of educational mail lists
  gopher://ericir.syr.edu/11/Listservs
« Educational Conferences Calendars
  gopher://gopher.ed.gov/11/programs/ERIC/conferences

products. One example of how these characteristics might be utilized in the high school would be to assign a small group of students in a civics, U.S. government, or history class the ongoing project of tracking the activities of the President of the United States and producing a hypertext document that links "promises to actions." The students might download from the Internet the "1994 State of the Union Address," and import it into HyperCard or any of a number of other hypermedia programs. This document might be used as the center or hub of the product. As students work in rotating subgroups, they monitor the text of new speeches and position papers as they are posted on the Internet, download, and create links to related passages in the "State of the Union Address." Newspapers and news magazines also can be monitored for comments and actions made by the President, scanning the information onto disk, importing it into the hypermedia program. They might download and look at campaign speeches from 1992 made by the President and other post-election activities. An added dimension might be links to comments made by student team members discussing why links were made and opinions on why actions differ from promises. These annotations could be audio or video files. The product then could be copied, distributed, archived, and made available in the library or over the school network, and even shared with other schools across the nation and beyond through the Internet. The Network provides the opportunity not only to learn information, but the interact with it, and use it as building blocks.

In the Future

One application of the Internet that holds much promise (when sufficient numbers of Internet computers are in place in schools) is networked virtual environments. Usually called MUDs, they are similar to the old adventure games where the player reads about their environment and navigates the space by typing simple commands; go north, go down, pick up, read sign, etc. There are hundreds of MUDs on the Internet now, but most are intended for entertainment. However, Massachusetts Institute of Technology has established a text-based rendering of the Media Lab where media researchers around the world can set up virtual offices, meet and discuss issues related to electronic media, or develop virtual information tools and toys (text-based VCRs and video cameras). Several virtual universities also have been created that students can log in to and take courses for credit.

With networked virtual environments, K-12 students could log in to a virtual museum, move from room to room and read about the exhibits; "go transportation in the past", "look Viking ship." Not bound by time or place, the students actually might board the Viking ship, raise the sail, and suddenly find themselves sailing through the icy North Atlantic with a crew of Vikings with the ability to change course and bark orders. Employees with the North Carolina Department of Environmental Health and Natural Resources are creating on the Internet a text-based rendering of a waste water treatment plant. Students will be able to visit, read about, and actually operate the facility

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Internet Tools

E-MAIL: Electronic mail involves sending and receiving messages over the network. You use a mail program like mail or pine to compose and read your messages.

MAIL LISTS: A group discussion carried on through electronic mail. BITNET is home to numerous mailing lists on a huge range of topics, but mailing lists are also found on the Internet itself. To subscribe to a mailing list, send an e-mail to the lists address, type "Subscribe <the name of the list> <your first and last names>", and send the message. You will receive a welcoming message with instructions.

NEWSGROUPS: A worldwide network of discussion centers on thousands of subjects which can be accessed by newsreader programs.

GOPHER: A tool developed at the University of Minnesota that creates menus that allow you to access network resources by moving an on-screen pointer: The idea behind Gopher is to simplify the process of using network information. Gopher can point to text files, Telnet sites, WAIS databases, and a wide range of other data.

Public Gopher Sites available through telnet:
gopher.msu.edu login: gopher .... Michigan State University
consultant.micro.umn.edu login: gopher ...... Uiniversity of Minnesota
ecosys.drdr.virginia.edu login: gopher .... University of Virginia
ecnet.ec login: gopher .... EcuaNet; Corporation
   (Language: Spanish)   Equatoriana de Informacion
gopher.th-darmstadt.de login: gopher .... Technische Hochschule
   (language: German)   Darmstadt

FTP: File Transfer Protocol is your tool for moving files from any one of thousands of computer sites to your service provider's machine. From there, you can download them to your own computer.

WorldWideWeb: This services provides a hypertext interface with Internet resources. Selecting accented words and phrases within Internet Documents acccss related documents form other Internet sites.

Public WorldWIdeWeb sites available three telnet:
gopher.msu.edu login: web .... Michigan State University
ecosys.drdr.virginia.edu login: lynx .... University of Virginia*
ukanaix.cc.ukans.edu login: www .... University of Kansas

TELNET: An Internet protocol that allows you to log on to a remote computer. Used, for example, in searching remote databases.

* Indicates public tool sites that allow jumping to any server.
Much of this information comes from *The Internet Navigator* by Paul Gilster

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by typing in simple commands.

Researchers at MIT, driven by the same constructionist concepts that brought us Logo programming, are carrying this one step further by developing a simple programming language that allows students to create their own text-based virtual environments. Rather than building dioramas of a Native American village, students could create text-based renders, where they could walk through the village, enter the teepees, use their tools, and talk with the occupants.. "At-risk" students in Phoenix, Arizona created a city on the Internet during the summer of 1993. Their next project is to create a text-based rendering of the continent of Europe. Virtual renderings of other countries also are appearing on the Internet, providing students of languages a place to go and practice their skills by maneuvering in an environment based on that language.

NC G.R.I.D. (Global Research using Internet Databases)

The North Carolina Department of Public Instruction is conducting an ongoing project called G.R.I.D. (Global Research using Internet Databases). Among the goals of the project are to determine the best uses of the Internet in terms of facility logistics and software interfaces, and to identify educationally appropriate Internet resources and effective applications of those resources. The findings, thus far, point to more Internet accessing stations in the schools, logistically placed for convenience — not just where the phone lines are. The interface is also important. The Library of Congress should be only a mouse click away and not at the end of fifteen menu selections and IP addresses. "It needs to be as easy to use as a CD-ROM," one teacher said.

Conclusion

There is hardly any area of education that cannot be affected positively by use of the Internet. It is as fundamental as the hallway to the media center and as specific as the precision scales in the chemistry lab. It provides for students the very words of the parents of our society and allows teachers access to the latest in research-based instructional techniques.

The equalizing effect of the Internet alone should be enough reason to begin providing it to all schools in North Carolina. When we can give to students in the most rural and isolated schools in the state the same global library as our wealthy urban schools, we are moving in the right direction toward addressing one of the major problems of education in North Carolina.

Reference

[1]Stephen J. Zoni, "Improving Process Writing Skills of Seventh Grade At-Risk Students by Increasing Interest through the Use of the Microcomputer, Word Processing Software, and Telecommunications Technology," ERIC #: ED350624 (1992).

The Internet Locations for Resources Mentioned in this Article

➤ Requests for penpals:
 gopher://wealaka.okgeosurvey1.gov/11/K12/keypals
➤ Internet Project Proposals:
 gopher://ericir.syr.edu/11/Ed/Projects
➤ President Clinton's 1994 State of the Union Address:
 gopher://info.tamu.edu/00/.data/politics/1994/deliver.0125
➤ Other speeches and townhall meetings in 1994:
 gopher://info.tamu.edu/11/.dir/pres.1994/pres.townhall.dir
➤ Documents from the 1992 Presidential Campaign:
 gopher://gopher.tamu.edu/11/.dir/campaign.dir
➤ The Earthquake Center at the University of Washington:
 ftp://geophys.washington.edu/pub/seis.net
 Earthquake files are "loc.<year>"
➤ Information on educational applications of networked, text-based virtual environments:
 gopher://mcmuse.mc.maricopia.edu
➤ To go the the Global Network Academy:
 telnet://microworld.media.mit.edu 8888 connect guest
➤ To go to Diversity University: **telnet://erau.db.erau.edu 8888** connect guest
➤ To visit the text-based rendering of M.I.T.'s Media Lab:
 telnet://purple-crayon.media.mit.edu 8888 Login as guest
➤ To visit a virtual museum: **telnet://merlin.nando.net 4201**
 Create a character, leave the bus station, take Wally Way east to Municipal Blvd, and take a left to the MetroMud Museum of Imaginiation.
➤ For the virtual waste water treatment plant:
 telnet://merlin.nando.net 4201
 Create a character, leave the bus station, take Wally Way west and a right on Front Street across the Elver River, then west.

The InfoWeb Project

Since this article was written, the North Carolina Department of Public Instruction has established an Internet information service called InfoWeb. A WorldWideWeb site, the InfoWeb is designed to assist educators in North Carolina and to inform the state's citizens.

Among the services of the InfoWeb are links to a wide variety of instructional resources on the Internet and materials developed by department staff that are aligned with the North Carolina Standard Course of Study. Also available are educational statistics and policy documents; access to education legislation; links to national education resources on the Internet, including the ERIC database; and a virtual tour of the Education Building in Raleigh (great view of Raleigh from the fifth floor).

The InfoWeb project also will be establishing Internet based facilities for group discussions on topics from student information management to the eighth grade computer competency test.

The InfoWeb is on the Inlenlet at: **http://www.dpi.state.nc.us**

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