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## **The Pioneering Partners Project: Collaboration Among K-12 Educators, Librarians, and Community Leaders**

### INTRODUCTION

The Pioneering Partners program was developed by GTE North, Inc., in cooperation with the Great Lakes Council of Governors. Broadly stated, the goals of the program were to enhance learning in K-12 classrooms by accelerating the use of educational technology. Specific goals of the program focused on team building, development of innovative ideas, adoption of innovative technology, planning, and development of strategies to secure matching program funds. The specific program goal that resulted in CICNet's involvement was to "telecommunicate regularly with other Pioneering Partners, sharing ideas, products, experiences and support for dissemination of innovative technology practices." CICNet's role extended beyond simply supplying network access; it included providing a network environment that supports collaborative activities and communication. This required the development of the system components, documentation, and end-user support. In addition, the environment was designed to expose participants to the Internet and kindle their interest in using the Internet and its resources in classroom projects.

### SELECTION OF PARTICIPANTS

Participants in the Pioneering Partners program included teams of educators from the eight Great Lakes states (New York, Pennsylvania, Michigan, Indiana, Illinois, Ohio, Wisconsin, and Minnesota). Three schools were selected per state through a competition in which participants were judged on their use of innovative technologies. Examples of winning projects included the use of computers to create technical drawings and maintain logs for the development of prototype inventions that solve specific technical problems, a schoolwide network and technology committee supporting teachers using computers to develop learning materials, and use of computers and networking to exchange information with schools in several countries around the world.

Pioneering Partners teams were made up of school personnel including teachers, librarians, vocational-ed teachers, and administrators. However, the program emphasized community involvement and in some cases included school board members, technical personnel and managers from local businesses, and faculty from local universities. Other key participants included the project team, composed of several individuals from the GTE or Great Lakes Council of Governors staffs, an advisory council consisting of representatives appointed by the governors of each of the participating states, and several educational and technical consultants.

The selection process for participating teams was completed in the 1991-1992 academic year with the intent of launching Pioneering Partners at the beginning of the 1992-1993 academic year. A five-day training program for all participants, staff, the advisory council, and consultants was held at the GTE corporate training facilities in August 1992 to launch the program. The training program focused on team building, interpersonal communication, and project planning but also included hands-on sessions on how to use the network. Several computers were made available so the participants could try out the system during breaks and in the evenings. Following the training program, teams returned to their schools ready to begin participation in the program with the start of school in September.

### SYSTEM DESIGN AND DEVELOPMENT

CICNet was approached by the Pioneering Partners management team at GTE in June 1992 regarding their interest in building a dial-up network to support the program. The CICNet staff was very interested in participating in the project, primarily because of the experience we would gain in working in a K-12 environment. At the same time, there was some concern within CICNet about our organization's capacity to deliver due to two factors—our lack of experience in supporting dial-up services and the short timeline to get the project launched. CICNet also was concerned that it not become directly involved in extensive end-user support. We wanted our role to be the design, implementation, and operation of a system that would support the goals of the Pioneering Partners program. This could include a "train the trainers" role and the development of documentation, but direct user support would be supplied by GTE or another participant. Following some discussion of these issues, it was agreed that CICNet would provide the networking component of the Pioneering Partners program.

Once design work began, it became immediately clear that the network would have two distinct components—dial-up infrastructure for network access and a suite of services for utilizing the information resources on the network. CICNet staff quickly began to evaluate 9.6 kb/s high-speed modems and terminal servers. After a review, the AT&T Paradyne modem was selected, primarily because of recommendations of peers in the networking community and the Paradyne's network management features. As a terminal server, CICNet selected the Cisco 500CS, primarily because of CICNet's heavy use of Cisco routers in its network. A Sun Sparcstation was chosen as the platform for running

the suite of applications software. Approximately 500 megabytes of storage was allocated for the project.

While the hardware infrastructure consisted of a straightforward setup to provide dial-up access, the network applications and software presented a challenge in that there are few standards for building systems specifically for a user population of K-12 teachers. As defined by the program staff, the system had to include several features, including the following:

- electronic mail (e-mail),
- a conferencing system,
- net news,
- menu-driven access to various Internet resources, and
- access to basic Internet tools, such as File Transfer Protocol (FTP).

And, of course, the system had to be easy to use.

The list of features can be applied to two distinct tasks: supporting communication and information sharing among program participants (e-mail and conferencing) and supporting exploration and use of Internet-based resources (e-mail, news, menu-driven access, and FTP). However, given the state of the art in Internet tools and applications, it was challenging to find a suite of tools that would be easy to use, let alone a suite that would provide something that approached a consistent environment for the end-user. Given time constraints and budget, any development work would have to be extremely limited.

With this in mind, CICNet staff selected Pine, an easy-to-use, menu-driven mailer developed at the University of Washington. This mailer came highly recommended by several individuals with experience in the K-12 community. The conferencing system selected was Caucus. CICNet had used it in an earlier project, and based on that experience, we believed it would be well suited for this project.

The primary tool used for providing access to Internet resources was the Gopher service, developed at the University of Minnesota. Gopher is a menu-driven, easily configurable front-end that provides access to an extremely wide array of Internet resources. Gopher can be configured to provide access to a number of resources including online library catalogs, FTP archives, full-text files, e-mail directories, national weather reports, and other Gopher servers. Access to USENET news was provided via the TIN news reader. Users also had access to standard UNIX system commands if they so chose.

Since end-users were going to access the GreatLinks service from a wide variety of desktop platforms, it was decided to confine access technology to terminal emulation only. That is, CICNet would not support SLIP (Serial Line Internet Protocol) or PPP (Point to Point Protocol), two popular but potentially complex Internet access protocols. This immediately raised the issue of standardizing on a terminal emulation package, such as Procomm or Kermit, and caused something of a problem in that CICNet saw itself being drawn into direct support activities. Concern around this issue was particularly keen given the wide array of systems, modems, and levels of expertise.

CICNet also determined that an initial menu screen would be particularly important in creating a user-friendly environment. An initial menu screen was developed using perl and UNIX scripts. The menu choices include the following:

- Electronic Mail
- Network News
- Internet and Pioneering Partners Resources
- File Transfer
- System Commands
- Personal Configuration Options
- Conferencing
- Information About Users

The Electronic Mail selection provides access to the Pine mailer. The Network News selection provides access to net news using the TIN news reader. Internet and Pioneering Partners Resources provides access to Gopher, which in turn provides access to many standard Gopher resources such as the list of all Gopher servers. In addition, this Gopher server provides access to a "Best of the Internet" menu item, a help file for the GreatLinks system, and a description of the Pioneering Partners program. File Transfer is a menu-driven interface for executing Kermit file transfers between the GreatLinks host machine and the user's desktop system. System Commands provides a menu for various UNIX commands. Personal Configuration Options allows the individual user to set options for use of either the Pine or Elm mailer, use of menus or command line at startup, changing passwords, and setting default editor to vi or pico. Conferencing provides access to the Caucus conferencing system. Information About Users provides access to a directory listing the e-mail addresses for all Pioneering Partners participants, information on who is currently logged into the system, and access to the "Chat" facility, which provides for real-time correspondence between participants.

Documentation was the final piece of the system to be put into place. The documentation packet developed by the CICNet staff included approximately 15 pages of documentation developed exclusively for the project and another 40 pages pulled from existing documentation for the various applications, such as Pine and Caucus, being used by the project. A concerted attempt was made to make the system easy to use but to also allow more sophisticated users to explore more advanced applications.

## SYSTEM UTILIZATION

The system became available to approximately 120 end-users in October 1992. All users were supplied with documentation and access via an 800 number and e-mail to consultants, GTE staff, and CICNet staff who served as user support specialists. The first problems encountered were with end-users who could not get their desktop systems to access GreatLinks. Because end-users were accessing GreatLinks from numerous platforms with many different types of terminal emulation packages, the support task was more complex. We decided to standardize on the Kermit terminal emulation package, which made the support task much easier.

Initial utilization of the system varied quite widely among users. Tables 1-3 show data for four months (November 1993 through February 1993). Table 1

describes the total hours of connect time and the total number of sessions for each month. The first month of utilization shows much higher utilization than each of the following months even though the number of users remained relatively constant during each month. It is reasonable to attribute this initial high level of usage to users becoming familiar with the system and an initial exploration of the Internet.

TABLE 1  
MONTHLY TOTALS  
(IN HOURS)

<i>Month</i>	<i>Total Connect Time</i>	<i>Total Sessions</i>	<i>Number of Users</i>
Nov.	416	1,036	55
Dec.	206	731	46
Jan.	255	920	51
Feb.	297	986	49

The data in Table 2 provide details regarding individual participants' average use of the system. These data are consistent with the data in Table 1 in that there is a peak in November and then usage levels off. The data also show that usage after the initial peak is about what would be expected. That is, users are initiating between 16 and 20 sessions per month, and each session lasts between 15 and 25 minutes—about what might be expected for users who are checking mail and doing some amount of network exploration.

TABLE 2  
MONTHLY AVERAGES PER USER  
(IN HOURS)

<i>Month</i>	<i>Average Total Connect Time</i>	<i>Average Number of Sessions</i>	<i>Average Session Length</i>	<i>Number of Users</i>
Nov.	7.56	19	.40	55
Dec.	4.48	16	.28	46
Jan.	5.01	18	.28	51
Feb.	6.06	20	.30	49

Table 3 shows maximums for individual connect time and number of sessions for each month. When compared with the data in Table 2, it is obvious that some small number of users are using the system very extensively. Unfortunately, no data have yet been collected beyond what appears in these three tables so it is impossible to draw any conclusions regarding what would account for variance in individual usage. At this point, however, it is reasonable to say that such differences are not unexpected and that further research with this group, or with similar groups, would add to our understanding of how the network is used.

TABLE 3  
MONTHLY MAXIMUMS  
(IN HOURS)

<i>Month</i>	<i>Maximum Total Connect Time</i>	<i>Maximum Number of Sessions</i>	<i>Number of Users</i>
Nov.	147	190	55
Dec.	26	64	46
Jan.	24	108	51
Feb.	56	108	49

We have also measured the use of the Caucus conferencing system. During the development of the GreatLinks system, the project leaders expected that access to a moderated, online conference would add considerable value to the system and become the cornerstone for collaboration and individual interaction. An examination of conferences provides some insight into the success of this plan.

For users unfamiliar with conferencing software, typically, conferences are structured using a hierarchy of conference items and discussion responses, which is the structure used for GreatLinks. It is worth noting, however, that there are a number of other ways in which conferences can be structured.

In the four-month period studied here, three different conferences were set up. All conferences were moderated by a staff member or consultant to the project. The first conference was devoted to providing online help for supporting the GreatLinks system. This conference has 9 items and 20 total discussion responses (2.2 responses per item). The second conference focused on the dissemination of information regarding project participants' activities. This conference, then, is most central to the mission of the Pioneering Partners program. It has 8 items and 16 discussion responses (2.0 responses per item). The third, and final conference, is for the discussion of the structure of the Pioneering Partners program and the application and award process. This conference has 5 items and 4 discussion responses (.8 responses per item).

The conference activity described above shows that, contrary to expectations, the conferences have not served as important a role as was hoped. While it is hard to draw any final conclusions from such a short period of operation, it is worth speculating about why this is true.

While everyone involved in GreatLinks devoted considerable energy to providing structure for the services available on GreatLinks, no particular attention was paid to conferencing beyond making sure it was easily available. More careful consideration of potential topics of interest to participants and ways to get them involved could add to the value of the system. For instance, recruiting a well-known K-12 network person to moderate a conference on K-12 Internet resources would provide more motivation to participate regularly in the conference.

Conference activities might also be increased by widening the scope of the participants. Initially, it was thought that staff from the participating governor's offices and other state agencies would participate in the program.

However, that has not happened. The presence of individuals outside the Pioneering Partners program, especially individuals who are perceived as having influence in state government, could be a strong motivation.

A third barrier to conference utilization could simply be the lack of critical mass. While the number of individuals with access to GreatLinks is about 120, approximately 50 use the system in any given month. It can be argued that 50 end-users is too small a group to sustain a significant level of ongoing conferencing activity. It may be that none of the efforts described above will make any difference until more active users join the system.

Finally, additional end-user support may be required to build the size of the core group of active users. Most of the current user support for GreatLinks is asynchronous in nature. A user can either leave a message on voice mail or pose a question via the conferencing system or e-mail. Increasing the amount of proactive support or outreach through such means as seeking out users who appear to be having problems or who are not using the system, developing tutorials or other training materials, or conducting real-time, network-based workshops could have a positive impact on the number of participants who regularly use GreatLinks.

## CONCLUSION

The Pioneering Partners program and the GreatLinks system present us with an opportunity to examine an effort to provide network access to a group of K-12 educators located across several states. This discussion is useful in that it provides a description of the hardware, software, and personnel components of the system for those organizations that may be considering building such a system. We believe the services developed for the GreatLinks network constitute a well-thought-out, high-quality solution to network access, and we encourage others to use the GreatLinks system as a model.

In addition, this paper raises a set of issues regarding use of the system by a fairly naive group of users. While the data presented here are clearly preliminary, it is a first step in understanding what has and has not worked for this group. Hopefully, a follow-up paper will continue the line of analysis begun here with a more robust data set.

Finally, the GreatLinks project raises an important issue in that this type of activity is becoming an increasingly common approach to providing access to the Internet for specific user groups. As the scope of resources on the Internet has grown, much of the Internet community's attention has been focused on the navigational tools and services needed to make Internet resources available to various user communities. While GreatLinks clearly addresses this issue, it goes further in that it forces us to consider the issue of how to build a point of access to the Internet. In the case of GreatLinks, the Internet is imbedded into local systems, and GreatLinks itself becomes the window through which users view the Internet. In developing such systems, we need to give careful consideration to exactly how that window to the Internet is structured and what local structure and resources are necessary to accomplish goals that may be unique to the group or project served by the system.