DOCUMENT RESUME

ED 392 394 IR 017 678

TITLE	Nebraska K-12 Internet Evaluation Progress Report--Year 2.
INSTITUTION	Nebraska Consortium of Educational Service Units.; Nebraska Univ., Omaha.
PUB DATE	30 Jan 96
NOTE	96p.; For the 18-month report, see ED 385 246.
PUB TYPE	Statistical Data (110) -- Reports - Evaluative/Feasibility (142) -- Tests/Evaluation Instruments (160)
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	Computer Networks; *Computer Uses in Education; *Educational Assessment; Elementary Secondary Education; Information Networks; Inservice Teacher Education; *Internet; Program Evaluation; *State Programs; Surveys; *Use Studies
IDENTIFIERS	*Nebraska

ABSTRACT

The goals of the Internet Evaluation Project, undertaken cooperatively by the University of Nebraska at Omaha and the Nebraska Consortium of Educational Service Units, focus on a long range assessment of Internet integration into the K-12 Nebraska schools and the support delivered by the Educational Service Units (ESUs). The purpose of this report is to relate progress, after 24 months, of a comprehensive evaluation process, which is examining the impact on teachers, students, and schools. In addition to a pre-training and post-training teacher survey data, information is being gathered from machine-based ESU server support data, and observed classroom uses and projects. Each of the teacher survey, server, and innovative use data sources was examined for related implications, with cross-referencing between sources conducted when appropriate. General implications include: (1) significant progress is being made for the implementation of LB 452, and LB 860 promises to also assist in Internet integration; (2) community interest is continuing to parallel educational interest; (3) statewide dialogue is becoming increasingly important; and (4) Nebraska continues to play a national leadership role. Appendices provide the pre- and post-training surveys; pre- and post-training survey graphs; the Internet coordinator's data request form; the innovative user electronic mail protocol; and innovative user interview protocol. (Contains 24 references.) (AEF)

Nebraska K-12 Internet Evaluation Progress Report - Year 2

January 30, 1996

A Progress Report Associated with the Nebraska K-12 Internet Evaluation, Undertaken Cooperatively By the University of Nebraska at Omaha and the Nebraska Consortium of Educational Service Units

Table of Contents

Purpose	Page 1
Evaluation Team	Page 1
Evaluation Project Goals	Page 1
Background	Page 2
Evaluation Questions	Page 5
Design of the Evaluation	Page 6
ESU Server Support Data	Page 6
Teacher Survey Data	Page 8
Innovative Use Data	Page 11
World Wide Web Sites (examples)	Page 15
Conclusions and Implications	Page 16
External Grant Progress	Page 31
Progress Compared to Other States	Page 32
Dissemination Progress	Page 33
Next Period Evaluation Goals	Page 34
Summary	Page 35
Appendices	Page 35

Nebraska Internet Evaluation Project

Year 2
Progress Report

Completed January 30, 1996

Purpose

The purpose of this report is to provide a progress report (after 24 months) related to the five year Nebraska K-12 Internet Evaluation Project, undertaken cooperatively between the University of Nebraska at Omaha and the Nebraska Consortium of Educational Service Units. This report, and other January reports, are summary updates to the July reports, with comprehensive data collection associated with the end of each K-12 school year.

Evaluation TEAM

The following are the team members conducting the evaluation project.

Dr. Neal Topp, Assistant Professor, College of Education, UNO
Dr. Neal Grandgenett, Associate Professor, College of Education, UNO
Dr. Elliott Ostler, Assistant Professor, College of Education, UNO
Dr. Robert Mortenson, Associate Dean, College of Education, UNO
Donalyn Heise, Graduate Assistant, College of Education, UNO
Pam Mooney, Graduate Assistant, College of Education, UNO
Karli Schlenker, Graduate Assistant, College of Education, UNO
Franci Addy, Secretary/Office Manager, Office of Internet Studies, UNO

Evaluation Project Goals *(24 Month Period)*

The goals of the Internet Evaluation Project focus on a long range assessment of the integration of the Internet into the K-12 Nebraska schools and the support related to this integration delivered by the Nebraska Educational Service Units. This 24 month report references progress related to each of these goals, which are targeted at providing a comprehensive and formative evaluation approach to examine the "Nebraska model" for integrating the Internet into K-12 education. The goals for the 24 month period of the Evaluation Project were:

1) To build upon the data collection and analysis procedures
2) To gather and analyze server data related to the ESU activities
3) To interpret the results related to the surveys of trained teachers
4) To summarize classroom observations of innovative uses of the Internet
5) To summarize observations related to statewide "Internet projects and activities"
6) To compare Nebraska's progress to the relative progress of other states

7) To examine Nebraska related World Wide Web pages
8) To provide World Wide Web access to the evaluation report

Background

The need to follow the educational use of the Internet in Nebraska is becoming increasingly important as information technology continues to rapidly evolve, and is also an area that many other states are also beginning to address. More than any other time in the history of our nation, there is a potential for change within our educational systems based on new technologies. The Office of Technology Assessment of the United States Congress, has emphasized the increasing importance of researching and evaluating this educational phenomenon:

> Computers, telecommunications networks, and other technologies have become increasingly central to the American way of life. The nation's schools are also investing substantially in technologies for education. What will be the impact of these technologies on schools in the near future? Will there be dramatic changes in teaching techniques, curriculum, staffing, and even the concept of school as a result of investments in these tools? What kinds of visions can we identify for education over the next decade, if technology use is supported? What factors affect the likelihood of meeting these visions?
>
> (U.S. Congress Office of Technology Assessment, 1995b, p. iii)

The use of new information technologies in schools is indeed increasing, and many states across the United States of America are beginning to plan and initiate steps to facilitate access to the "Information Superhighway", as represented currently by the Internet. In part, a vision for this effort has been identified and encouraged by the federal government. As stated by Vice President Gore, in a recent address to the communications industry:

> Today, we have a dream for a different kind of superhighway that can save lives, create jobs and give every American young and old, the chance for the best education available to anyone, anywhere. I challenge you....to connect all of our classrooms, all of our libraries, and all of our hospitals and clinics by the year 2000.
>
> (National Institute of Standards and Technology, 1994, p. 57)

The "information superhighway" described by Vice President Gore is currently represented by the Internet, and is the world's largest computer network. It was born more than 20 years ago as a U.S. Defense network, with the purpose of supporting military research, through a communications structure which could survive a limited nuclear attack. In the late 1980's the National Science Foundation extended the network to encompass scientific and higher education institutions. Since that time, the Internet has expanded commercially and internationally, and is now estimated to be resident within more than 155 countries worldwide (Quarterman & Carl Mitchell, 1995b; Calcari, 1994; Pawlowski, 1994), and serving over 27 million users (Quarterman & Carl Mitchell, 1995a). It is growing rapidly, with estimates for new hosts being added at more than one approximately every 30 minutes (Calcari, 1994). The Internet based World Wide Web system is evolving even more quickly, and a recent

MIT researcher noted that there was as much information passed over the Web in 15 minutes of 1994, than in all of 1992 combined (Gray, 1995).

The Internet provides the efficient exchange of computer-based data across the globe. In addition, it provides users access to a wide variety of long range network based computing (called telecomputing) activities, including direct access to electronic mail, network supercomputers, and extensive on-line databases, software, and newsgroups. Within the general population, the interest in these new informational resources has been significant, and it is now estimated that more than 1 in 6 homes have at least one modem connected computer (Cohen, 1994). The use by commercial business is even more impressive, and is expected to include more than 27 million employees of such firms by the end of 1995 (Quarterman & Carl-Mitchell, 1995a, Calcari, 1994). Although at first lagging behind both industry and home use, the use of the Internet in schools is quickly expanding, and a recent government report indicated that 35% of a random sample of American educators reported access to the Internet somewhere within the school, and 3% of the sample reported access within their own classroom (Heaviside, Farris, Malitz, & Carpenter, 1995).

Many K-12 schools and school districts are now showing considerable interest in being a part of the Internet and its related telecomputing activities. For the K-12 classroom, Internet access offers the potential of "breaking down the classroom walls", and linking a classroom microcomputer with any computer on this international network. Thus, a fifth grade student in Fort Calhoun, Nebraska might exchange electronic mail with a fifth grade student in Melbourne, Australia, or receive actual pictures of Mars from NASA, or perhaps search a national database for the most recent U.S. Supreme Court ruling. Popular Internet sites such as NASA's Spacelink, are now visited by more than 1,000 people per day, and support teacher access to everything from lesson plans, to specific information on current space shuttle flights (Cohen, 1994). The real time communication capability of such technology is quite remarkable. For example, on a recent international bicycle trip through Guatemala, trip organizers were able to receive and send electronic notes to K-12 students across the world, to help them better understand Guatemala, and follow their progress (Smith. 1995). It is anticipated that the Internet will parallel or even exceed the substantial adoption into education of the classroom microcomputer (Krol, 1993). The skills that students gain in such telecomputing activities are also becoming better understood, and the use of telecomputing in the K-12 classroom appears to be very consistent with what many businesses are desiring of high school graduates in the workplace (Reinhardt, 1995; Sheingold, 1991).

Many national organizations are now making strong statements related to the necessity of providing K-12 students with effective Internet access and related information based technologies. The Committee for Economic Development, which is an independent nonpartisan research and policy organization of some 250 business leaders and educators, expressed this critical need in their recent policy document.

> We believe that the ability to access information should no longer be considered an educational frill; it should be recognized as a necessary investment in our children's education and, therefore, an essential item in the regular school budget. We believe that increased competition among providers will ultimately result in fairer pricing for all, but we recognize that this will take time and that schools need more affordable access now. We call on federal, state, and local policy makers in cooperation with the private-sector providers to develop new incentives and strategies so that schools can gain affordable access to communication

> services. In addition, any strategies that are developed to provide access to schools should ensure that costs are shared equitably.
> (Committee for Economic Development, 1995, p. xiii)

Although the nation's K-12 teachers are beginning to have access to the Internet, many of their current activities are facilitated by the knowledge, equipment, and motivation of individual teachers (Willis, 1993). However, formal statewide support in the nation is increasing, and many states are initiating statewide plans for supporting at least some type of general technology network (television, satellite, telecomputing, etc.) for their resident schools and districts (Cohen, 1994). Nine states were identified as early leaders in K-12 telecomputing planning and adoption, through their early statewide plans (Kurshan, 1990; McAnge, et. al., 1990; Web Associates, 1993), and included Arizona, Florida, Indiana, New Mexico, Pennsylvania, Texas, Virginia, West Virginia, and Nebraska. This group has quickly expanded, and now 33 states report the direct support of at least some sort of telecomputing network related to education (Office of Technology Assessment, 1995; Cohen, 1994), and most of the remaining states are beginning to develop statewide plans and consider statewide efforts. Yet, as stated by the Office of Technology Assessment, these networks "vary considerably in their scope, sophistication, and support services" (p. 114). With such variation, many states are beginning to look to the "early adopters" for important input related to refining their evolving statewide efforts and plans.

The state of Nebraska is in position to help provide considerable leadership in the emerging national efforts to realize the potential of telecomputing and the Internet in K-12 education, and is carefully documenting its own model for integrating the use of Internet into its K-12 schools. Nebraska has long had a strong support network of 19 Educational Service Units, which have since 1966, provided the state's public schools with many resources, including significant computer data and information services (Nebraska Educational Service Units, 1991). Building on this statewide expertise, the Nebraska Legislature recently passed Legislative Bill 452, which authorized the local educational service units to levy an additional property tax to support the introduction of Internet equipment and teacher training for Nebraska schools. Legislative Bill 860 was also recently passed, and will further enhance Internet connectivity to schools using school weatherization funds. A statewide effort to bring the Internet into Nebraska schools is indeed well underway, and the Educational Service Units are now working with their local school districts to bring them on-line as soon as possible.

Yet the monitoring and evaluation of such statewide efforts is critical to the effective use of these new technologies in education. As suggested in a recent statement by the Center for Teaching and Learning, there is a strong need for addressing accountability:

> Given the difficulty of making widespread, fundamental changes in teaching practices, a strong body of research and evaluation evidence supporting these practices must be generated and disseminated to policy makers and the public if the kinds of practices we describe are to be commonplace in the year 2005.
> (U.S. Congress Office of Technology Assessment, 1995b, p. 141)

A research team from the University of Nebraska at Omaha has been contracted by the Nebraska Educational Service Units to evaluate and document Nebraska's statewide approach to providing Internet connections and support for schools. This

team, directed by Dr. Neal Topp, Dr. Neal Grandgenett, and Dr. Elliott Ostler, is currently investigating evaluation questions that include: What is the frequency and patterns of Internet usage by teachers and students in the state of Nebraska following teacher Internet training? Is the usage pattern spreading? Are trained teachers sharing their expertise with other teachers? Are there relationships between teacher characteristics, teacher perceptions, and teacher Internet use? Does the Internet impact the role of teachers? How does Internet usage impact students and their learning? How do teachers perceive Internet usage to be impacting schools? What are the strengths and weaknesses of the Nebraska model for involving Internet in K-12 education?

Within the partnership with the Nebraska Educational Service Units, the University of Nebraska at Omaha research team is coordinating the evaluation project, and the Educational Service Units are facilitating the data collection procedures. The evaluation process is both formative and comprehensive in nature, and will be ongoing for at least five years. Results and information related to the evaluation are also being reported to interested organizations, such as the U.S. Department of Education.

As a leader in the integration of the Internet, Nebraska is aware of the responsibility of carefully documenting the effectiveness of its K-12 telecomputing model, as these activities impact upon the classrooms and students of Nebraska. This careful assessment and evaluation of the educational use of the Internet is the purpose of the Nebraska K-12 Internet Evaluation Project. The more we know about the success and failure of statewide Internet activities in K-12 environments, the better able we will be to help all students and teachers use the Internet to its full potential, not only in Nebraska, but in the United States as a whole.

Evaluation Questions

The current evaluation questions for the project are listed below, and correspond to the initial evaluation questions developed by the University of Nebraska at Omaha Evaluation team, with input from the Nebraska Educational Service Units. The questions reflect a five year, long term approach to the evaluation, and are only partially addressed in this current 24 month report.

1) Does the Internet impact the role of teachers?
2) What are the characteristics of teachers who continue to use the Internet following training?
3) What are the characteristics of teachers who do not continue to use Internet following training?
4) What are the perceptions of teachers concerning Internet potential before and after initial training?
5) What are the perceptions of teachers concerning Internet potential after an initial period of usage?
6) Is the Internet used by teachers after training?
7) What are the reasons for using or not using the Internet? (i.e. lack of phone line? lack of computer access? etc.)
8) What are the innovative classroom uses of the Internet in Nebraska?
9) How does the Internet appear to impact student learning in the classroom?
10) What are the general characteristics of Internet related projects in Nebraska?
11) How does Nebraska compare to other states regarding the Internet?

Design of the Evaluation

The Nebraska K-12 Internet Evaluation is focused on being a formative evaluation, and is essentially that of an "impact analysis". In evaluation studies, impact analysis can be defined as "determining the extent to which one set of directed human activities affected the state of some objects or phenomena, and ..... determining why the effects were as large or small as they turned out to be" (Mohr, 1992, p.1). In this evaluation project the evaluation design is focused on research based questions which seek to determine the general impact of the Internet training of teachers, facilitated by the Educational Service Units, on K-12 education in Nebraska, or specifically on teachers and their students in the classroom.

Within the evaluation, three primary types of data are being examined related to the research questions. These data types include 1) teacher survey data, 2) machine based ESU server support data, and 3) observed classroom uses and projects. The observed classroom uses also include teacher interviews, and an examination of key integration projects happening in the state. The twenty four month evaluation period of the project is associated primarily with continuing the data collection and analysis procedures for each of these three areas, and then summarizing the initial results. This report, like other January reports, is primarily an addendum summary report, with annual data collection procedures implemented at the end of each school year and associated with the July reports.

Descriptive summary statistics were targeted during this reporting period, with correlational and pattern analysis planned for years 3 - 5. Data runs for each 6 month analysis period are cumulative in presentation, with some trends illustrated at one year intervals as the project evolves during the five year period. For a peer group reference, a brief investigation of the general progress in other states related to the Internet is also being conducted.

Progress in each of the three data areas, as well as some implications apparent at the 24 month reporting period, are summarized in the following subsections.

ESU Server Support Data

Estimates related to the general support offered at each of the ESU servers are requested periodically from each of the Internet coordinators by phone or electronic mail (see Appendix F). Data summaries from these periodic contacts are being reported as state totals, rather than individual ESU totals. The information requested establishes statewide estimates related to the total number of teachers using the system, the modem and direct connect access available to users, and evolving support plans. The following cumulative statewide totals were found through feedback from the Internet coordinators at each server site and are current as of January 1, 1996. It will be updated in each evaluation report at six month intervals.

Estimates:	**Year 1:**	**Year 2:**
Number of statewide Internet users supported by the ESU's:	10,200	20,610
Number of "direct connected" schools:	186	306
Number of planned additional "direct connects" next year:	170	158
Number of Individuals going through at least initial ESU training.	5,800	11,545

The Internet Coordinators for the ESU's also report some significant "barriers" or "issues" that they are facing as they move forward in supporting Internet Integration into their organizations school districts. These can be summarized below:

Issue 1: Community education access is unclear

The Nebraska Educational Service Units are receiving numerous requests to support community education access to the Internet. Due to the specifically defined role of ESUs to directly support K-12 schools, they are unable to respond to these requests. However, the interconnectivity of the Internet, and increasing school and community cooperation, is making this support role less clear.

Issue 2: There is a wide range of connectivity in the schools.

The wide range of connectivity existing currently in Nebraska schools makes it challenging to train all teachers in the same training sessions. While some schools have been able to facilitate "direct connections", many schools still have only modem access. Limited phone lines in smaller schools is making even initial modem access a challenge in these areas. This range of access will probably continue to be a problem until all or most of the schools attain a direct connection environment.

Issue 3: Time available for "freeing" up teachers for training sessions is limited.

Some school districts are having difficulty freeing up their teachers during the day, so a significant number of training sessions, at some sites, have had to be offered outside school hours. This makes it difficult to provide the teachers with the preferred "extended" training session.

Issue 4: The issuing of student accounts involves special access concerns.

With the issuing of student accounts for direct student access to the Internet. or within the direct connect environment of the World Wide Web, it is virtually impossible to effectively limit access to various sites with offensive material by machine based or technical solution. Many schools and ESU's are appropriately taking a formalized "adult supervision" approach to the problem, where the students, teachers, and parents share in the responsibility of ensuring the appropriate use of the Internet. Other schools are working with software such as Surf Watch to help try to limit student access to offensive materials.

Issue 5: Data line and school connectivity costs are expensive.

The Educational Service Units have been confronted with considerable difficulty in dealing with cost issues associated with local data lines, school connectivity, and general communication requirements. The costs to an individual school district varies considerably, and often there is some confusion related to institutional responsibilities for the sharing of costs and support.

Issue 6: Limited resources for technical and curricular support exist.

Many of the Educational Service Units are "stretched very thin" in their ongoing support and resources related to this state-wide endeavor. Much of the responsibility for facilitating individual school access and ongoing curricular support must rest with the specific school and community. Such ESU support

problems are increasing with the addition of PPP accounts (point to point protocol), which permits complete Internet access with a modem.

The Nebraska Educational Service Units, and the school districts that they are working with, have been remarkably cooperative and "innovative" in their approaches to these very difficult "barriers" and "issues". Often, they are leading the country with addressing these particular issues. It would seem apparent that continued cooperation between all Nebraska institutions, under the leadership of the Educational Service Units, is critical to the continued progress of the Educational Service Units in bringing the Internet into Nebraska's K-12 classrooms.

Teacher Survey Data

To gather usage information and perceptions from teachers before and after they receive the Internet training offered by the Nebraska Educational Service Units, a 30 question pre-training survey and a 44 question post training survey are being used. The pre-training survey is designed to be read by NCS scan equipment, and the post training survey is designed to be delivered by electronic mail and ground survey. Both surveys were field tested and refined based on teacher and trainer feedback. A photocopy of these instruments is provided in Appendix B and Appendix C.

Pre-Training Survey Data

Incorporation of the pre-training survey into the training program by the Educational Service Units has been continuing, and a total of **3776** pre-training surveys have been analyzed, reflecting 2643 surveys for year 1, and 1133 surveys for the first six months of year 2. The remaining year 2 surveys will be analyzed at the end of the academic school year. All educational service units are represented. The surveys will continue to be given as teachers are trained across the state to examine changing demographics and teacher characteristics.

During years 3-5 of the project, follow-up surveys and interviews will be correlated with these surveys to examine additional patterns in teacher roles, perceptions, and classroom activities. Descriptive statistics for the pre-training survey were computed by use of a SPSS program, and examined based on a year 1 to year 2 comparison.

Summary graphs related to the pre-training survey are included in Appendix D, and described in the Conclusions and Implications section of this report. To represent responses on the narrative questions, 100 random responses were organized into categories of similar response for each of year 1 and year 2. One open response question asked:

"How do you plan to use Internet either for yourself or your students?"

For year 1, 48% of the sample of 2643 respondents left this question blank or said "I don't know". Of those who responded, the following were the types of responses identified, listed in order of frequency:

1) For information gathering - *as a general response (29%)*
2) To communicate with other professionals in my field, share ideas, and link with other teachers *(11%)*
3) For electronic mail *(10%)*
4) To link students with other Nebraska schools to share information

and ideas *(10%)*
5) As pen pals in international, national, and statewide areas *(8%)*
6) To contact people who speak a foreign language, such as German, Spanish, French, and Japanese *(8%)*
7) For library research, library science research, access to college libraries, and the library of congress *(5%)*
8) To access career and post secondary education information *(4%)*
9) To access information on current events *(3%)*
10) To access NASA and Space Link *(3%)*
11) To facilitate class projects *(2%)*
12) To connect to places we study *(2%)*
13) To teach students to use the Internet *(2%)*
14) To communicate with visual artists, and museums *(1%)*
15) For problem solving across the state *(1%)*
16) To motivate at risk and non reading students *(1%)*
17) To facilitate a mentor situation with highly gifted students *(1%)*

For year 2, 53% of the initial sample of 1133 respondents left this question blank or said "I don't know". Of those who responded, the following were the types of responses identified, listed in order of frequency:

1) For information gathering - as a general response (48%)
2) For electronic mail (20%)
3) To communicate with other professionals in my field, share ideas, and link with other teachers (9%)
4) To facilitate class projects (8%)
5) To link students with other schools to share information and ideas (3%)
6) For library research (3%)
7) To teach students to use the Internet (3%)
8) To contact people who speak a foreign language (2%)
9) For written language proficiency (2%)
10) For art and gifted students (1%)
11) Genealogy (1%).

The two most common general uses for each year, when collapsing categories more completely, were the following:

	For Year 1:	**For Year 2:**
Information gathering	(43%, responses 1, 7, 8, 9, 10)	(53%, responses 1, 6)
Communication	(48%, responses 2, 3, 4, 5, 6, 14)	(37%, responses 2, 3, 5,8)

In responding to the second narrative question, which identified the teachers knowledge of other teachers who might be using the Internet in innovative ways in the classroom, a large number of teachers for each year left this question blank. The open ended question asked:

"Do you know of anyone we should contact that is using Internet in innovative ways in their classroom?"

The following were the number of the respondents for each year who left this question blank. It is important to remember that the information reported for year 2

really represents only the first six months of year 2, and that this survey data is updated at the end of each academic school year.

Year 1: 94 % of the 2643 respondents left the question blank
Year 2: 97 % of the 1133 respondents left the question blank

Of those teachers who responded, most responded with both the name and school, as requested by the question. Using this list of names taken from the surveys, identified teachers were contacted either by electronic mail or by phone interview to begin to identify and document the innovative uses of the Internet by teachers in the state. Results of these contacts and interviews are included in a later section in this report.

Post-Training Survey Data:

In November 1994, a pilot questionnaire was sent by electronic mail to earlier survey respondents. The purposes of this instrument was 1) to identify early trends in the use of the Internet by Nebraska educators, and 2) to refine the post-survey instrument. In April 1995, the refined survey was sent by electronic mail to all pre-training survey respondents, with 517 (13.6%) responses returned. Obviously, these respondents were Internet users, since they responded over the Internet.

A follow-up paper copy of the survey was then sent via US. Mail, to 400 randomly selected non-respondents, with 142 (35.5%) of these surveys completed and returned. The data from these two surveys will be reported in the Conclusions and Implications Section. Related graphs are included in Appendix E. Responses from the e-mail survey and the ground mail survey were analyzed separately because of the different methods of receiving the data.

The survey also included two open-ended questions related to suggestions for increasing personal and student use. These questions were analyzed together, due to the similarity and general overlap of the responses. The questions were:

> "What needs to change if you personally are going to use the Internet significantly more in the future?"
>
> and
>
> "What needs to change if you are going to have your students use the Internet much more in the future?"

Teachers made several common suggestions in response to both of these questions. The most prevalent suggestion was that more training was needed for both teachers and students, since "we are still both learning the basics" (20%). Typically this follow-up training suggestion focused on "curricular training" for teachers", and would identify specific disciplines, such as music or mathematics. Another 15% of the respondees wrote that individual student accounts are desired, but that they are not yet available, primarily because student accounts have yet not been approved by the district. Some teachers offering this suggestion reported that they sometimes circumvent this problem by allowing their students to use their own classroom teacher's account. However, these same teachers typically made statements that said that they were uncomfortable with this practice, due to potential student misuse. As stated by one respondee, "Although Internet is available to my students through my

account, I must log them in. The school board at this time has chosen not to allow individual student accounts. They are afraid of what students might access on the net."

Another 15% of the teacher respondents reported that current software or hardware constraints, especially related to modem based connectivity, prevents them from effectively using the internet in their classrooms, either by themselves or by their students. As one teacher stated, "my classroom of fourth graders is not directly connected to the internet. This makes it currently unrealistic for me to use it. Hopefully my room will be connected soon". Another less common suggestion related to the need for additional classroom planning time (8%), including time for teachers to explore on their own during the school day. Only a relatively few teachers (4%) wrote that they were currently in a curricular area that they believed did not lend itself well to Internet use.

Innovative Use Data

Another component of the evaluation process is to examine some of the innovative uses of the Internet in K-12 classrooms in Nebraska, both by teachers and through education related projects. The general observations, summarized below, consist of combining and interpreting three sources of data 1) electronic follow-up surveys, 2) phone and in-person interviews, and 3) on-site visitations. Electronic follow-up surveys were electronically mailed to teachers identified as "innovative users" by a colleague on the Pre-training Survey instrument. A copy of the questions asked by this "Innovative User" survey sent by electronic mail is available in Appendix G. Phone interviews were conducted with selected "innovative users" identified from above, or referenced in traditional forums (conferences, etc.) by other colleagues in the field. The phone interview protocol is included in Appendix H. For selected "innovative uses" where there might be interesting things to observe in the classroom, a "field observer" was sent to the classroom to observe Internet related activities with students. These visits were generally "open ended" to permit a teacher or project leader to share whatever they desired, and typically focused on observations related to student and teacher activities, curriculum integration, and the "unique" characteristics related to the classroom environment.

Observation and interview tasks were divided between a group of three professors and three graduate assistants. These activities will continue periodically through the duration of the five year project. After a review of the information from each of the above data sources for the 24 month reporting period, the following summary observations from both classrooms and projects, seemed noteworthy at this time.

Observation 1: Innovative uses often used the Internet in a support role of other curriculum goals, rather than as a curricular focus.

Often, the more innovative activities observed used the Internet system as one of several educational tools to support other curricular goals, rather than focusing on the use of the Internet itself. For example, one innovative science teacher had his students collect weather data from various cities via the Internet, and then use a computer spreadsheet to extrapolate weather patterns and make predictions. The use of the Internet appeared to be relatively transparent in its support of the science related activity in the lesson.

Observation 2: Teachers identified as "innovative users" by colleagues, often involved students directly in the use of the Internet.

Many of the teachers who seemed to be doing innovative things involved their students in even routine Internet related tasks, such as keyboarding and basic retrieval. For example, a fifth grade teacher had his students search NASA's database for pictures of the moon, and similarly, a second grade teacher had her students type the mail messages to a 12th grade calculus class. The direct involvement of students seemed to be a consistent trend in many of the classrooms observed and in the teacher interviews conducted.

Observation 3: Teachers identified as "innovative users" by colleagues, often had students "publish" as well as "retrieve" information on the Internet.

Many of the classroom projects commonly included the student sharing of information back over the Internet, as well as just retrieving information, often by electronic mail. For instance, one class was communicating electronically with a university genetics professor, another was exchanging information with a NASA engineer, and a high school class was asking questions of a famous artist.

Observation 4: Publishing on the World Wide Web is becoming considerably easier for both teachers and students.

Within the last few months of this reporting period, several editing tools have enabled both teachers and students to publish more easily on the World Wide Web. Programs such as Web Weaver, and a new version of ClarisWorks, have encouraged additional web publishing activity, and its use within the classroom and school context.

Observation 5: Most teachers identified "student motivation" as an important reason for pursuing Internet related activities .

Almost all the teachers visited in classrooms, and interviewed by phone, mentioned the enthusiasm of the students. One well established high school project which involved the study of Mars, reported significant increases in overall science course enrollment. As another example, an elementary teacher who had students communicating regularly with students in other parts of the U.S., as well as Russia, Finland, and Australia, reported that students immediately wanted to "organize" their information into charts related to cultural differences, leading to highly motivated class discussions of charting and graphing.

Observation 6: On-site equipment "frustrations" primarily related to current modem access, seem to currently be a significant instructional problem.

Many of the teachers visited in classrooms, and interviewed, identified on-site equipment access as their biggest frustration. Much of the problem related to limited modem access, with often only one or two phone lines available for the school. Several teachers reported the need to "string" a phone line down the hall when using the Internet, and one teacher reported that she currently had to "disable" the Principal's phone when using the Internet. All of these teachers reported that they eagerly await "direct connect" access within their particular building or classroom.

Observation 7: The innovative teachers observed appeared to have relatively little concern about student access to offensive material.

The teachers most involved with the use of the Internet in their classrooms seemed to have relatively little concern about inappropriate access by students. It appeared that both teachers and students in these classes were significantly focused on the curricular task at hand. The teachers in such observed settings generally indicated little specific anxiety regarding this issue.

Observation 8: Strong student keyboarding skills were often mentioned as a necessity, especially by lower grade level teachers.

Many of the teachers at the elementary level mentioned the need for good student keyboarding skills. Several of the teachers identified this as a very limiting problem for some students, and one even made the point that students who did not have these skills tended to "self-select" themselves out of computer and Internet related activities. Many of the teachers reported that they had to take the time to review at least a few keyboarding fundamentals with their class. Another teacher made the point that since all teachers are now considered "reading teachers" with limited training in this area, perhaps all teachers should be considered "keyboarding teachers" and also receive training in this area.

Observation 9: Interdisciplinary curriculum connections seemed to be very common.

Most of the classroom activities observed, and the projects described, had substantial interdisciplinary components. For instance, a "Romeo and Juliet" project, involved rewriting the classic play in English class with follow-up implications discussed in social studies class. Another example is an ongoing multi-district art and Internet project, which involves the blending of art into other disciplines such as science and mathematics. It was apparent that integration between curricular areas seemed very natural in the observed innovative uses of the Internet, and often "blurred" discipline lines.

Observation 10: Student "research" within the observed classrooms appears to be at a considerably higher level than is typical.

One of the more interesting observations is that student research within the observed classrooms, and in the activities described by teachers, appears to be considerably more involved than is traditional. As one teacher reported, students want to "define the problem" more carefully, and then "ask" to investigate it. It was also remarkable that the word "research" was used so frequently and naturally in the Internet related classrooms, and by teachers involved in the classroom activities.

Observation 11: Many non-traditional classroom resources were being accessed.

Access to non-traditional classroom resources was very common in many of the innovative classrooms observed and described. For example, a high school physics class was accessing ray tracing programs from the National Education Supercomputer Center. Other examples included an elementary class downloading weather images from the National Weather Archives, second graders sharing mathematics ideas with an officer from the U.S. Air Force, and a junior high class locating government information from the National Archives in Washington.

One elementary class even communicated electronically with Janet Reno's office of the United States Attorney General.

Observation 12: The potential for grant funding is becoming a real "catalyst" to larger scale district projects and innovation planning.

A significant portion of the more ambitious and extensive multiple teacher projects starting in school districts are related to either a funded lottery or private foundation grant, or planning a potential grant proposal. Many of these projects involve districts attempting to carefully integrate computer and Internet technology into the curriculum. Often the related grant proposals are very extensive, and represent considerable planning by a district, which is very useful whether the project is eventually funded or not. It appears that to many innovative teachers and districts, the possibility of grant money is something that helps them "envision" their project ideas on a larger scale.

Observation 13: World Wide Web access is becoming increasingly important to state-wide Internet related projects .

Most of the large scale and statewide focused projects involving the Internet are depending on efficient World Wide Web access for the operation and dissemination of project activities. For example, the Nebraska Mathematics and Science Initiative has established a web page for the sharing of information by its project and among the seven state regional coalitions. Another example is the Nebraska Web Project, facilitated by U.S. West and the Nebraska Educational Service Units, which is linking teacher developed World Wide Web pages related to the communities, recreation, environment, and economic systems of Nebraska.

Observation 14: There is considerable corporate interest in Nebraska based Internet projects.

The corporate interest in Internet based education activities in Nebraska seems to be substantial and growing. In particular, companies such as U.S. West, with their Network Schools program, and organizations such as the Applied Information Management Institute, with their business and education related initiatives, are beginning to work more directly in facilitating education and telecommunications related projects within the state. The emerging corporate and education related cooperation seems particularly effective in providing additional credibility to many of the educational innovations being undertaken by teachers and districts.

Observation 15: There is considerable community interest in Nebraska based Internet projects.

Similar to the corporate participation in Internet related education projects, general community activity is also increasing. This is apparent by many of the new "freenets" and "community bulletin boards" emerging in communities across the state. For example, Great Plains Communications is establishing community bulletin board services in many small towns in western Nebraska, and the University of Nebraska at Omaha has established a citywide FreeNet in Omaha. This interconnectivity between community and education would eventually help support many of the education related activities and projects currently planned, such as the education outreach activities by the Nebraska Game and Parks Association

It was generally apparent from these field observations, that many Nebraska teachers are striving to use the Internet effectively, and that Nebraska is truly becoming a "leader" in innovation related to the use of the Internet in education.

World Wide Web Sites

Considerable examples of the potential for the educational use of the Internet is available through an examination of Nebraska related sites on the World Wide Web. Numerous sites are available related to Nebraska, and are expanding rapidly. Below are a limited set of sites which represent the comprehensive incorporation of the World Wide Web for education related purposes in Nebraska.

Nebraska Department of Education,
http://www.nde.state.ne.us

Nebraska Curriculum Project: Integrating the World-Wide Web Into the Curriculum
http://esu3.esu3.k12.ne.us/NEBWEB/nebweb.html

University of Nebraska-Lincoln
http://www.unl.edu/

Omaha Public Schools,
http://ops.esu19.k12.ne.us/home.html

Sunset Hills Elementary School,
http://techlab.esu3.k12.ne.us/educ551/avolberd/SunsetHills.html

PANESU Home, ESU 12,13, and 14 in Alliance, Scottsbluff, and Sidney, Nebraska,
http://panesu.esu14.k12.ne.us/

Grant Public Schools
http://www.gps.k12.ne.us/school/school.htm

McMillan Magnet Center
http://204.234.89.150/

School District of Grand Island
http://www.gi.esu10.k12.ne.us/

ARTnet Nebraska,
http://nde4.nde.state.ne.us/ARTnet/ARTnethome.html

NebraskaNet,
http://nebraskanet.unl.edu:2025/NebNet.html

Nebraska Math and Science Coalition,
http://www.nde.state.ne.us/NMSI/NMSIhome.html

Nebraska Game and Parks Commission,
http://164.119.102.2/gp.html

Nebraska Department of Economic Development
http://www.ded.state.ne.us/

Center for Economic Education, University of Nebraska at Omaha,
http://unicron.unomaha.edu/dept/econ/econed.htm

Omaha Free-Net
http://omahafreenet.org/

Office of Internet Studies, University of Nebraska at Omaha
http://137.48.46.72/htmldocs/ois.html

Nebraska Travel and Tourism
http://www.ded.state.ne.us/tourism.html

Professor Gigabyte's Gateways to Infinity, Dana College
http://www.dana.edu:80/~dwarman/

Conclusions and Implications

Each of the teacher survey, server, and innovative use data sources were examined for related conclusions and implications, with cross-referencing between sources conducted when appropriate. The analysis techniques used were primarily descriptive statistical procedures, with expanded correlational procedures between sources planned for the next 3-5 year reporting periods. Although it is still relatively early in the five year evaluation process, several suggestions and implications were apparent at this 24 month reporting period.

These conclusions and implications are divided into smaller sections related to the primary data source suggesting the implications. These sections include a section on implications from the pre-training survey data, implications from the post training survey data, implications from the server survey data, implications from the innovative uses of teachers and projects, and some general conclusions and implications. The section related to implications from the post survey data is further divided into parts which identify general categories of implications. These include post survey implications related to educator use, post survey implications related to student use, and post survey implications related to future plans.

Implications from the pre-training survey data:

A fairly wide range of survey responses from the pre-training instrument has currently been analyzed (3776 surveys), representing all Nebraska ESUs, in order to provide evolving demographics information on the teachers who enter the ESU training process. The following implications can be identified from the pre-training survey analysis.

1) Many teachers report knowing very little about telecommunications before entering the Internet related training.

Responses to the Internet and telecommunications related questions suggest that teachers often still know very little about the Internet before beginning the training process. This is particularly illustrated by the high percentage of teachers who identified telecommunications as either "unfamiliar" or as having "little or no skill" in the area. This result is most prevalent in the data recently collected for the first six months of the year 2 reporting period. It appears the second year of training is involving a higher percentage of teachers who consider themselves as currently unfamiliar or low in proficiency related to the Internet and telecommunications. This suggests that the training sessions are now beginning to "reach" a higher percentage of teachers without any current background or understanding of the Internet. See Figure 1 on the next page.

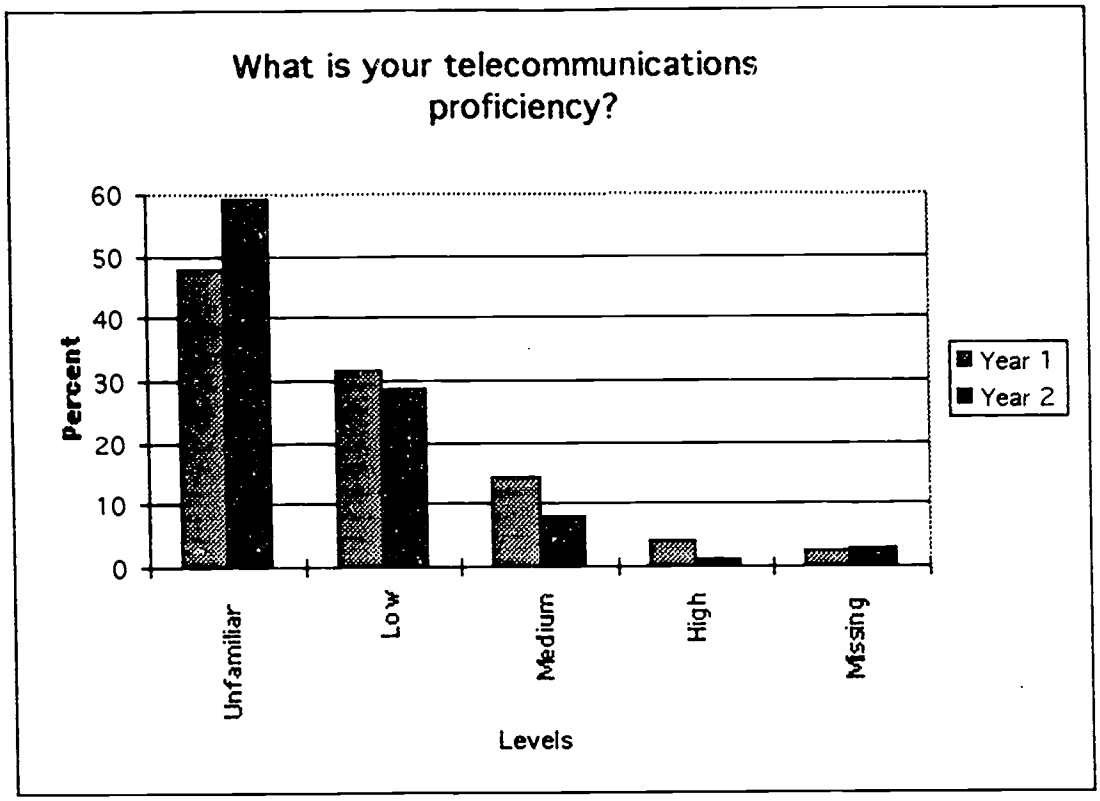


Figure 1.

Such a result suggests that the initial training workshops will need to continue to include, and perhaps even enhance, a "conceptual training component" describing just what the Internet is, and its potential for education, as well as the "hands-on" training activities. Based on the responses to the narrative question regarding expected use in their own classroom, where 48% of the teachers left this blank in year 1, and 53% left it blank in year 2, it is also apparent that approximately half of the teachers are entering training with very limited personal plans or expectations related to their own classrooms. Training activities should continue to recognize this low level of initial teacher awareness and expectation, and plan for the continued emphasis of specific classroom application. Such a low level of understanding before training also appears to reinforce the critical need for the Internet workshops currently being delivered by the Educational Service Units.

2) A variety of teachers are becoming involved in the Internet training, with the second year of training accessing a higher percentage of teachers in the early grades.

The data supports that a representative mix of teachers is being included in the initial training sessions. This representation indicates that participation in the training process is inclusive to most groups and levels of teachers. The data examined for the first six months of year 2 also indicates that a higher percentage of early grade teachers is now being trained, as indicated by the Figure 2.

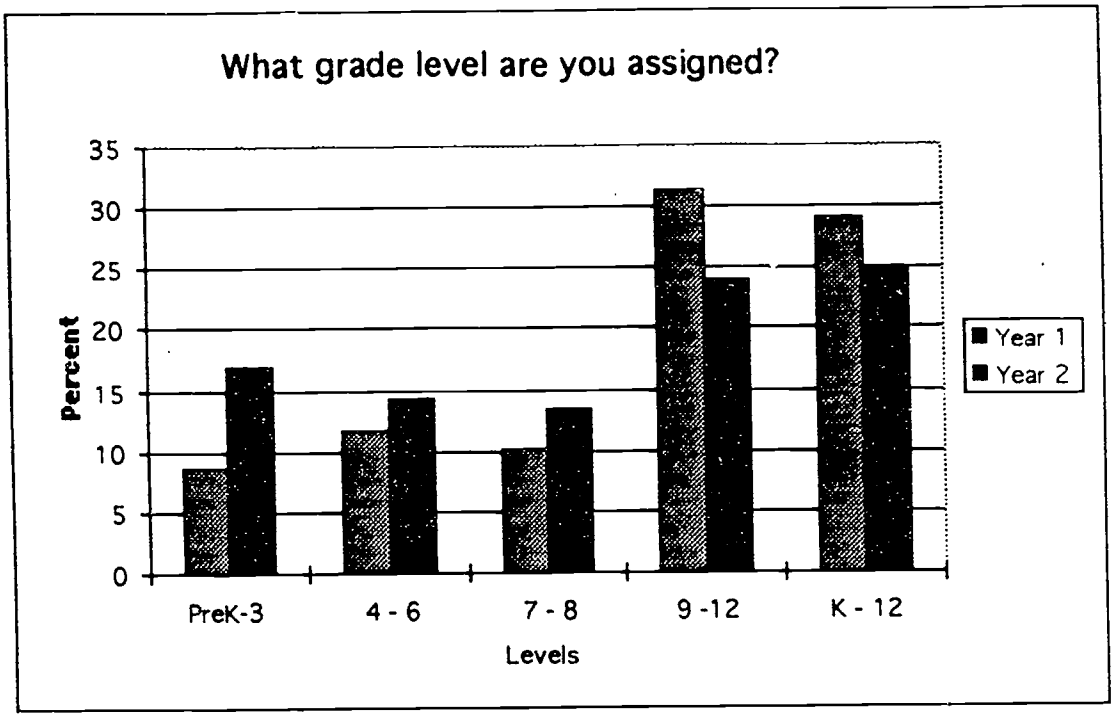


Figure 2.

The teachers being trained also seem to continue to have a "student involvement" philosophy that is consistent with research related to the effective uses of technology (and the Internet). This is indicated by the responses to questions related to student projects, research, and group work. In general, approximately 90% of the Nebraska teachers surveyed use such techniques periodically in their classrooms; suggesting that there is a fertile environment for classroom integration and the eventual student use of the Internet.

3) Initial training sessions are beginning to involve a higher percentage of teachers who are less computer literate in general.

It would appear that the training sessions are beginning to reach a set of teachers who are generally less computer literate than their colleagues who were trained in year 1. This is apparent from the higher percentage of teachers who are reporting "unfamiliar" or "low" when asked to provide their computer related proficiencies. An example is teacher reported proficiency in hypermedia, which is illustrated by the graph below in Figure 3.

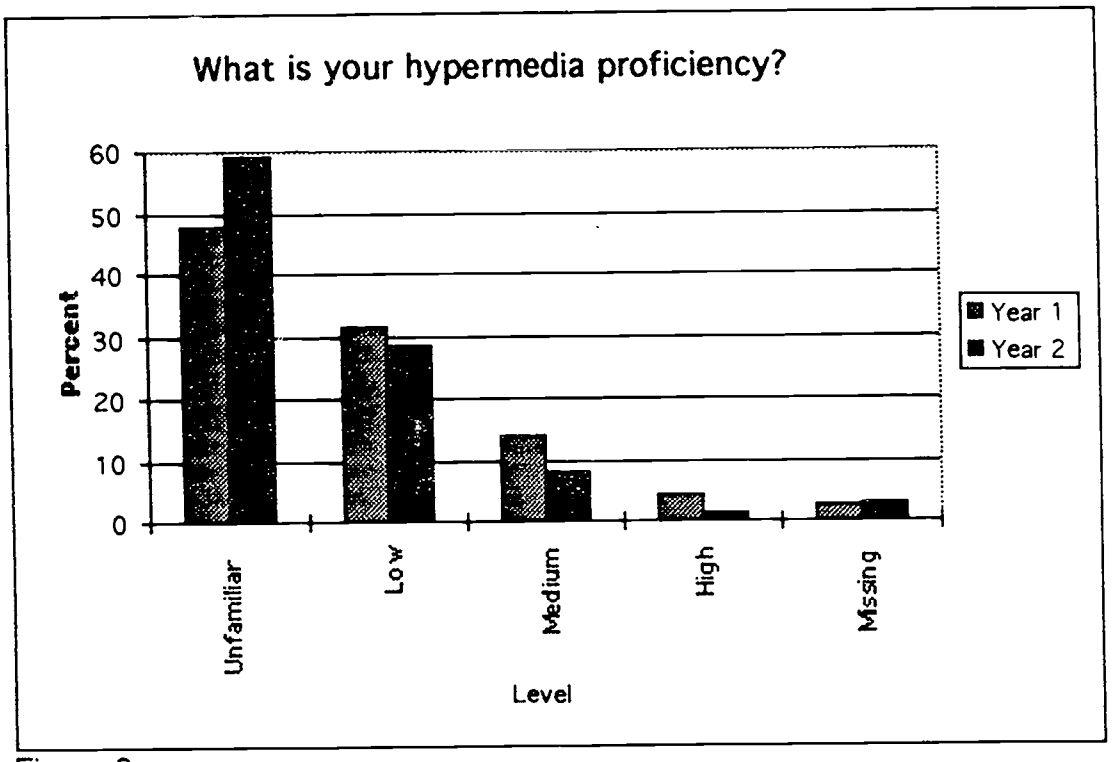


Figure 3.

Such a result should be generally encouraging to the Educational Service Units, suggesting that their training process is reaching a wide variety of teachers. The increased involvement of teachers who are initially less computer literate, should also have the added benefit of improving the general computer literacy of these teachers. This benefit is particularly possible when considering that many Internet related activities that these teachers will be trained in, such as the use of the World Wide Web, involves skills which are closely related to many other important computer topics, such as hypermedia and computer graphics.

4) Examples of innovative classroom uses of the Internet need to be widely distributed to the teaching population.

There are some very innovative uses of the Internet being used by Nebraska teachers, and in particular, teachers are becoming more involved in the use of the Internet's information based resources. Accessing NASA's archives for elementary space lessons, and using ray tracing programs from the National Education Supercomputer Center for secondary physics classes, are both excellent examples of effective Internet use in the classroom. However, it is important to determine the best way to utilize these "success stories" for assisting the statewide awareness of the Internet and its potential for education. This is especially important, since in general, most of the teachers being reached in current training sessions are not already aware of how other teachers are using the Internet effectively in their classrooms. This is implied by the high response of teachers (94% for year 1, and 97% for the first six months of year 2) who did not list any individual that might be contacted as using the Internet in an innovative way within the classroom.

Such an awareness of successful colleagues, and related educational projects, would seem to be important for the eventual acceptance of the Internet as a viable classroom tool. Many of the teacher uses which are currently underway, and those

just beginning, provide excellent "in-state" examples for increasing teacher awareness of the potential use of the Internet in the K-12 classroom. The Educational Service Units will want to consider how best to "utilize" these success stories, both within and outside of training sessions, to provide a strong "vision" for teachers who are interested in expanding their own classroom use of the Internet.

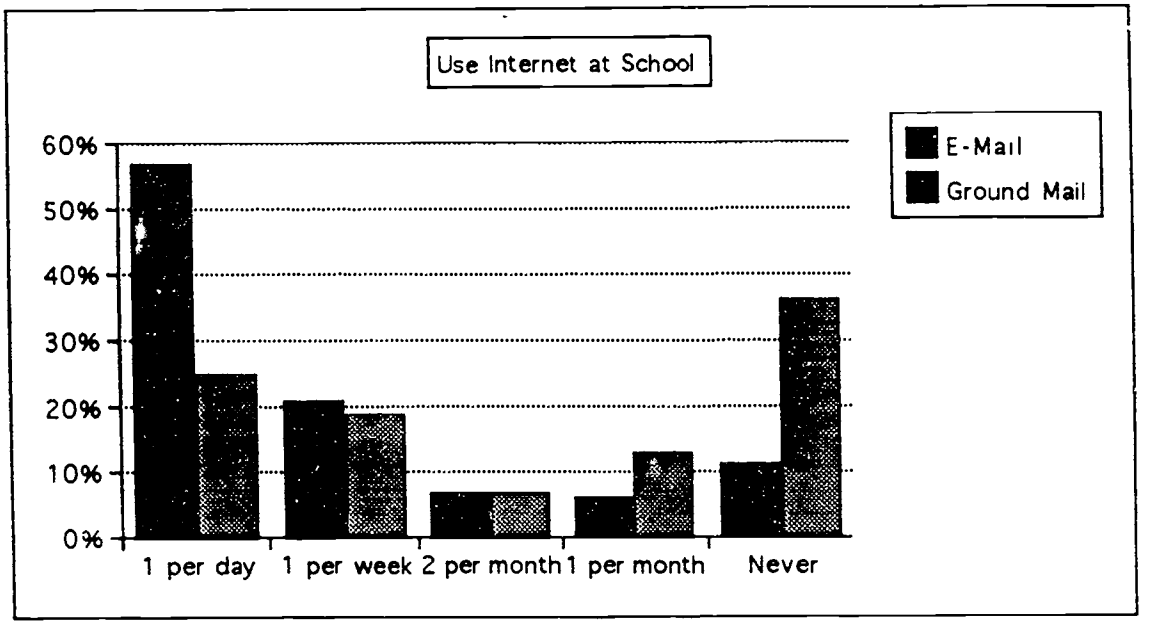
Implications From the Post Survey Data:

The implications of the post survey data will be organized in four categories, educator use of Internet, student use of Internet, Internet access, and future use and trends of Internet use.

Educator Use:

1) Teachers responding use the Internet often, and most teachers report accessing the Internet at school, although few Internet-connected computers are currently available to them.

This finding would indicate that teachers need better access to the Internet at school. Internet-connected computers, as well as the time to get on-line, should be priorities of school buildings. The respondents ranged from very novice Internet users (<1 month) to more veteran users (>1 year). When asked about their last Internet usage, two-thirds of the ground mail respondents indicated that they had used the Internet within 1 month, although 15% indicated that they had not been on-line for over 6 months. NOTE: The e-mail respondents had all been on-line within 1 month, since they responded to the survey via e-mail. When asked how often do they use Internet at school and at home, many more indicated that they use the Internet at school rather than at home. Of the e-mail respondents, 57% reported accessing the Internet at school daily and 28% reported accessing the Internet at home daily, while 25% of the e-mail respondents accessed the Internet daily at school and 9% daily accessed the network at home. See Figure 4.



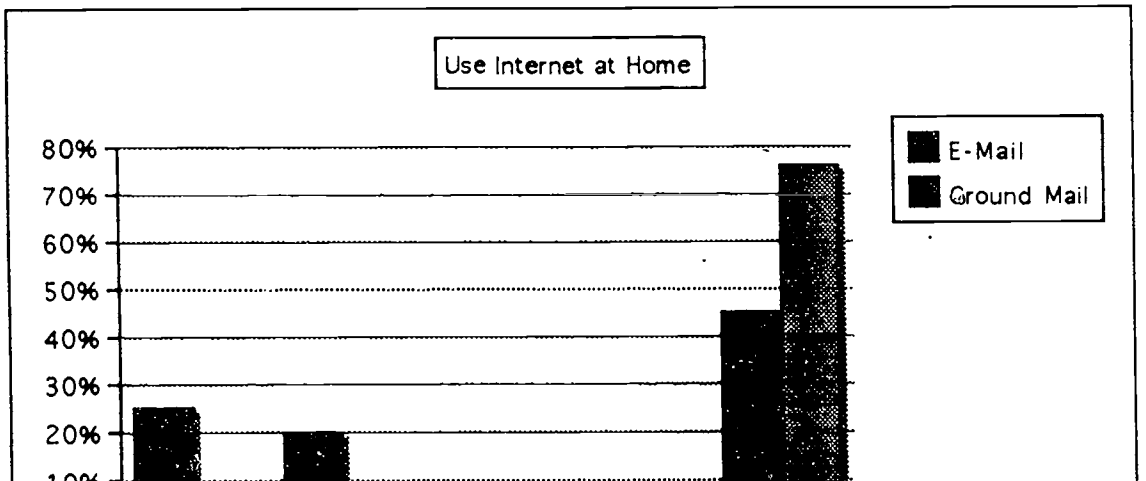


Figure 4.

Respondents also reported that there are few Internet-connected computers available to them at school, as illustrated by Figure 5. Note that over one-half of the respondents have zero or only one Internet-connected computer currently available to them in the school environment.

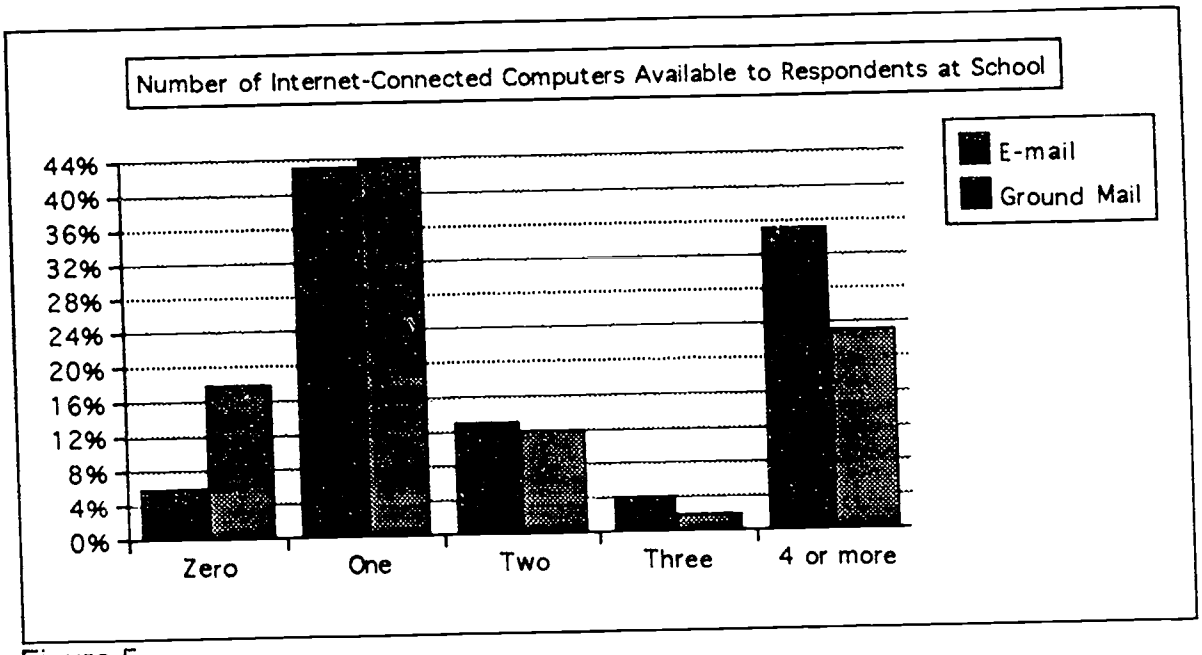


Figure 5.

2) Nebraska educators' initial use of electronic mail supports that they are using the Internet in very appropriate ways.

Lack of communication between and among educators has been a problem in K-12 education for many years, with the isolation of individual teachers limiting progress in effective teaching techniques. The Internet seems to be helping the communication challenges of teachers and may help to give teachers ongoing information and ideas to help in their teaching.

The Internet protocol used most by teachers is electronic mail, with 89% of the e-mail respondents and 46% of the ground mail respondents using electronic mail at least weekly. Other protocols were much less used. See Figure 6.

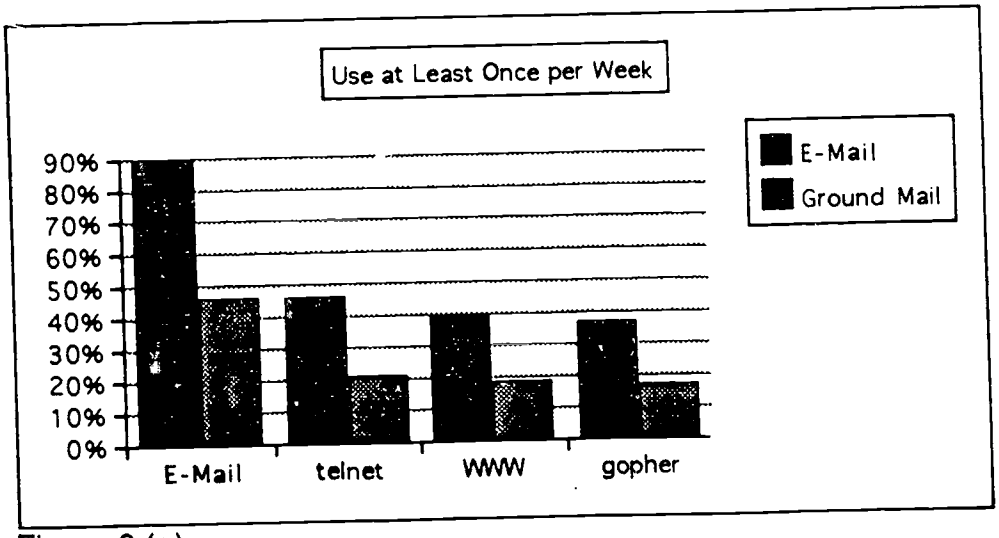


Figure 6 (a)

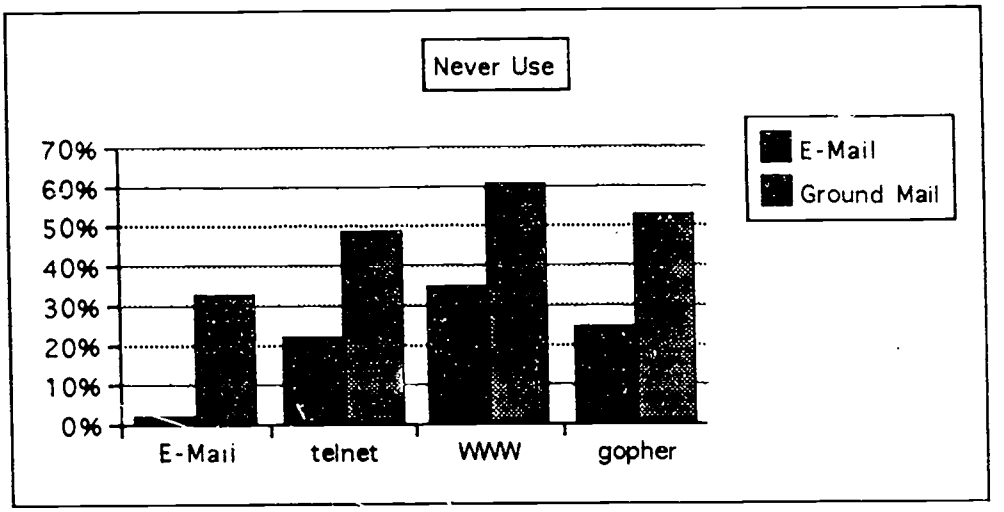


Figure 6 (b)

3) Educators tend to use specialized computer personnel as their primary source of help.

Although Internet using educators are seeking help from several sources (see Figure 7), it appears that specialized personnel, such as technology coordinators and ESU personnel, are most often used as resources. As more and more teachers become Internet users, one must question whether these limited number of specialized personnel can answer the questions of teachers in a timely matter. Possibly, schools and teachers need to develop "building" or "teacher" networks to be able to get timely answers to challenges and questions. Also, knowledgeable students may be excellent classroom resources for some answers to Internet questions.

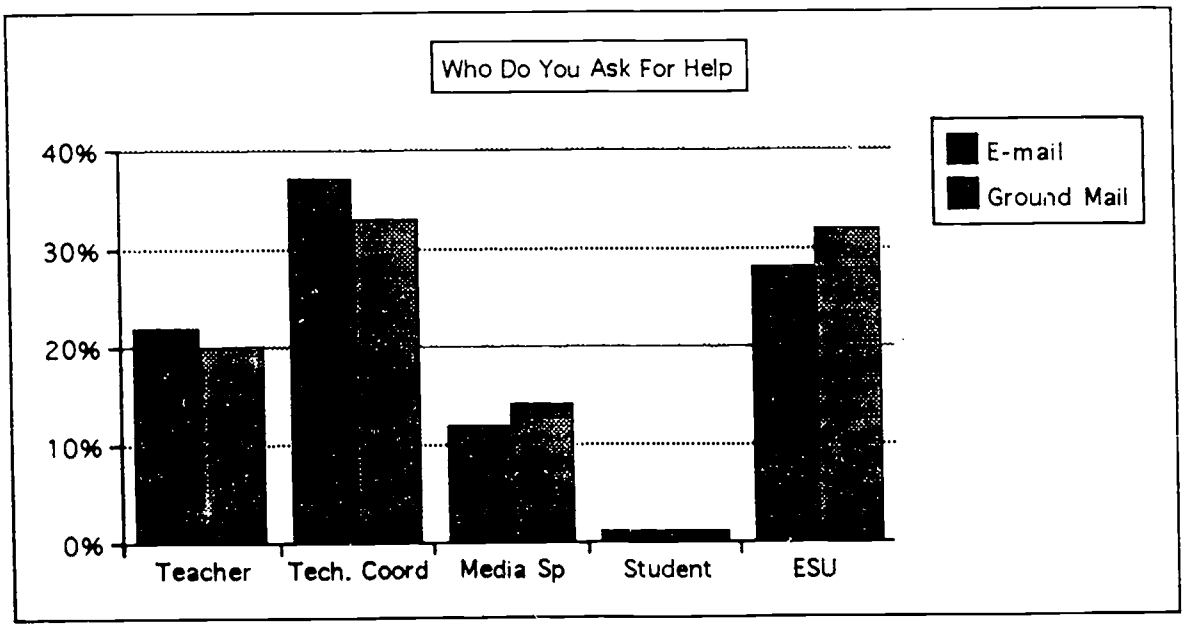


Figure 7.

Student Use:

4) Relatively few Nebraska students are currently using the vast and varied resources of the Internet.

Use of the Internet by their students was also reported by the responding educators. Less that one-half (e-mail respondents-43%, ground mail-32%) of the educators have had their students use the Internet in any way. Student access to Internet-connected computers is currently limited. Almost one-half of the schools have zero or one Internet-connected computer available to their students (see Figure 8), and when asked why educators do not have their students use the Internet, over 30% stated that an "Internet-connected computer is not available", while 15% stated that students do not have accounts, and 15% indicated that software and hardware limitations constrained student use.

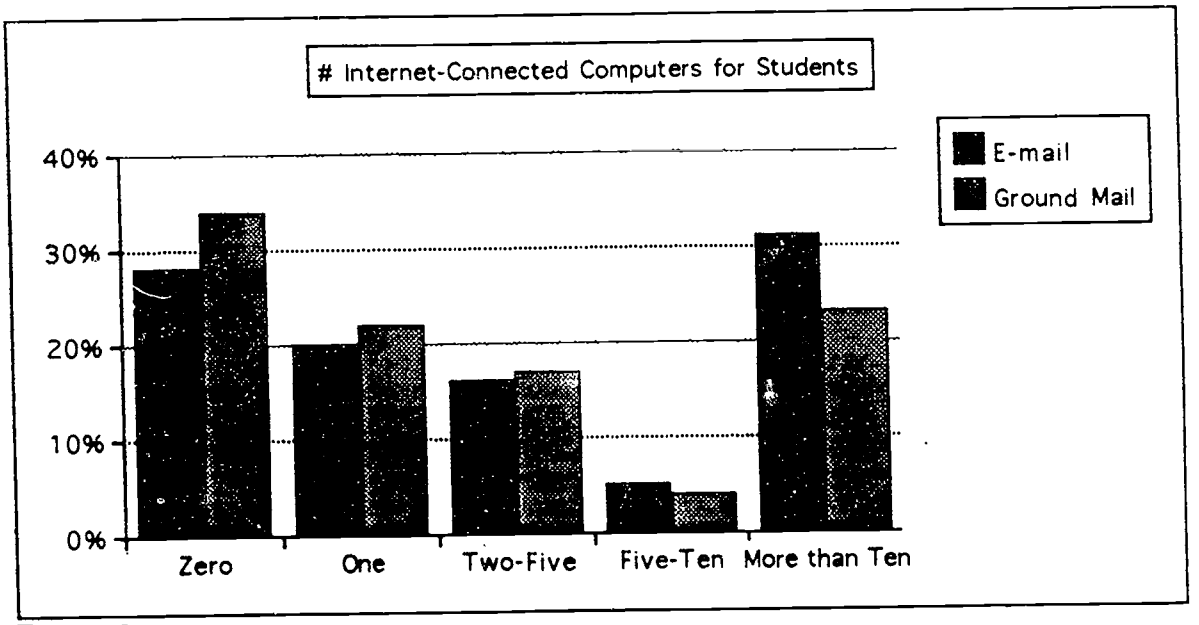


Figure 8.

As noted in the "Innovative Users" section of this report, active student use of the Internet seems important to learning in many model classrooms. The challenges of student use, such as access to Internet-connected computers and the inappropriate material issue, needs to be addressed quickly if Internet connectivity is going to help the overall reform our classrooms into active learning environments that will prepare our students for life in the 21st century.

In order to achieve this goal, buildings need to have direct Internet connections. and local area networked computers need to be readily available to all students. The recent passage of LB 860 should help in this effort. It is very encouraging that based upon a national analysis, Nebraska is a real leader in the statewide progress and efforts in this area (see report section on Progress Compared to Other States).

5) Principal support seems important to Internet use.

Respondents were asked to rate their principal's support of the use of Internet with their students. The data indicates that few principal's are reported as "discouraging" Internet use at this time (see Figure 9). The rate of support seems much higher than in the November 1994 survey (as reported in the 12 month report)

and continued training and support of these building instructional leaders would seem crucial to the success of improving education by innovative and creative uses of the Internet. School districts, ESU's, and university colleges of education need to continue to help principals understand the potential of the Internet, as well as help them develop school settings that encourage creative and technology based learning environments.

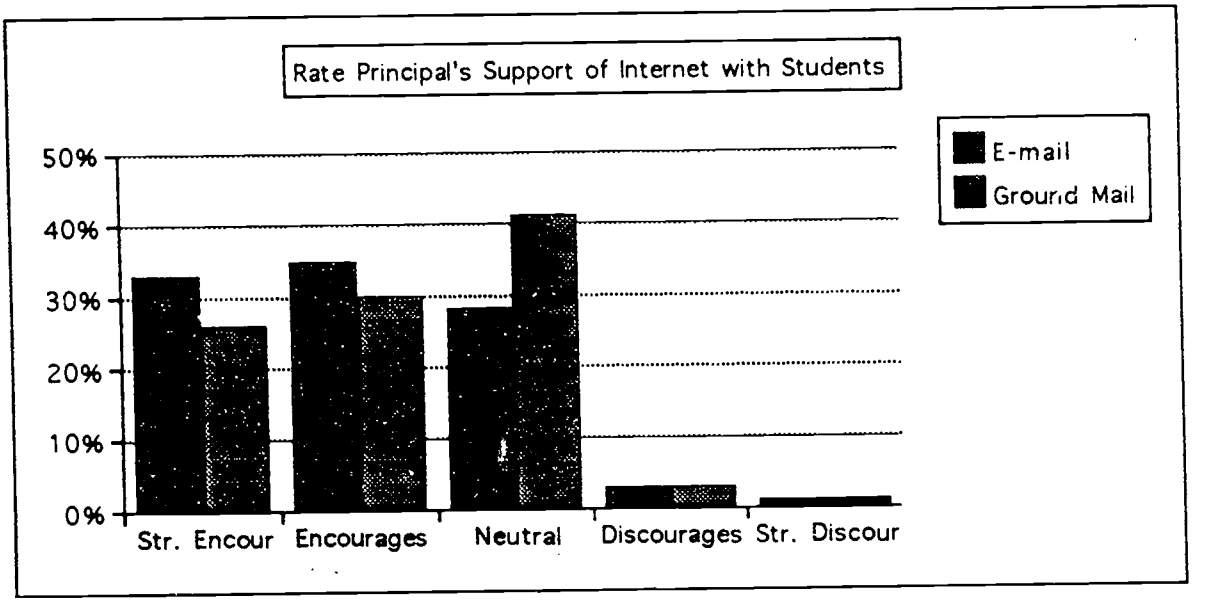


Figure 9.

Encouragement by the building principal to use Internet can be a powerful variable in a teacher's classroom Internet use. A statistical correlation was found to support this premise. There is a positive correlation between the variable dealing with principal support for student use and several Internet use classroom variables, including whether teachers had their students use the Internet, the frequency of teacher use of e-mail, and the frequency of teacher Internet use at school. Figure 10 reports the related Pearson Correlation coefficients.

Pearson Correlation Coefficients

	Principal's rated support for student use
Students use of the Internet	.159 *
Frequency of electronic mail use	.144 *
Frequency of Internet use at school	.171 *

* < .01 Significance (2-tailed)

Figure 10

Future Plans of Internet Use:

6) Responding educators plan to continue to use the Internet and see its value to them for communication and information gathering.

Communication is very important to improving education, and the ability of teachers to "break down the walls of the classroom" is a very exciting aspect of Internet access. Also, as teachers gather information and learn from new and varied resources, they can become better prepared in their fields, and practice the same information based learning skills that they are teaching their students.

When asked how they plan on using the Internet in the future, less than 10% of the total respondents indicated that they "don't plan on using Internet". This is very encouraging, as it indicates that a very high majority of Internet-trained educators see value in this tool. The responding educators indicated that they mainly plan on using the Internet in the future for communication (e-mail respondents-51%, U.S. mail respondents-36%) and for information gathering (e-mail respondents-38%, U.S. mail respondents-51%).

7) Nebraska educators see value in having their students use Internet and it's information gathering capabilities.

As indicated earlier in this section, few students currently use Internet, but the protocol most often used was electronic mail, followed by World Wide Web, and gopher. On the surveys, a question was asked about the potential of the Internet for future student use. Over one half indicated that World Wide Web held the most promise for helping students in the future, followed by gopher (approximately 20%) and e-mail (approximately 12%). To support this finding, information gathering, often seen as an important component of student research, was the most often selected planned student use of the Internet in the future. See Figure 11.

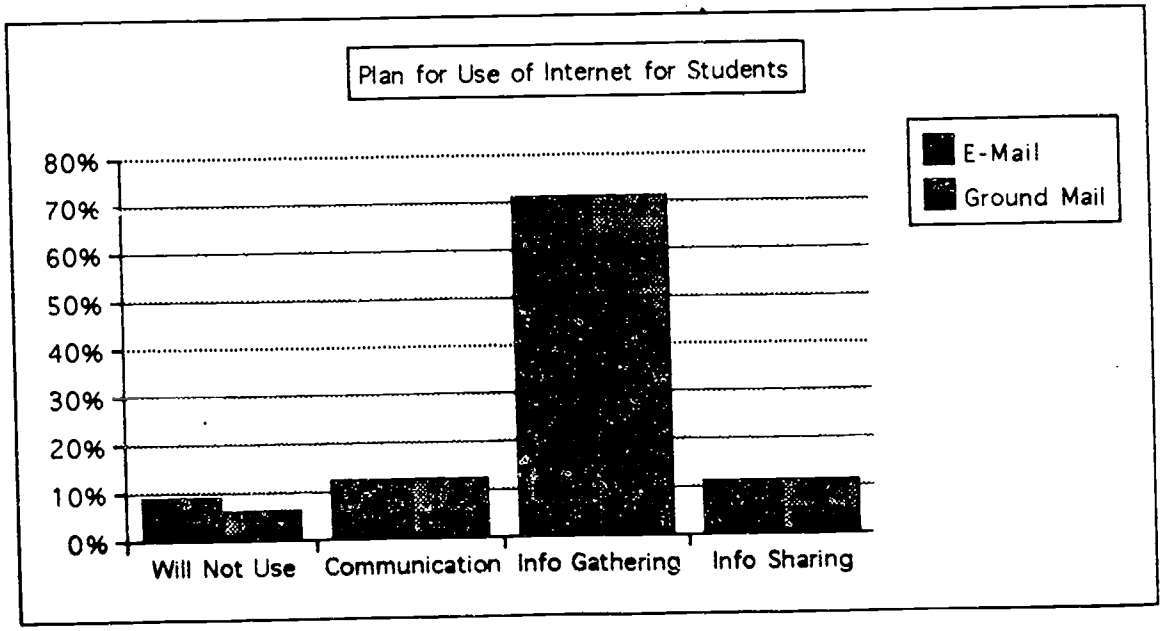


Figure 11

8) A majority of Nebraska teachers, who have had Internet training, are comfortable with computers, and a high percentage feel that computers are very important to the future of their profession.

Educators who responded to the surveys were asked to indicate some attitudes towards computers in general, and the response were very positive. When asked if they "enjoy using computers", 73% of the electronic mail and 43% of the ground mail respondents indicated that they "strongly agree". Also, when asked to respond to the statement, "Computers are very important to the future of education", 87% (electronic mail) and 71% (U.S. Mail) of the respondents indicated that they "strongly agree". See Figure 12.

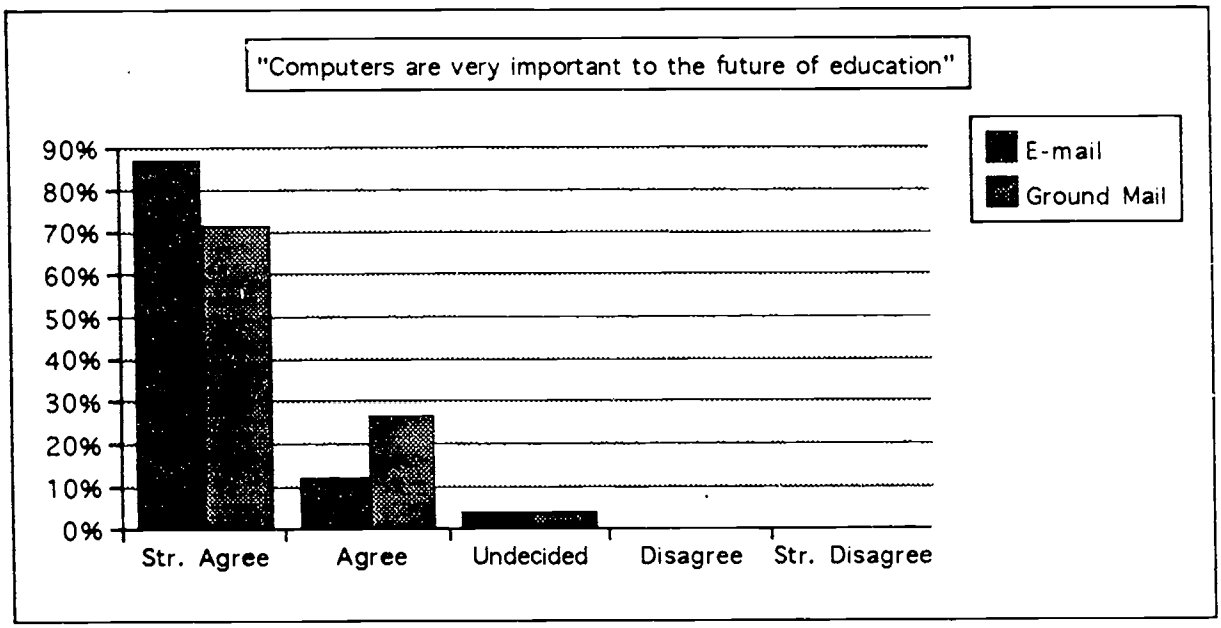


Figure 12.

It is very encouraging that this large group of Nebraska educators seem to see computers as a powerful and necessary addition to the educational "toolbox". As the state continues its efforts to improve the educational opportunities for our students. teacher comfort with computers and their belief in computer use will no doubt be two important components to progress in this area.

Implications from the Server Data:

Several implications were apparent from the data gathered related to server use and support.

1) The statewide pace of training is substantial.

The Educational Service Units are currently facilitating Internet based training at a substantial rate, averaging almost 6000 individuals per year. Most of the training sessions have currently been introductory in nature. However, with the rapid pace of change on the Internet system, and considering the Internet's vastly expanding resources and capabilities, it would appear ongoing and periodic training sessions will no doubt be needed. School districts must also continue to look for innovative ways for freeing up teachers for training, since training sessions offered outside of the

school day are typically very limited in time, and traditionally less effective for technology based inservices.

2) Statewide connectivity is progressing well, but the reliance on modem based technology at many schools is still a significant barrier to progress.

The state is moving to a direct connect environment more rapidly and more successfully than most of the states in the United States. However, the continued reliance on modem based technology at many schools threatens to "leave these schools far behind" in accessing the numerous and vast instructional resources represented by the Internet. Modem based access severely restricts the use of the World Wide Web, makes uniform training sessions very difficult, and limits the instructional use of the Internet in the classroom. Efforts and funding related to LB 860, promise to help facilitate better classroom and school connectivity.

3) Technical and cost issues threaten some implementation efforts.

School implementation issues related to the significant costs of data lines, and the varying connectivity costs due to differing areas and demographics is making it difficult to take a consistent approach to support. In addition, with the evolving use of PPP (point to point protocol), and related home Internet use, there is some evolving confusion related to community support, student access, and home Internet support.

4) School districts must work to become more self-reliant on follow-up Internet support.

With the rapid pace of initial training, and the ongoing connectivity support being facilitated by the educational service units, it is somewhat alarming that roughly 30% of the teachers responding to the post survey suggest that they will first ask the Educational Service Units for help if they have a question on the Internet. On-site help from knowledgeable colleagues, media specialists, and technology coordinators, would seem to be the most effective "first question" resource. Such a potentially large number of "call-in" support questions, many no doubt easily handled on-site at the school, threatens to "overwhelm" the Educational Service Units support system. Training sessions must continue to emphasize the critical roles of the school district, school, and individual users, in assisting in local on-site support activities. In addition, individual schools and districts must plan for "sharing the responsibility" of ensuring the proper use of the Internet by students, particularly when individual student access is provided.

Implications from the Innovative Uses of Teachers and Projects:

Several initial implications are apparent from the classroom observation and teacher interview data related to the evaluation at the 24 month reporting period. These implications will no doubt evolve as additional data is accumulated and analyzed for later reporting periods.

1) Innovative uses often blend the Internet into other curricular activities.

Many of the most innovative and effective uses of the Internet use the Internet as one of several educational technology tools, in the support of more traditional curricular goals (learning about geometry in math, learning about the weather in

science, etc.). It appears that the many effective uses of the Internet involve the use of this network as a relatively "transparent" resource in the teaching and learning process. It was also interesting that in this task oriented environment, teachers appeared to have relatively little concern for the possibility of students accessing offensive material.

2) Student use appears to be a critical component to "innovative" curricular use.

The most impressive and effective curricular uses of the Internet observed in classrooms identified by other teachers as "innovative", typically involved putting the students on-line for the majority of the classroom's Internet based activities. This included having the students do the research, help plan the activity, and even do routine typing tasks. The classroom enthusiasm of "involved" and "motivated" students was often one of the most observable aspects of the more "innovative" classrooms, and was often identified by teachers as a major outcome related to the Internet use by students.

3) Student "research" using the Internet appears to be at a considerably higher level than in more traditional classroom activities.

The student research being conducted over the Internet appears to be much richer than more traditional school library based research. Often, classes not only retrieved textual information, but accessed and incorporated information from visual images (such as NASA moon images), on-line software programs (such as physics ray tracing, or biology frog dissection programs), and even communicated with on-line experts (such as a genetics scientist). The concept of "student research" seemed to be more dynamic, and teachers reported that even the word "research" appeared to be used more commonly by students. In addition, the Internet research appeared to be more interactive, with students sharing information as well as retrieving it (such as when talking to content experts, or students at other sites).

4) Most innovative curricular uses were multi-disciplinary in nature.

The involvement of two or more disciplines in a classroom Internet activity was very common in the observed classrooms, and in the classroom activities referenced by interviewed teachers. Often, when two or more teachers were involved in a project. a multi-disciplinary aspect of the Internet appeared to be the curricular "glue" that facilitated the professional collaboration between the teachers within the activity.

5) Innovative uses by teachers typically overcame significant technical and instructional barriers

Most of the teachers involved in innovative classroom activities reported confronting and overcoming a wide range of technical and curricular problems in order to initiate the activity. Access to needed equipment was the most common problem referenced by the teachers, and often involved limited modem or phone line access. The mention of a lack of personal planning time was the second most common curricular problem referenced by teachers, followed by concerns related to student keyboarding difficulties.

6) Innovative classroom uses often accessed "non-traditional" classroom resources.

Most of the innovative classroom activities related to the Internet accessed information which was not typically available in other mediums or school based

classroom resources. For example, current pictures of Jupiter were downloaded by an elementary science class, and daily White House schedules were accessed by a high school social studies class. In some classroom activities, these "non-traditional" resources also included students in other countries, such as Russia, Finland, and Australia. Thus, many of the innovative classroom uses involved using the Internet to secure information not available, or not readily available, from traditional sources, such as the school textbook or library resources.

7) Teacher and school based grant opportunities appear to be an important catalyst to innovation.

Many of the teachers involved in the most innovative and extensive classroom projects had plans to eventually seek additional funding through either lottery or private foundation funds. Often, these teachers were very excited about the opportunity to write a grant, and the potential opportunity to widen the dissemination of their personally designed and successful project. The possibility of such later funding seemed to be a real catalyst for the teachers to be willing to endure the extra work and effort personally associated with pursuing an innovative Internet based project.

General Implications:

These general implications are also apparent from the evaluation process.

1) Significant progress is being made for the implementation of LB 452, and LB 860 promises to also assist in Internet integration.

The evaluation team has presently noted a very high level of progress related to LB 452 and its implementation by the Nebraska Educational Service Units. As LB 860 is also implemented, it is expected that Internet use will considerably increase as classroom access increases. In addition, other contributing organizations, such as the Nebraska Department of Education, and the University of Nebraska system, have joined in the efforts to support the use of the Internet in Nebraska education, often though joint activities with schools and the Educational Service Units. The movement toward direct connections, and the expanding use of the World Wide Web is also an encouraging sign for eventual implementation of the Internet into education. More than 300 school based direct connect hook-ups are currently completed in the state, with more than 150 planned for the next year. Over 20,000 users are now being directly supported by the Educational Service Units and their Internet related operations.

Indeed the implementation of LB 452 has been statewide and comprehensive in nature, and has included the following activities:

- The installation and use of UNIX based computers to provide support
- The establishment of connectivity for many Nebraska schools
- The operation of a statewide training program
- The development and distribution of training support materials
- The enhanced technology planning of individual schools and districts
- The facilitation of model projects and teacher uses
- The development and implementation of a formative evaluation process

2) Community interest is starting to parallel educational interest.

Many community groups are beginning to show a parallel interest in the educational use of the Internet, and to build upon local educational activities. This is

most apparent in some of the smaller communities of Nebraska, where companies such as Great Plains Communications, are helping Nebraska towns examine the possibility of starting a local bulletin board system. Interest is also strong in Lincoln and Omaha, where area based freenet systems are initiated. It would appear that an active partnership between educational and community interests related to the Internet has real potential.

3) Statewide dialogue and planning is becoming increasingly important.

As the use of the Internet in the schools expands and evolves, it appears that statewide planning efforts will become increasingly useful and important. The Internet is naturally conducive to the sharing of resources and expertise, and it would seem that continued joint planning associated with the K-12 use of the Internet will be mutually beneficial for all related stakeholders and organizations.

4) Nebraska continues to play a national leadership role.

Nebraska is continuing to play a leadership role in several areas related to integrating the Internet into K-12 education. In particular, Nebraska's full statewide approach to the Internet, its tax based funding, its commitment to teacher training, its continued planning for a direct connect environment, and its formal evaluation process, provides a successful and comprehensive state model, fairly unique to the nation. Some states are still struggling to initiate a statewide networking plan, while Nebraska's plan is well underway and operational. However, most states are now pursuing education related connectivity at a very rapid pace, and Nebraska will need to continue to actively plan for the future of Internet based innovation, in order to maintain its current educational leadership.

In summary, it is apparent from these evaluation implications that Nebraska has a solid start toward the implementation of LB 452, and its beginning efforts related to LB 860. There appears to be solid progress in support of the eventual integration of the Internet into the K-12 schools in Nebraska. The continued high level of cooperation between many state institutions would seem critical to continued progress in the state. Based upon a review of the relevant literature, and periodic status reports from other states, it is also clear that Nebraska is well ahead of a considerable majority of states in bringing the power of the Internet into the K-12 classroom.

External Grant Progress

The state resources available for the evaluation project, as funded by the Nebraska Educational Service Units, are minimal, and thus initial evaluation activities have also included the submission of proposals to help facilitate a comprehensive and statewide evaluation process. The submission of additional proposals has been for the most part successful, and include the following grants now underway that contribute in some partial way to the overall evaluation process summarized in this report.

Federal Evaluation Grant

In December of 1993, a grant proposal was submitted to the U.S. Department of Education (for $87,358), entitled "An Appraisal of the Impact of Statewide Internet Implementation on Nebraska K-12 Education". This proposal was funded for September 1, 1994 to September 1, 1995, and is now completed.

This funding facilitated startup costs of the evaluation, and an expanded evaluation for one year, including enhanced survey development, interview, and on-line data collection activities associated with baseline information.

Project TEAM - Internet

The focus of this grant is to train teacher leaders in the educational uses of the Internet, as well as help document some of the innovative uses of the Internet by teachers. The project was funded by the Helena Foundation for $99,700, and will run through 1996. It is assisting in the development of the World Wide Web page related to the evaluation project, as well as helping identify innovative uses of the Internet across the state.

Case Study Mini-Grants

Several educational research organizations such as MCREL (Mid Continent Regional Education Laboratory), have expressed interest in looking at specific Internet active schools in depth, and such case study analysis supports the overall evaluation process. At the request of MCREL, a case study analysis was conducted of McMillan Middle School (funded at $4000), of the Omaha Public Schools, and is available for access either from the Office of Internet Studies at UNO (Department of Teacher Education), or MCREL.

Excellence in Education School District Grants

Through proposals to the Nebraska Excellence in Education grants, which are funded through Nebraska Lottery revenue, many school districts are asking to become "model sites" related to Internet, and computing technology in general. This statewide evaluation project is consulting with many of these schools and districts to develop a formal "data collection and analysis" process at their specific site. Such "in-depth" case studies will contribute to the overall state-wide evaluation, and facilitate some careful observations of how a school or school district effectively integrates the Internet into the curriculum.

The continued funding of such proposals will be of critical assistance in implementing an effective and long range analysis of Nebraska's K-12 uses of the Internet. Each grant plays a role in providing the component resources to examine one or more perspectives related to the evolving use of the Internet in Nebraska schools and classrooms.

Progress Compared to Other States

The evaluation project is also examining what is happening in other states in the United States, primarily to provide comparison information for the Nebraska Evaluation Project, and to draw upon the expertise of out of state colleagues during the evaluation process. Research is starting to emerge related to statewide efforts in telecommunications and technology. The Office of Technology Assessment, of the United States Congress, recently published a 1995 report which summarized educational technology related activities from each of the 50 states in the United States. Within that report, a total of 39 states now report having some type of support system for K-12 instructional telecomputing at least partially operational, and nine of the remaining eleven states report being in the planning stages (p. 114). These networks and the support offered vary considerably, and the most of the states are still

heavily dependent upon "modem" based connectivity. Nebraska is comparatively strong in telecommunications integration, as well as in general educational technology access, as represented by having the fifth lowest computers to student ratio (10.4) out of all 50 states (Office of Technology Assessment, 1995, 101). In particular, Nebraska's Legislative Internet initiatives represented by LB 450 and LB.860 are currently fairly unique in the United States.

The pace of national change is rapidly increasing, and some other states, along with Nebraska, have had considerable early success in building education related networks. In particular, these early leaders include states such as Texas, Florida, and Virginia. A few states, such as Mississippi, are only now beginning to consider and develop their formal plans for building a statewide network, but are now well focused on the need to do so. Based on the progress documented in this report, and the state officials contacted in phone interviews, Nebraska appears to be making significant progress relative to the other states, and can be considered a real leader. In particular, Nebraska has shown substantial leadership in five specific aspects related to K-12 integration of the Internet:

1) Funding

Nebraska has been successful in providing tax based funding for providing education related Internet connectivity.

2) Teacher Training

Nebraska is one of the only states to provide for comprehensive teacher training related to the Internet.

3) Model School Environments

Nebraska has been successful in accessing funding for the development of model school environments related to the Internet, such as with the U.S. West Network Schools Projects, and the Nebraska Lottery supported Excellence in Education grant activities.

4) Direct Connections

Nebraska has been a leader in emphasizing "direct connect" technology in its statewide connectivity plans and activities. Many states have built their network based upon modem connections, often including "800" support phone lines. Some of these states are now having considerable difficulty in making such networks cost effective, and in making the necessary transition to a direct connect environment.

5) Evaluation

Although other states and researchers are examining the use of the Internet in education, Nebraska appears to be the only state with a state supported and formalized evaluation plan being fully implemented across the state.

Dissemination Progress

The evaluation project is also planning and beginning to implement a formal dissemination process. Five methods of dissemination are currently being used and developed, and are in various stages of operation.

1) Evaluation Project Six Month Reports

An evaluation project report is being completed every six months, and is represented currently by this document. The July reports analyze the major data collection activities at the end of each academic school year, and the January reports provide summary narratives and brief updates to the evaluation process. Each project report is submitted to the Eric Document service for access in their entirety by interested professionals.

2) Conference Presentations and Papers

Conference presentations, including conference proceedings and papers. are also being used as a dissemination tool for the Evaluation Project. Current report summaries are were delivered at the 1995 Society for Information Technology and Teacher Education Conference (SITE), and the 1995 National Educational Computing Conference (NECC).

3) Journal Articles

Several articles are being submitted for review and possible publication in selected professional journals. Recently, notification was provided that the "Nebraska K-12 Evaluation for Year 1" would be published in the journal Computers in the Schools. Manuscripts summarizing this 24 month report of the Evaluation Project is currently in progress.

4) Evaluation World Wide Web Page

The Office of Internet Studies maintains a World Wide Web Site in the UNO College of Education with links to the Nebraska K-12 Internet Evaluation data at **http://137.48.46.72/htmldocs/ois.html**. This World Wide Web page provides current summaries of the evaluation, and representative links to innovative projects and sites.

Next Period Evaluation Goals *(3rd Year)*

The following are the goals of the Internet Evaluation Project for the 3rd year of the evaluation. These goals will be refined with feedback from the Nebraska Educational Service Units, and the ongoing formative evaluation process itself. The goals focus on continuing the evaluation process, and moving into a more complete implementation of the data analysis and general dissemination procedures.

1) To continue to refine, expand, and implement the overall evaluation process
2) To continue to collect and summarize teacher surveys
3) To continue to document examples of innovative Internet uses
4) To continue to examine Nebraska related sites on the World Wide Web
5) To continue the investigation of the progress and plans of other states
6) To continue to refine and develop the dissemination process
7) To continue to submit external funding proposal(s) to facilitate the evaluation

Summary

As the use of the Internet in Nebraska evolves, it is apparent from this 24 month reporting period of the evaluation, that the Nebraska Educational Service Units and collaborating Nebraska Institutions are making considerable progress related to bringing the Internet into the K-12 classrooms of Nebraska. Indeed, Nebraska would seem to be a leader in meeting the national initiative described by Vice President Gore to "connect all of our classrooms, all of our libraries, and all of our hospitals and clinics by the year 2000" (National Institute of Standards and Technology, 1994, p. 57).

In particular, the collaborative environment and efforts within Nebraska are quite exceptional, and promise to be the most important "key" to eventual statewide success of the endeavor. Nebraska's comprehensive approach to bringing the Internet into the classroom, including leadership in funding, teacher training, model school environments, direct connect technology, and formal evaluation activities, is already providing a useful model to other states who are working toward similar goals. However, the general pace of change in technology, and the hastily expanding efforts by other states, makes it of critical importance that Nebraska institutions continue to support this state-wide endeavor, in order for Nebraska to continue in its current leadership role.

The state of Nebraska, along with the nation, is embarking on a very difficult, but worthwhile task, in bringing the Internet into the K-12 schools. It is a difficult task, because Nebraska is truly ahead of most states in trying to bring the Internet into K-12 classrooms, so there are currently few states to model on a national scale. It is a worthwhile task, because of the Internet's exciting potential for impacting education in the state of Nebraska, as well as the nation. The Internet provides a chance to truly break down the walls of individual classrooms, and to make available the vast resources of information that exist around the world.

As this evaluation project continues, a unique opportunity is provided through the chance to examine how an entire state confronts one of the greatest innovations and challenges that has come to education in some time. The evaluation process itself will help teachers from the field, and the students they work with, to have a collective voice on how this new challenge is developing, and what can be done to help ensure that state resources are used effectively.

This evaluation will continue to be refined and expanded as the amount of data grows, and as teachers are trained and attempt to use the Internet in their classrooms. Like the Internet, the evaluation process will be dynamic rather than static. Yet the underlying purpose of the evaluation project will remain unchanged, which is fundamentally to help the students of Nebraska receive the maximum benefit of the resources being brought to bear on their behalf, and to help bring them into the 21st century of education, through an effective integration of the Internet "information superhighway" into K-12 classrooms of Nebraska.

Appendices

Appendix A: References
Appendix B: Pre-Training Survey
Appendix C: Post-Training Survey
Appendix D: Pre-Training Survey Graphs
Appendix E: Post-Training Survey Graphs
Appendix F: Internet Coordinator's Data Request
Appendix G: Innovative User Electronic Mail Protocol
Appendix H: Innovative User Interview Protocol

Appendix A

References

References

Calcari, S. (1994). A snapshot of the Internet. *Internet World*, 5(6), 54-58.

Cohen, P. (1994). The online classroom. *ASCD Update*, 36(10), 6-7.

Committee for Economic Development. (1995). Connecting students to a changing world: a technology strategy for improving mathematics and science education. New York, New York: Committee on Economic Development.

Grantham, C. E., & Vaske, J. J. (1985). Predicting the usage of an advanced communication technology. *Behaviour and Information Technology*, 4, 327-335.

Gray, M. (1995). World Wide Web statistics. As reported on the Massachuses Institute of Technology Web Page, accessible at the electronic address of http://www.mit.edu.8001/afs/sipb/user/mkgray/ht/wow-its-big.html.

Heaviside, S., Farris, E., Malitz, G. & Carpenter, J. (1995). Advanced telecommunications in U.S. public schools, K-12. *E.D. TABS Publication No. NCES 95-731*. Washington, D.C.: U.S. Government Printing Office.

Kearsley, G. (1993). Education@Internet. *ED-TECH Review*, Autumn/Winter 1993, 43-45.

Krol, E. (1993). *The Whole Internet*. Sebastopol, CA: O'Reilly and Associates, Inc.

Kurshan, B. (1991) EduCorp statewide survey. In R. F. Tinker & K. P. Kapisovsky (Eds.), *Consortium for Educational Telecomputing Conference Proceedings*, 43-53. Cambridge, MA:TERC.

McAnge, T. R. (1990). *A survey of educational computing networks*. Blacksburg, VA, Virginia Polytechnic Institute and State University.

Mohr, L. B. (1992). *Impact Analysis for Program Evaluation*. Newbury Park, California: Sage Publications, Inc.

National Institute of Standards and Technology. (1994). Putting the information infrastructure to work: Report on the Information Infrastructure Task Force Committee on Applications and Technology. Washington, D.C.: U.S. Department of Commerce.

Nebraska Department of Education. (1993). NEnet: The Implementation of LB452. *In the Nebraska Department of Education Newsletter: The Circuit*, Nebraska Department of Education, P.O. Box 94987, 301 Centennial Mall South, Lincoln, Nebraska, 68509.

Nebraska Educational Service Units. (1991). Assisting Nebraska's Schools and Children. *A brochure of the Nebraska Educational Service Units*, 25th anniversary, available from the Nebraska Department of Education, P.O. Box 94987, 301 Centennial Mall South, Lincoln, Nebraska, 68509.

Pawloski, R. (1994). How I found out about the Internet. *Educational Leadership*, 51(7), 69-73.

Quaterman, J.S., & Carl-Mitchell, S. (1995a). Matrix size update. *Matrix News*, 5(1), 6.

Quaterman, J.S., & Carl-Mitchell, S. (1995b). How many countries on the Internet?. *Matrix News*, 5(5), 8.

Reinhardt, A. (1995). New ways to learn. *Byte*. March 1995 issue, p. 58.

Sheingold, K. (1991). Restructuring for learning with technology: the potential for synergy. *Phi Delta Kappan*. September 1991 issue, p. 18.

Smith, M. M. (1995). The new trekkie. *Electronic Learning*, February issue, p. 30-33.

U.S. Congress, Office of Technology Assessment. (1995a). *Teachers and technology: making the connection. OTA-EHR-616*. Washington, D.C.: Government Printing Office.

U.S. Congress, Office of Technology Assessment. (1995b). *Education and technology: future visions, OTA-BP-EHR-169*. Washingtone, DC: U.S. Government Printing Office.

Web Associates. (1993). TENET after one year. *A technical evaluation report from Web Associates*, 4001 Gulf Shore Blvd, N. Suite 804, Naples, Florida, 33940.

Willis, J. (1993). Educational technology issues and innovations. *Computers in the Schools*, 9(4), p.19-21.

Appendix B

Pre-Training Survey

↓ KEEP OVERPRINTING WITHIN THESE LINES ↓

Telecomputing Survey

Purpose: The Internet telecomputing network has an exciting potential for use in the K-12 classroom, and may well be one of the most innovative new technology tools of the information age. Yet very little is known about how to most effectively help teachers to learn to access the full potential of this powerful new tool. The purpose of this survey is to gather some general demographic and attitudinal information from teachers beginning training on this system, so as to better understand the needs of new users, and to assist in the more effective use of the Internet system in education.

Anonymous and Voluntary Participation: All data collected by this survey will be kept in the strictest confidence. No individual data will be reported in any report, and only group information will be analyzed and described. Individuals have the full right to participate or not participate in the survey as desired, without any repercussions of any kind for this decision.

Survey coordinated by: Neal Topp, Neal Grandgenett, UNO, & Nebraska Educational Service Units

Name _____ **Address** _____

E-mail Address: _____ **Phone** (___) _____

Would you be available to complete a follow-up survey or interview related to your Internet use? (Please Circle One) Yes No

Please mark the bubble (only one per item) that best answers the following questions

8 What is your age?
A. Under 30 B. 30-39 C. 40-49 D. 50-59 E. 60 or over

9. How many years have you taught school?
A. 1-5 yrs B. 6-10 yrs C. 11-15 yrs D. 16-20 yrs E. > 20 yrs

10. Approximately how many students per grade are in your school district?
A. < 51 B. 51-100 C. 101-200 D. 201-300 E. > 300

11. Do you have a school Technology Coordinator? (Select only one)
A. No B. Yes District C. Yes Building D. Yes District&Building

12/13 What area are you assigned? (Please select only one)
<--- A. Admin. B. Lang. Arts C. Fine Arts D. For. Lang E. Math

<--- A. Media Sp. B. Science C. Social St. D. Self-contained
E. Other (please specify)_____

14. What grade level are you assigned? (Please select only one)
A. PreK-3 B. 4-6 C. 7-8 D. 9-12 E. K-12

15 What is your gender?
A. Female B. Male

16. What is your degree status at this time?
A. BA/BS B. BA/BS+15 C. Masters D. Masters+15 E. Doctorate

17. How often per month do you use cooperative learning groups in your classroom? (leave blank if this question is not applicable to your situation)
A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

18. How often per month do you have students develop projects ? (leave blank if this question is not applicable to your situation)
A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

19. How often per month do you lecture or demonstrate to your students ? (leave blank if this question is not applicable to your situation)
A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

20. How often per month do you have students use the computer? (leave blank if this question is not applicable to your situation) **(OVER PLEASE)**
A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

SURVEY NUMBER

SURVEY B
Form No 19637

NATIONAL COMPUTER SYSTEMS

Y N

21 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 21. How often per month do you have students research (on their own) a topic? (leave blank if this question is not applicable to your situation)
A. 0 B. 1-2 C. 3-5 D. 6-8 E >8

22 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 22. How often per month do you give students assignments that involves writing (i e process writing)? (leave blank if this question is not applicable)
A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

23 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 23. How often per month do you have students use the library resources at your school? (leave blank if this question is not applicable to your situation)
A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

24 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 24 How fast can you keyboard/type?
A. Very Slowly (< 10 wpm) B. Slowly (10-19 wpm) C. Moderately (20-29 wpm) D. Rapidly (30-40 wpm) E. Very Rapidly > 40 wpm)

25 Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ 25 I enjoy writing.
A. Strongly Disagree B. Disagree C. Undecided D. Agree E Strongly Agree

26 26 I enjoy speaking in public (outside of classroom teaching)
A. Strongly Disagree B. Disagree C. Undecided D. Agree E. Strongly Agree

27. I enjoy using computers.
A. Strongly Disagree B Disagree C. Undecided D. Agree E Strongly Agree

28 Computers are very important to the future of education
A ngly Disagree B. Disagree C. Undecided D. Agree E Strongly Agree

We would like you to rate your current proficiency in using the following computer-related technologies. Using the following scale, please mark the bubble that best describes your proficiency in using each item.

A	Unfamiliar - do not know what this item is
B	Low - little or no skill
C	Medium - some proficiency, could use some advanced training
D	High - very proficient, use regularly

		Unfamiliar	Low	Med	High
31.	Problem solving / Higher order thinking	A	B	C	D
32.	Word processing	A	B	C	D
33.	Databases and/or Spreadsheets	A	B	C	D
34.	Programming (e.g. Logo, Basic, Pascal)	A	B	C	D
35.	Hypermedia (e.g , Hypercard, Hyperstudio, Linkway)	A	B	C	D
36	CD ROM	A	B	C	D
37.	Video Disc	A	B	C	D
38.	Telecommunications	A	B	C	D

- How do you plan to use the Internet either for yourself or your students? _____
- Do you know of anyone we should contact that is using Internet in innovative ways in their classroom? If so, please write their name and school. _____

DO NOT PRINT IN THIS AREA

Appendix C

Post-Training Survey

Nebraska Internet Survey
6 Month Follow-Up #2 – May 1995

PURPOSE: The Internet telecomputing network has an exciting potential for use in the K-12 classroom, and may be one of the most innovative technology tools of the information age. Yet very little is known about how to most effectively help teachers to learn to access the full potential of this powerful new tool. The purpose of this survey is to gather some information from educators who have had some training on this system, so as to better understand the needs of users, and to assist in the more effective use of the Internet system in education. This information may be very important to the future of Internet in Nebraska schools.

ANONYMOUS AND VOLUNTARY PARTICIPATION: All data collected by this survey will be kept in the strictest confidence. No individual data will be reported in any report, and only group information will be analyzed and described. Individuals have the full right to participate or not participate in the survey as desired, without any repercussions of any kind for this decision. This survey is coordinated by Dr. Neal Topp, Dr. Neal Grandgenett, University of Nebraska at Omaha, & the Nebraska Educational Service Units.
E-Mail: k12eval@unomaha.edu

Please mail your completed survey in the enclosed envelope. This survey will take from 10-15 minutes to complete. Thank you very much for your response.

Your Name (optional) _____ **ESU #** _____

Your E-Mail Address (optional)_____

Please select **ONE** response for each item.

1) What response best describes your current position? (Select one)
A. Teacher B. Administrator C. Technology Coordinator D. Media Specialist E. Support Staff

2) Approximately how many months ago were you trained to use the Internet?
A. 0-2 B. 3-5 C. 6-8 D. 9-11 E. 12 or more

3) How is your school building connected to the Internet?
A. Modem
B. Direct Connection
C. Both Modem and Direct Connection
D. School is Not Connected

4) How many school Internet-connected computers are available to you personally at least once per day?
A. 0 B. 1 C. 2 D. 3 E. 4 or more

5) Approximately how many STUDENTS are in your building?
A. Less than 100 B. 100-199 C. 200-399 D. 400-799 E. 800 or more

6) How many Internet-connected computers are available to STUDENTS in your building?
A. 0 B. 1 C. 2-5 D. 5-10 E. More than 10

7) Of the Internet-connected computers in your building, how many are available to <u>your</u> STUDENTS at least twice per week?

A. 0 B. 1 C. 2-5 D. 5-10 E. More than 10

8) Have you had your STUDENTS use the Internet?

A. Yes B. No

9) If not, why not? (select the most important reason)

A. An Internet-connected computer is not available
B. The Internet system is too difficult to use
C. I have no one to answer my questions
D. The Internet is of little value in my classes
E. Other (please specify) _____

10) Rate your principal's support of the use of Internet with your students?

A. Strongly Encourages B. Encourages C. Neutral D. Discourages E. Strongly Discourages

11) If you had questions about using the Internet, who would you ask for help? (Please select the most likely person)

A. Another Teacher
B. Technology Coordinator
C. Media Specialist
D. Student
E. ESU Personnel

12) How long ago did you <u>last</u> use the Internet?

A. < 1 month B. 1-2 months C. 3-4 months D. 5-6 months E. over 6 months

13) Approximately how often do YOU personally use the Internet at school?

A. Once per day B. Once per week C. Twice per month D. Once per month E. Never

14) Approximately how often do YOU personally use the Internet at home?

A. Once per day B. Once per week C. Twice per month D. Once per month E. Never

15) Approximately how often do YOU use e-mail?

A. Once per day B. Once per week C. Twice per month D. Once per month E. Never

16) Approximately how often do YOU use telnet?

A. Once per day B. Once per week C. Twice per month D. Once per month E. Never

17) Approximately how often do YOU use gopher?

A. Once per day B. Once per week C. Twice per month D. Once per month E. Never

18) Approximately how often do YOU use ftp (file transfer protocol)?

A. Once per day B. Once per week C. Twice per month D. Once per month E. Never

19) Approximately how often do YOU use World Wide Web? (i.e.-Mosaic, Netscape, Lynx, MacWeb)

A. Once per day B. Once per week C. Twice per month D. Once per month E. Never

20) Approximately how often do you have your STUDENTS use e-mail?
A. Once per day B. Once per week C. Twice per month D. Once per month E. Never

21) Approximately how often do you have your STUDENTS use telnet?
A. Once per day B. Once per week C. Twice per month D. Once per month E. Never

22) Approximately how often do you have your STUDENTS use gopher?
A. Once per day B. Once per week C. Twice per month D. Once per month E. Never

23) Approximately how often do you have your STUDENTS use ftp (file transfer protocol)?
A. Once per day B. Once per week C. Twice per month D. Once per month E. Never

24) Approximately how often do you have your STUDENTS use the World Wide Web? (i.e.-Mosaic, Netscape, Lynx, MacWeb)
A. Once per day B. Once per week C. Twice per month D. Once per month E. Never

25) Do you plan on using the Internet much more within the next 6 months?
A. Yes B. No

26) What needs to change if you PERSONALLY are going to use the Internet significantly more in the future?

---

27) Do you plan on having your STUDENTS use the Internet significantly more within the next 6 months?
A. Yes B. No

28) What needs to change if YOU are going to have your STUDENTS use the Internet much more in the future?

---

29) In your opinion, which Internet application has the most potential for you as a TEACHER? (Please select one response)
A. E-Mail
B. Telnet
C. Gopher
D. File Transfer Protocol (FTP)
E. World Wide Web (i.e.-Mosaic, Netscape, Lynx, MacWeb)

30) In your opinion, which Internet application has the most potential for your STUDENTS? (Please select one response)
A. E-Mail
B. Telnet
C. Gopher
D. File Transfer Protocol (FTP)
E. World Wide Web (i.e.-Mosaic, Netscape, Lynx, MacWeb)

31) How do YOU plan to use the Internet for yourself in the future? (Select the most important use)
A. I don't plan on using the Internet
B. For communication (e-mail, conferencing, etc.)
C. For information gathering
D. For information sharing

32) How will your STUDENTS use Internet in the future? (Select the most important use)

A. I don't plan on having my students use the Internet
B. For communication (e-mail, conferencing, etc.)
C. For information gathering
D. For information sharing

33) Do you have a World Wide Web Server in your building?

A. Yes B. No C. No, but we are planning on setting one up within 6 months

34) How often per month do you use cooperative learning groups in your classroom? (leave blank if this question is not applicable to your situation)

A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

35) How often per month do you have students develop projects ? (leave blank if this question is not applicable to your situation)

A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

36) How often per month do you lecture or demonstrate to your students ? (leave blank if this question is not applicable to your situation)

A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

37) How often per month do you have students use the computer? (leave blank if this question is not applicable to your situation)

A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

38) How often per month do you have students research (on their own) a topic? (leave blank if this question is not applicable to your situation)

A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

39) How often per month do you give students assignments that involves writing (i.e. process writing)? (leave blank if this question is not applicable)

A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

40) How often per month do you have students use the library resources at your school? (leave blank if this question is not applicable to your situation)

A. 0 B. 1-2 C. 3-5 D. 6-8 E. >8

41) I enjoy writing.

A. Strongly Agree B. Agree C. Undecided D. Disagree E. Strongly Disagree

42) I enjoy speaking in public (outside of classroom teaching).

A. Strongly Agree B. Agree C. Undecided D. Disagree E. Strongly Disagree

43) I enjoy using computers.

A. Strongly Agree B. Agree C. Undecided D. Disagree E. Strongly Disagree

44) Computers are very important to the future of education.

A. Strongly Agree B. Agree C. Undecided D. Disagree E. Strongly Disagree

Again, thank you very much for your participation.

Internet Studies Office, College of Education, UNO, Omaha, NE 68182-0163

ELECTRONIC MAIL VERSION

Nebraska Internet Survey
6 Month Follow-Up #2
April 1995

Please respond to this survey by using the REPLY function of your e-mail.

PURPOSE: The Internet telecomputing network has an exciting potential for use in the K-12 classroom, and may be one of the most innovative technology tools of the information age. Yet very little is known about how to most effectively help teachers to learn to access the full potential of this powerful new tool. The purpose of this survey is to gather some information from you teachers who have had some training on this system, so as to better understand the needs of users, and to assist in the more effective use of the Internet system in education. This information may be very important to the future of Internet in Nebraska schools.

ANONYMOUS AND VOLUNTARY PARTICIPATION: All data collected by this survey will be kept in the strictest confidence. No individual data will be reported in any report, and only group information will be analyzed and described. Individuals have the full right to participate or not participate in the survey as desired, without any repercussions of any kind for this decision.

Survey coordinated by: Neal Topp, Neal Grandgenett, UNO, & Nebraska Educational Service Units--
e-mail k12eval@unomaha.edu

Please respond to this survey by using the REPLY function of your e-mail. Indicate your response by placing an X before the appropriate item.

This survey will take from 10-15 minutes to complete. Thank you very much for your response.

Please select ONE response for each item.

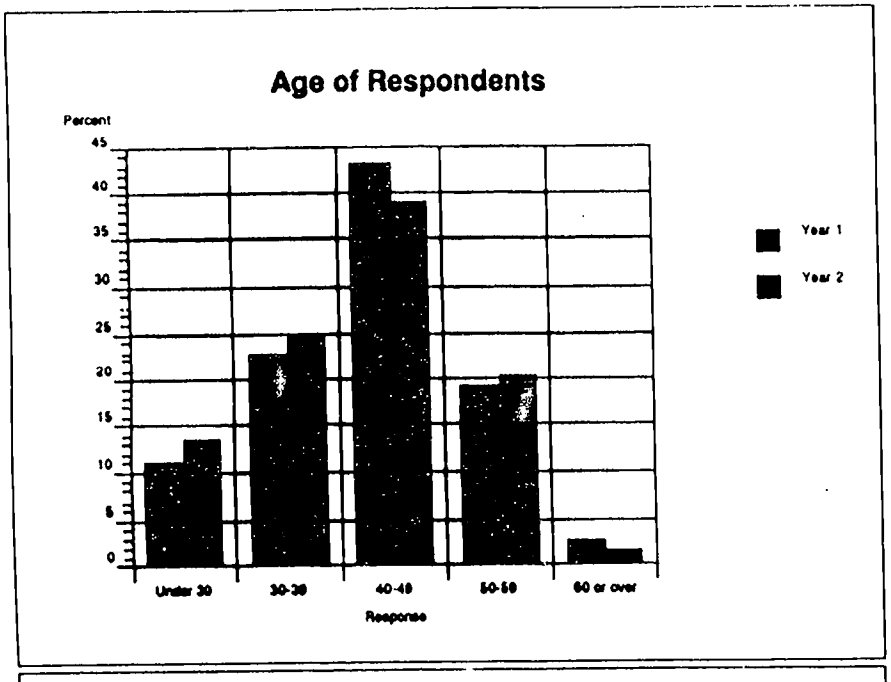
1) What response best describes your current position? (Select one)

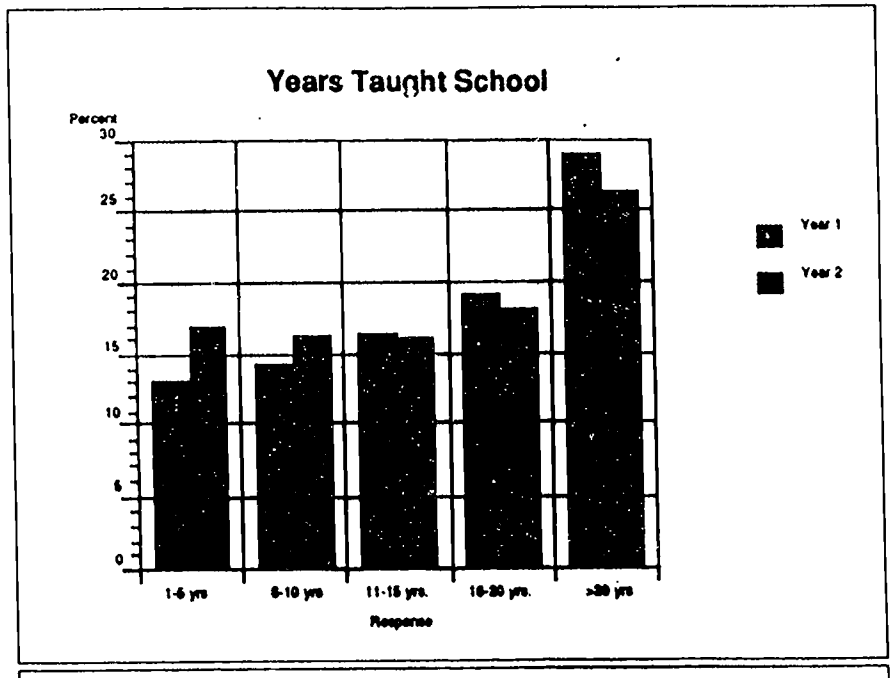
A. Teacher
B. Administrator
C. Technology Coordinator (no teaching)
D. Media Specialist
E. Support Staff

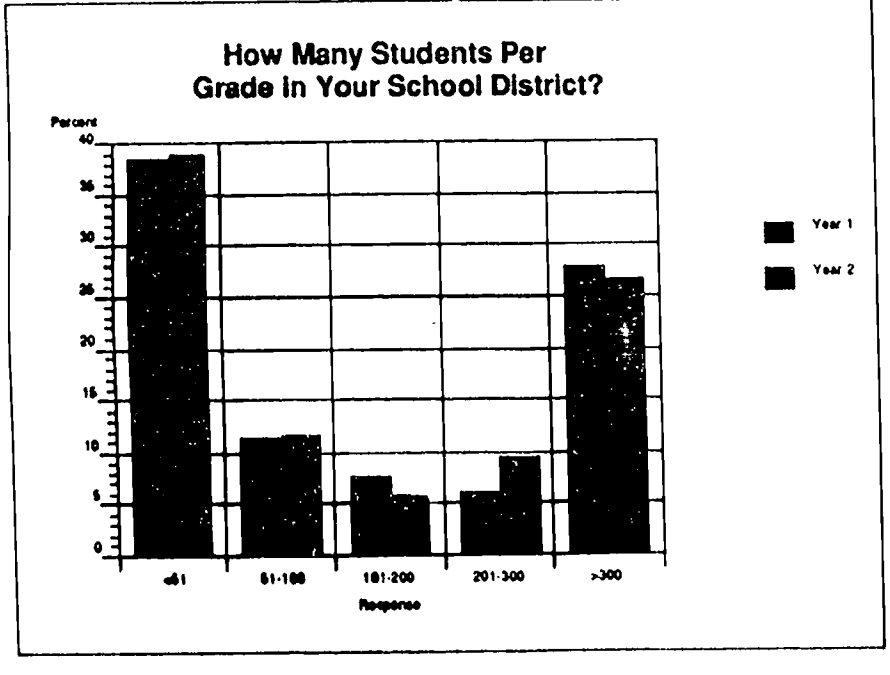
The rest of the survey is similar to the U.S. Mail version. To save duplication costs, the rest of the survey is omitted.

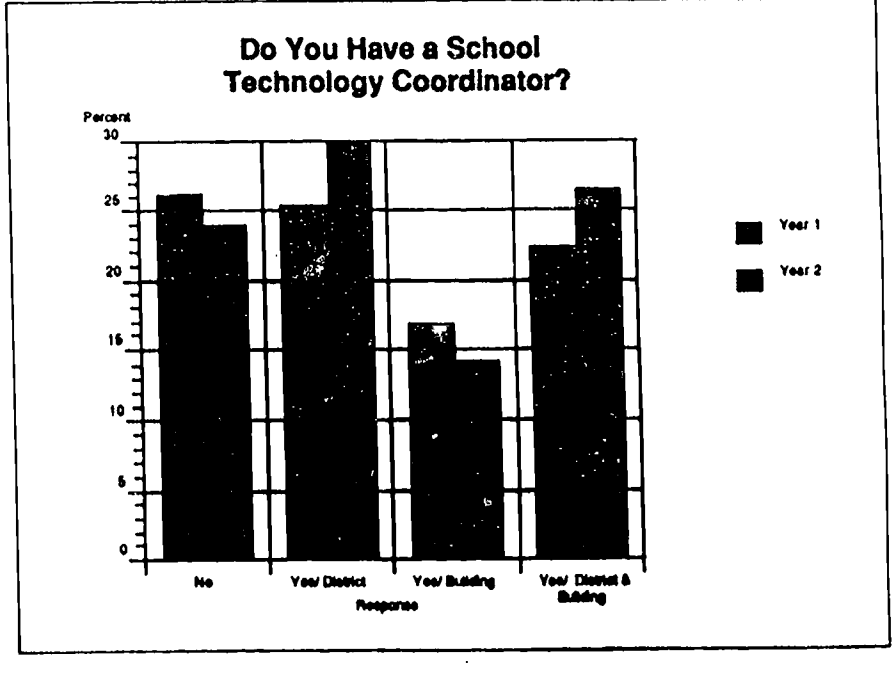
Appendix D

Pre-Training Survey Graphs

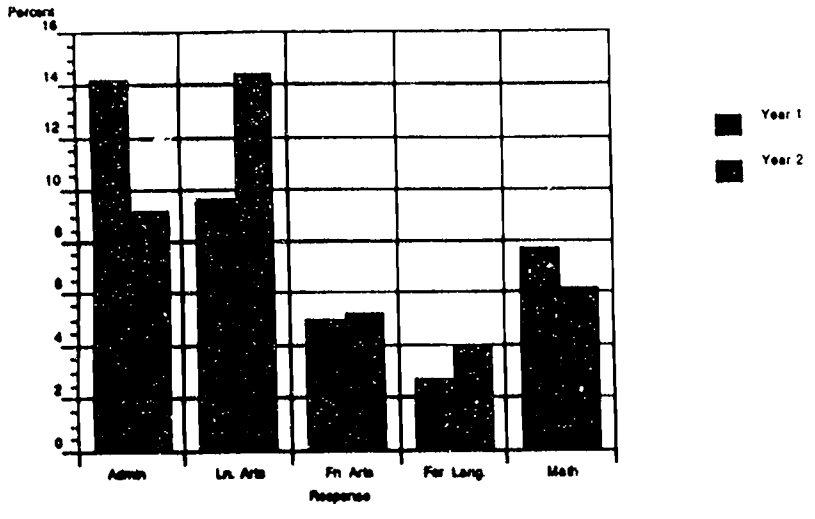

Age of Respondents
Percent
45
40
35
30
25
20
15
10
5
0
Under 30
30-39
40-49
50-59
60 or over
Response
Year 1
Year 2


Years Taught School
Percent
30
25
20
15
10
5
0
1-5 yrs
6-10 yrs
11-15 yrs.
16-20 yrs.
>20 yrs
Response
Year 1
Year 2

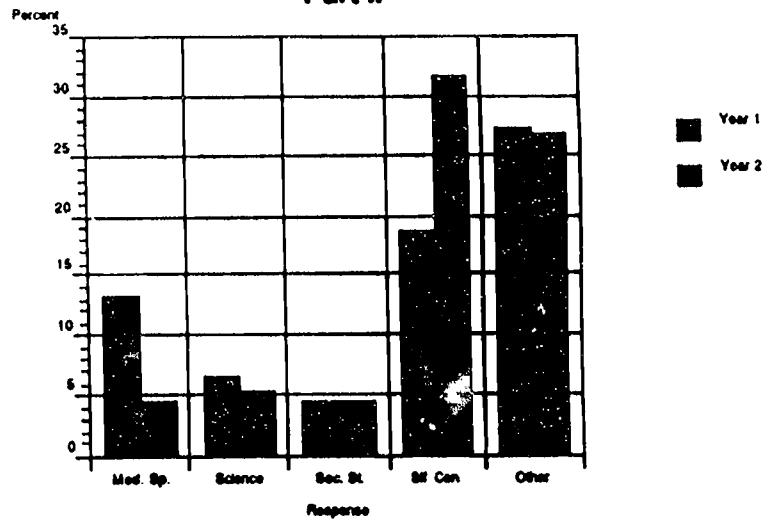

How Many Students Per
Grade In Your School District?
Percent
40
35
30
25
20
15
10
5
0
<51
51-100
101-200
201-300
>300
Response
Year 1
Year 2


Do You Have a School
Technology Coordinator?
Percent
30
25
20
15
10
5
0
No
Yes/ District
Yes/ Building
Yes/ District &
Building
Response
Year 1
Year 2

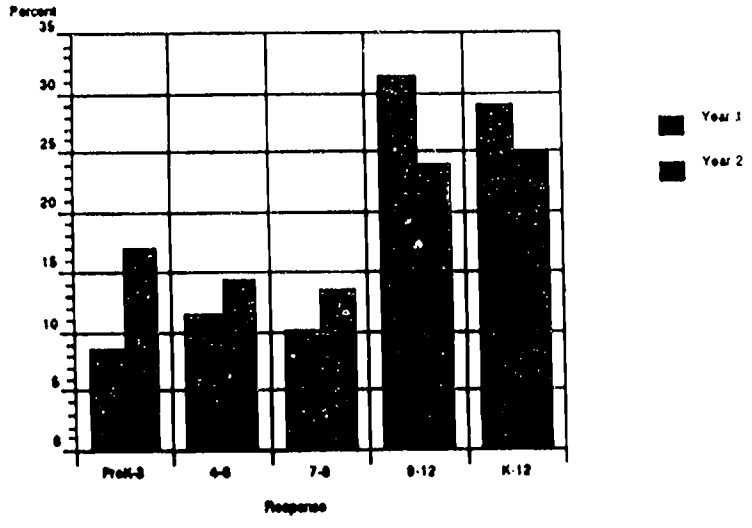
What Area Are You Assigned? Part I



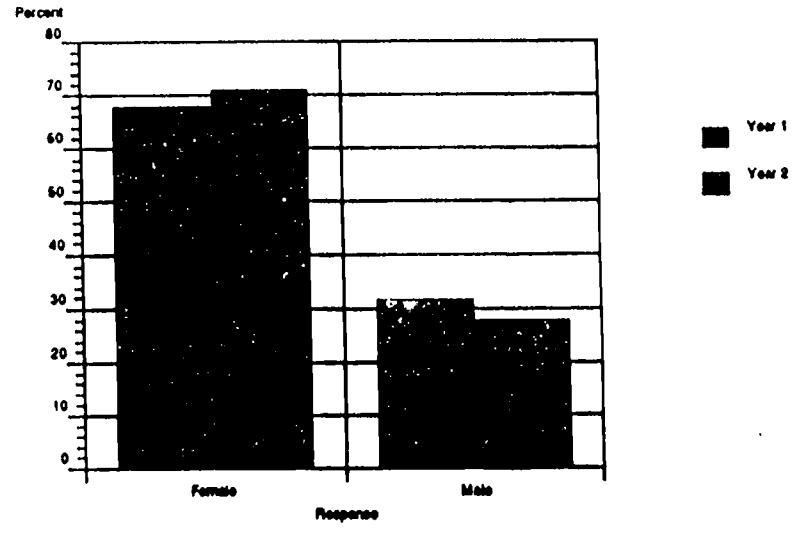
What Area Are You Assigned? Part II



What Grade Level Are you Assigned?

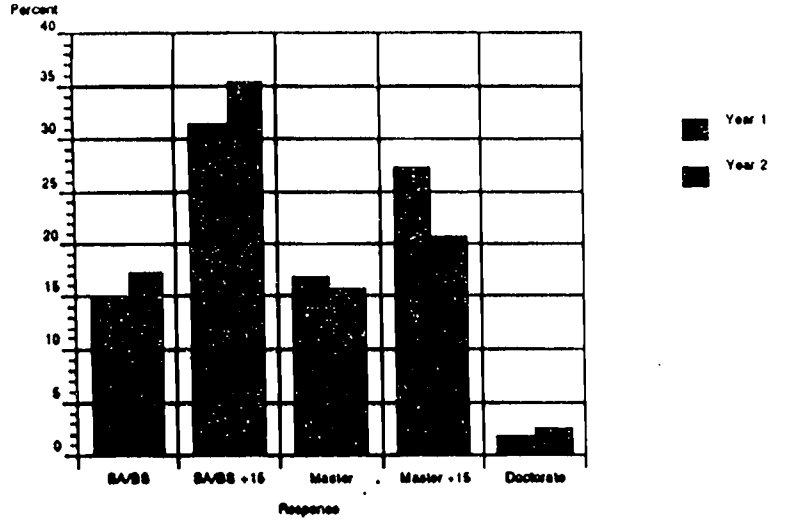


Gender of Respondent

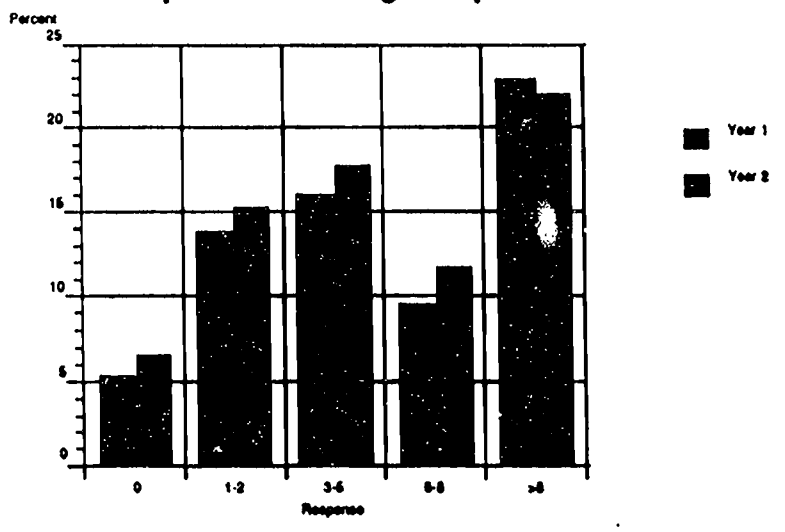


55

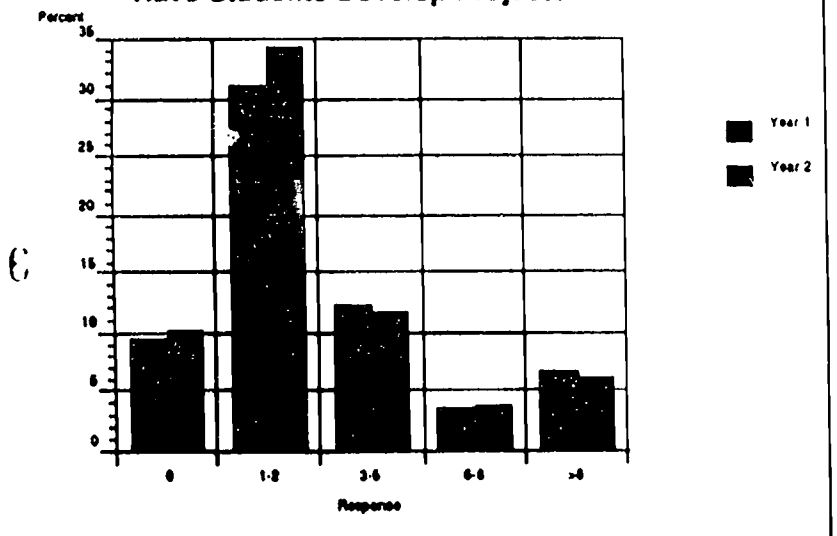
What is Your Degree Status?



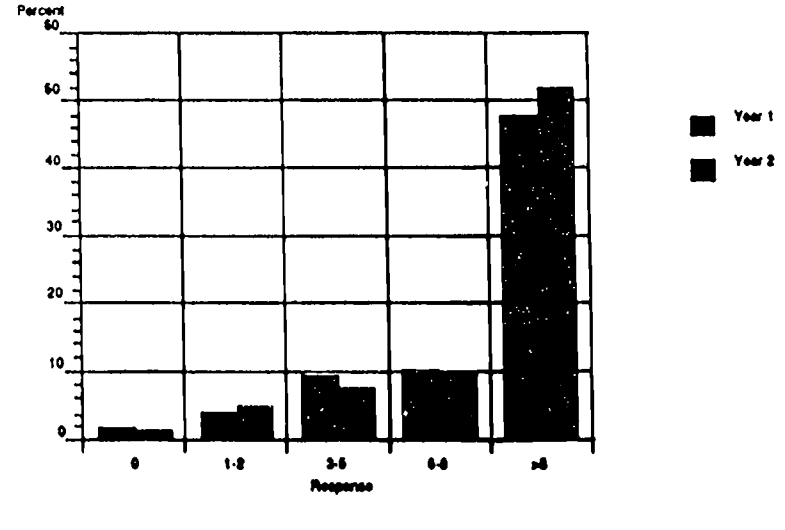
How Often Per Month Do You Use Cooperative Learning Groups?

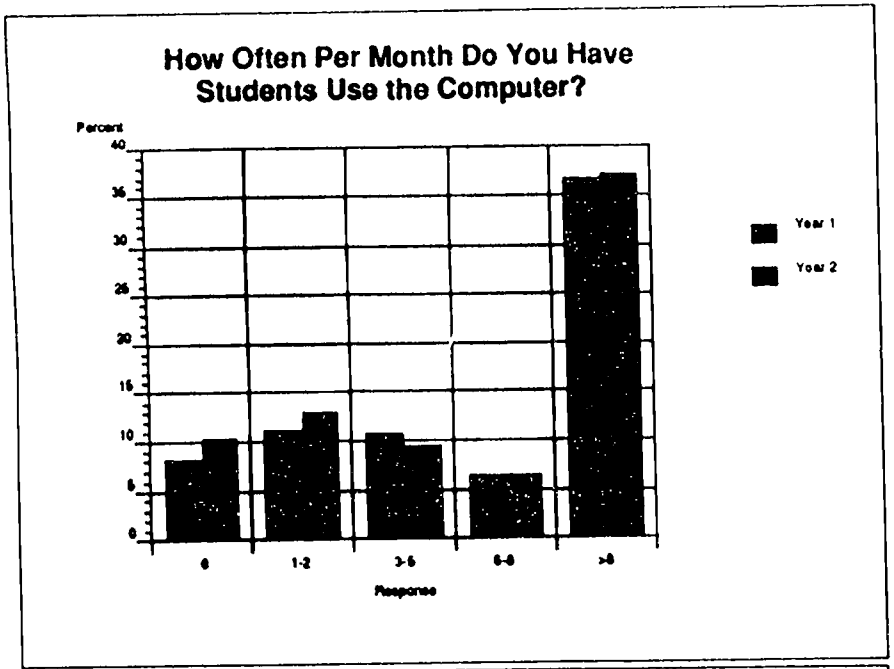


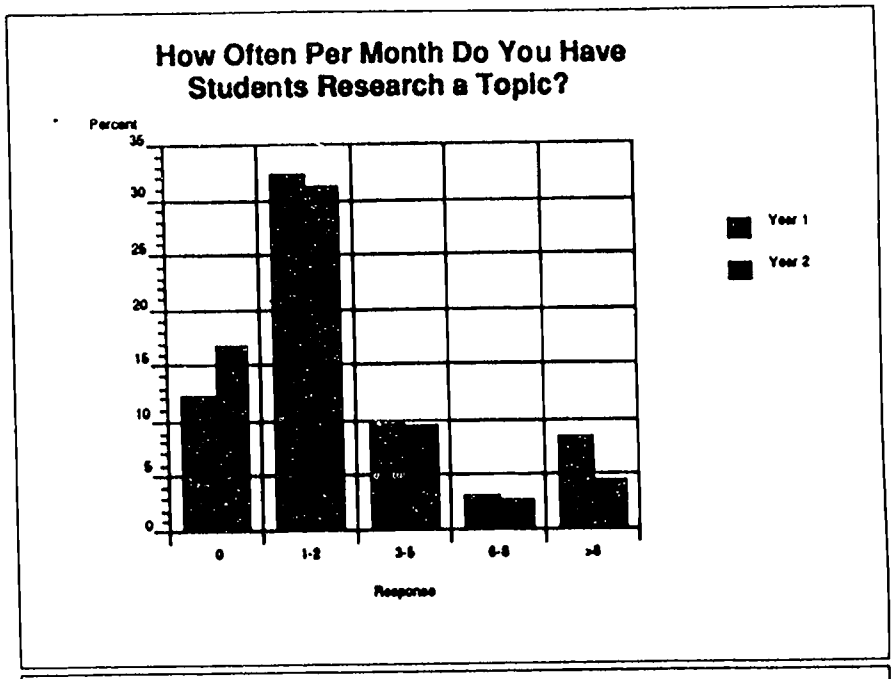
How Often Per Month Do You Have Students Develop Projects?

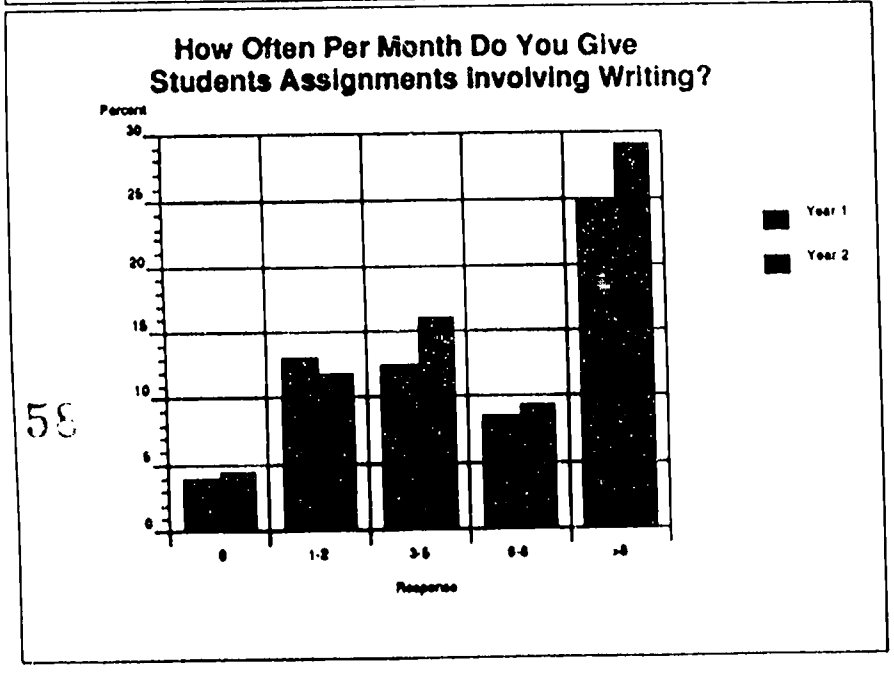


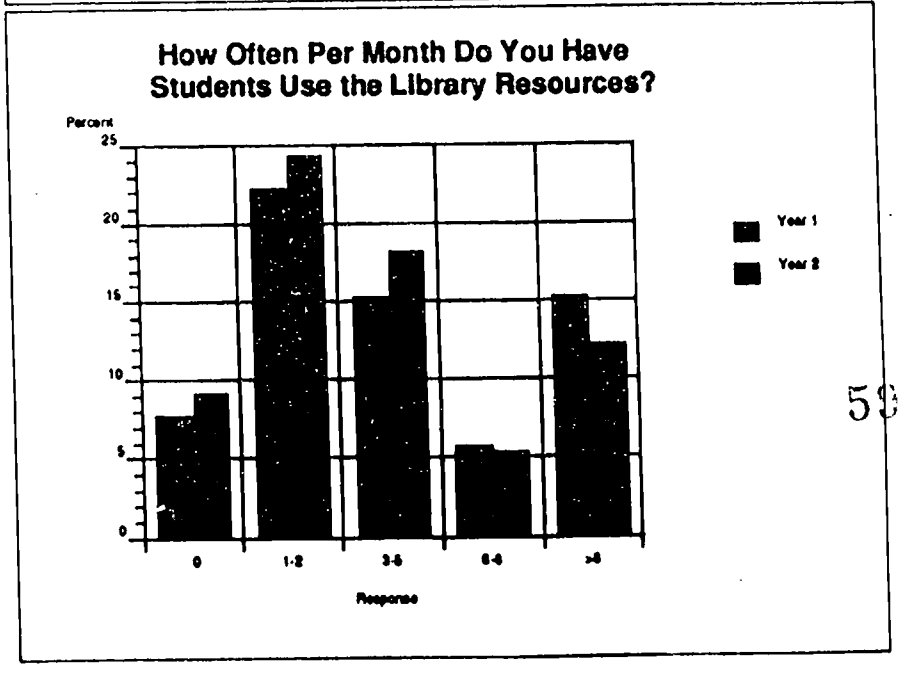
How Often Per Month Do You Lecture or Demonstrate to Your Students?

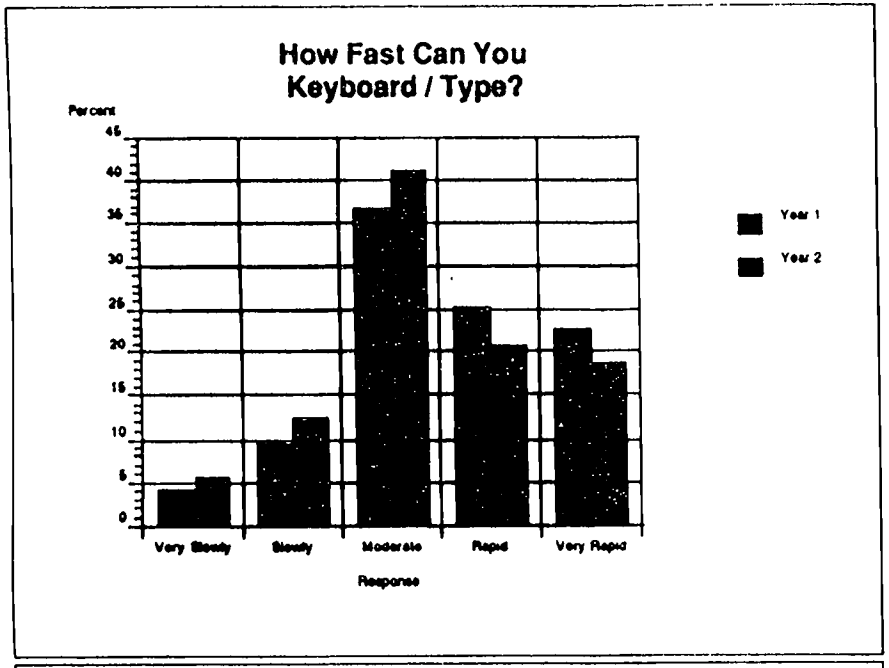


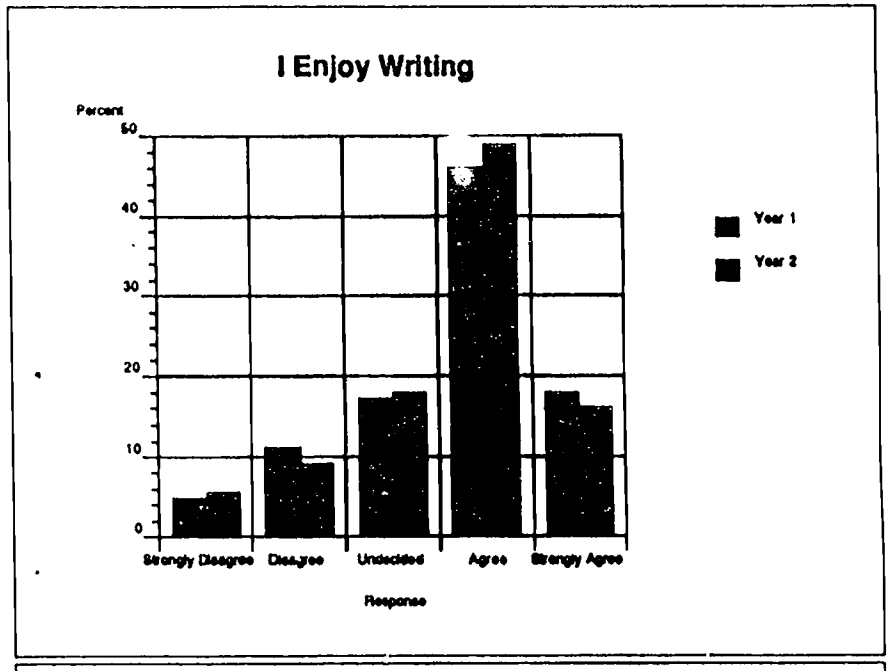

How Often Per Month Do You Have Students Use the Computer?
Percent
40
35
30
25
20
15
10
5
0
0
1-2
3-5
6-8
>8
Response
Year 1
Year 2

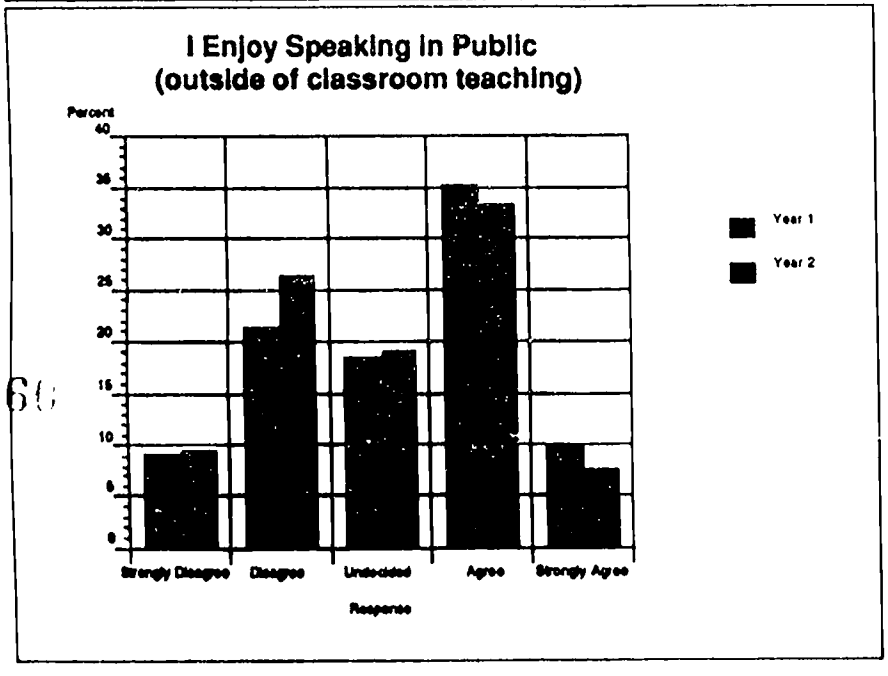

How Often Per Month Do You Have Students Research a Topic?
Percent
35
30
25
20
15
10
5
0
0
1-2
3-5
6-8
>8
Response
Year 1
Year 2

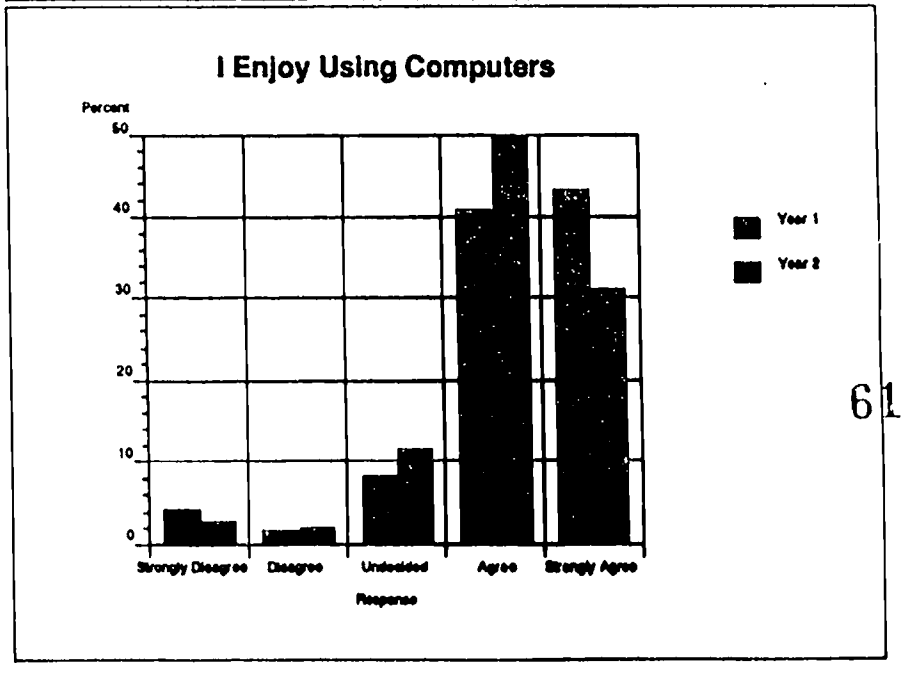

How Often Per Month Do You Give Students Assignments Involving Writing?
Percent
30
25
20
15
10
5
0
0
1-2
3-5
6-8
>8
Response
Year 1
Year 2

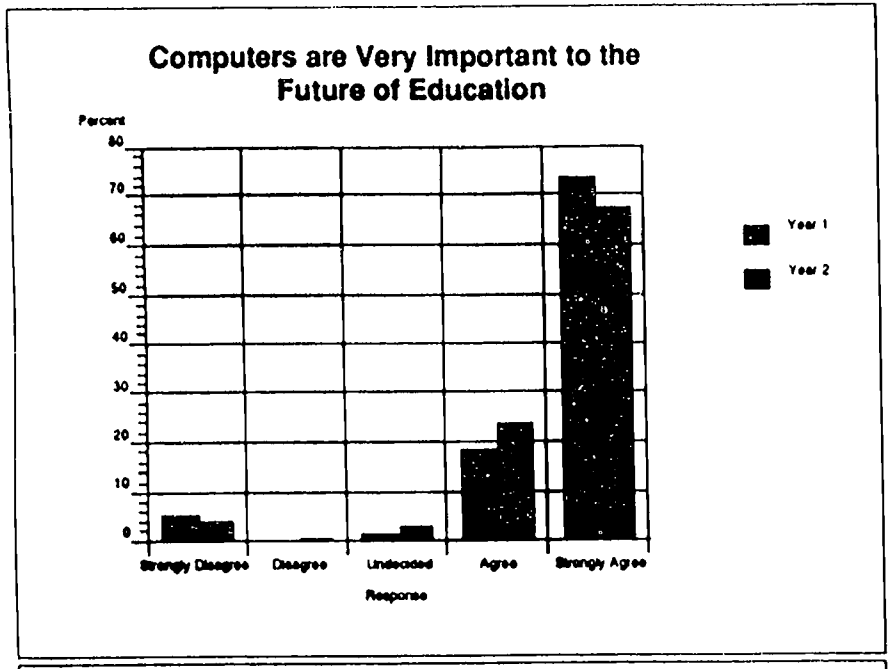

How Often Per Month Do You Have Students Use the Library Resources?
Percent
25
20
15
10
5
0
0
1-2
3-5
6-8
>8
Response
Year 1
Year 2

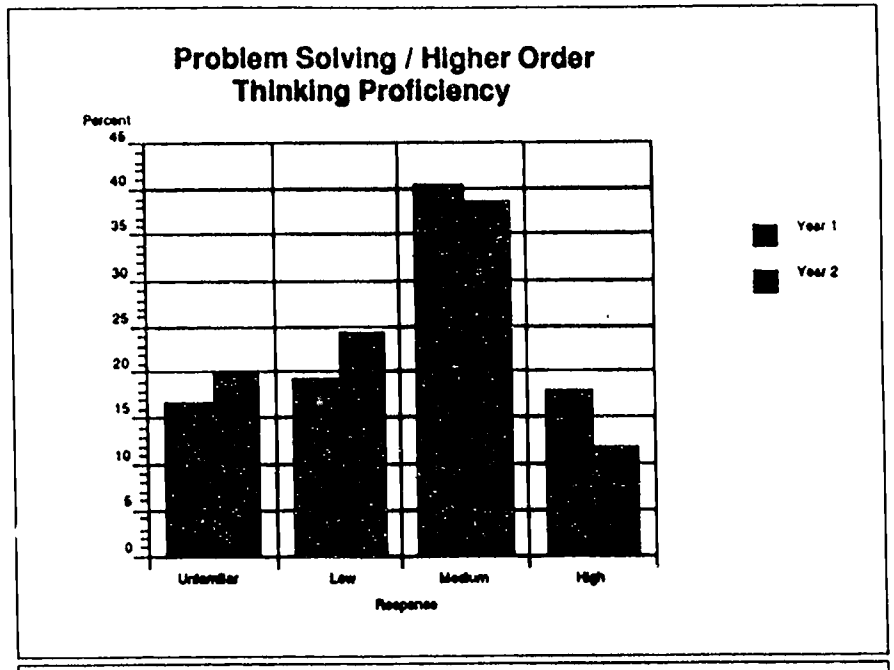

How Fast Can You Keyboard / Type?
Percent
45
40
35
30
25
20
15
10
5
0
Very Slowly
Slowly
Moderate
Rapid
Very Rapid
Response
Year 1
Year 2

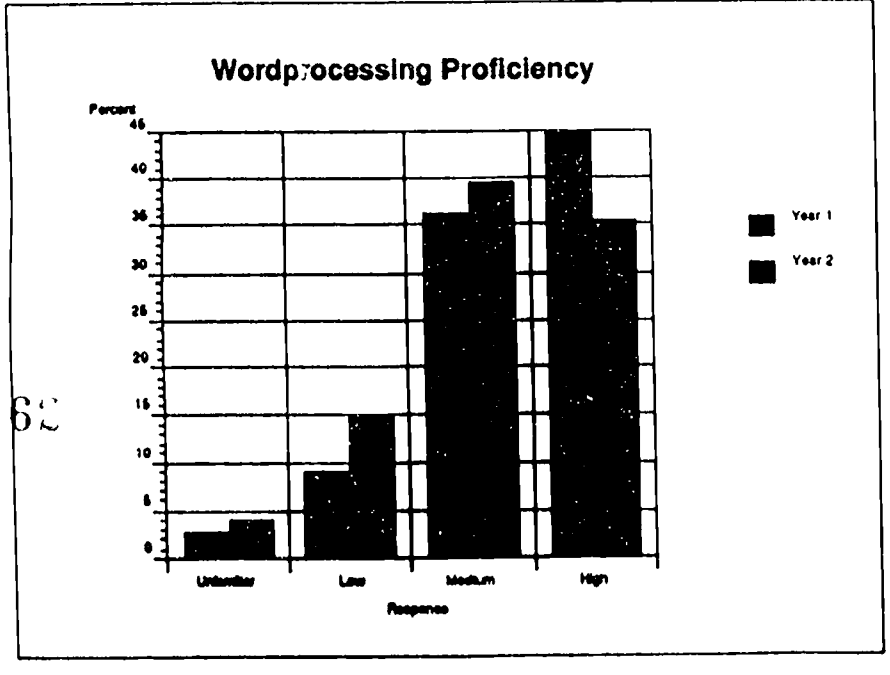

I Enjoy Writing
Percent
50
40
30
20
10
0
Strongly Disagree
Disagree
Undecided
Agree
Strongly Agree
Response
Year 1
Year 2

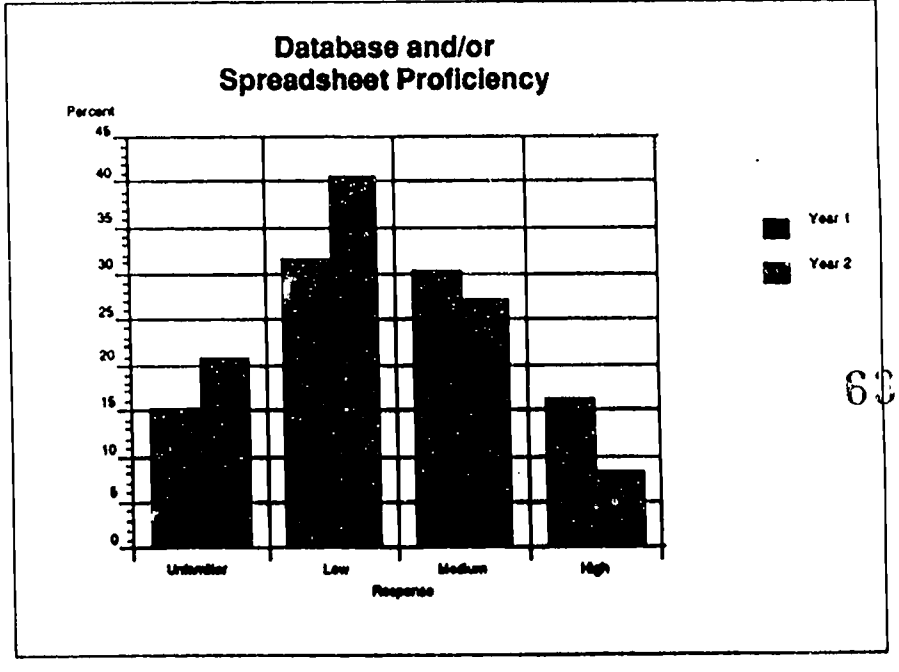

I Enjoy Speaking in Public (outside of classroom teaching)
Percent
40
35
30
25
20
15
10
5
0
Strongly Disagree
Disagree
Undecided
Agree
Strongly Agree
Response
Year 1
Year 2

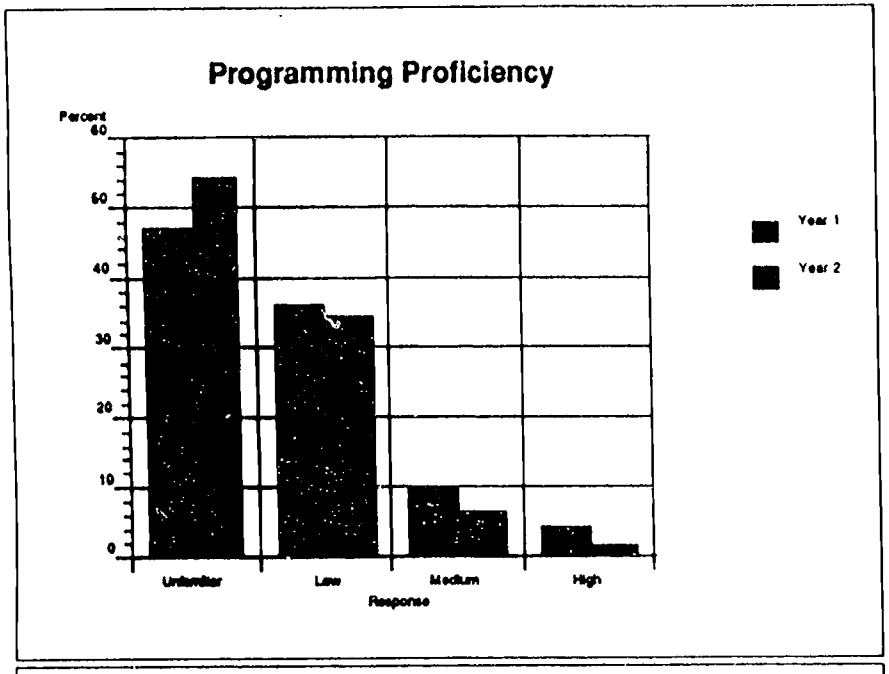

I Enjoy Using Computers
Percent
50
40
30
20
10
0
Strongly Disagree
Disagree
Undecided
Agree
Strongly Agree
Response
Year 1
Year 2

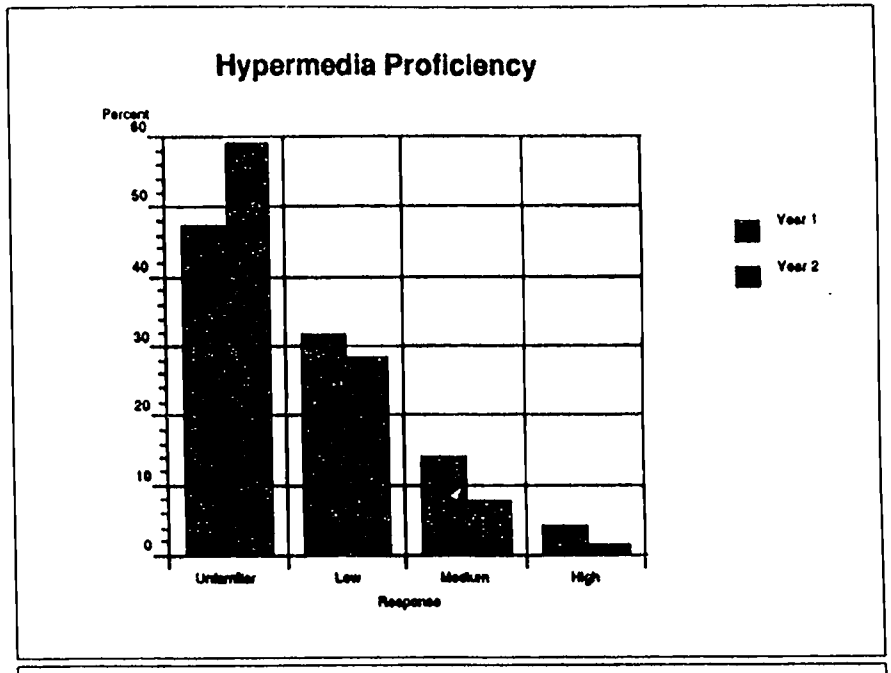

Computers are Very Important to the Future of Education
Percent
80
70
60
50
40
30
20
10
0
Strongly Disagree
Disagree
Undecided
Agree
Strongly Agree
Response
Year 1
Year 2

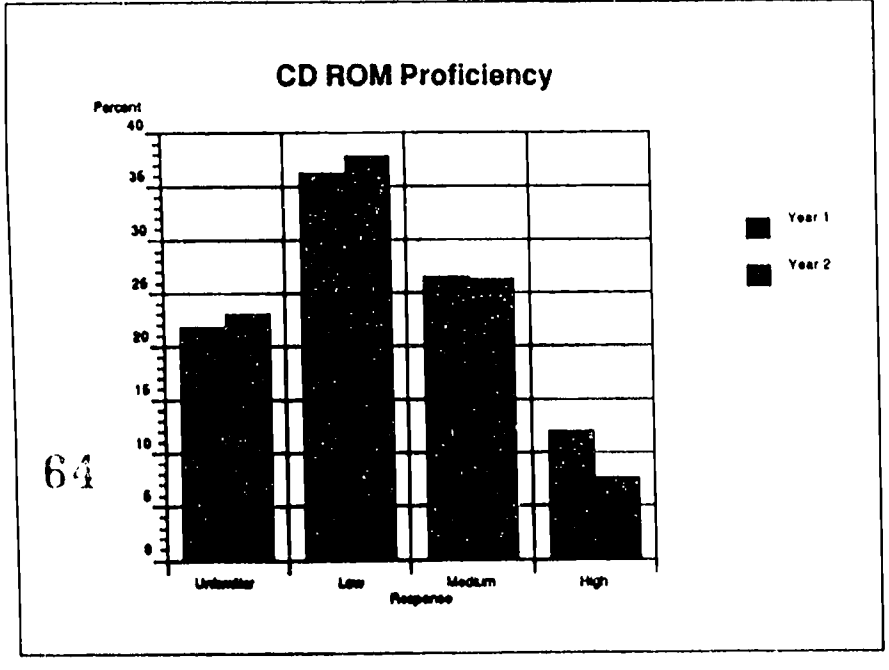

Problem Solving / Higher Order Thinking Proficiency
Percent
45
40
35
30
25
20
15
10
5
0
Response
Year 1
Year 2

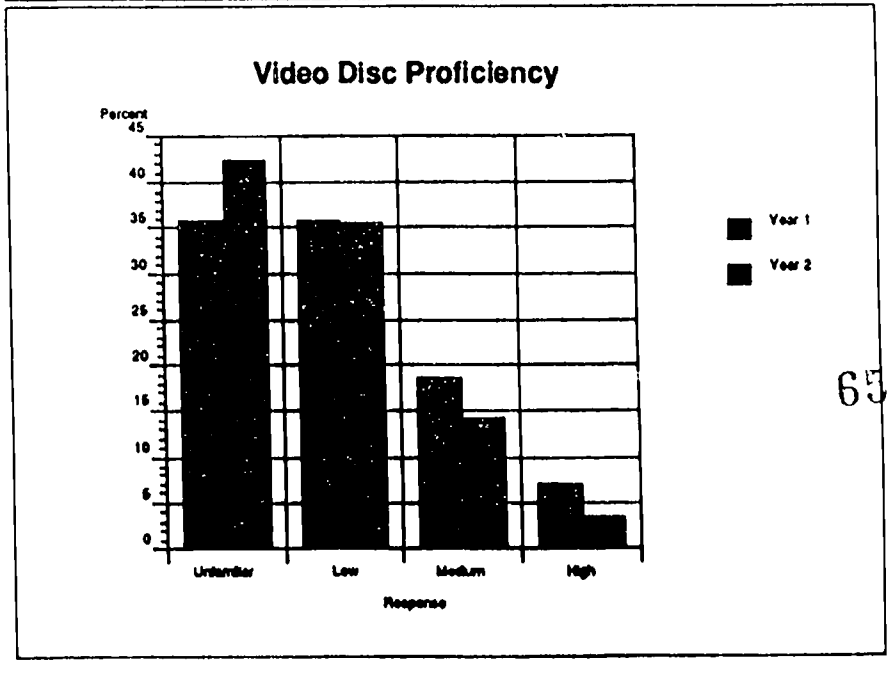

Wordprocessing Proficiency
Percent
45
40
35
30
25
20
15
10
5
0
Response
Year 1
Year 2

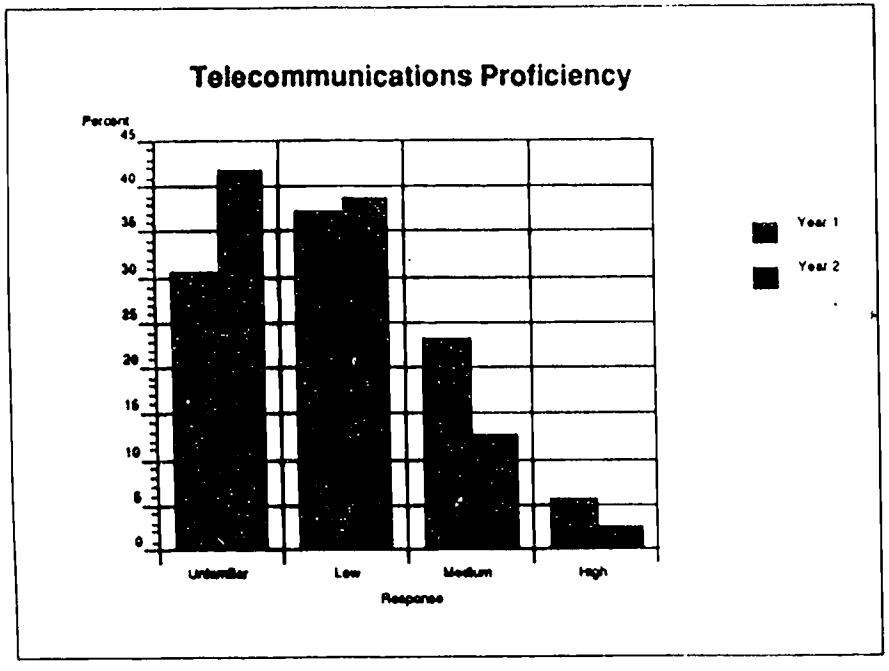

Database and/or Spreadsheet Proficiency
Percent
45
40
35
30
25
20
15
10
5
0
Response
Year 1
Year 2


Programming Proficiency
Percent
60
50
40
30
20
10
0
Unfamiliar
Low
Medium
High
Response
Year 1
Year 2


Hypermedia Proficiency
Percent
60
50
40
30
20
10
0
Unfamiliar
Low
Medium
High
Response
Year 1
Year 2


CD ROM Proficiency
Percent
40
35
30
25
20
15
10
5
0
Unfamiliar
Low
Medium
High
Response
Year 1
Year 2

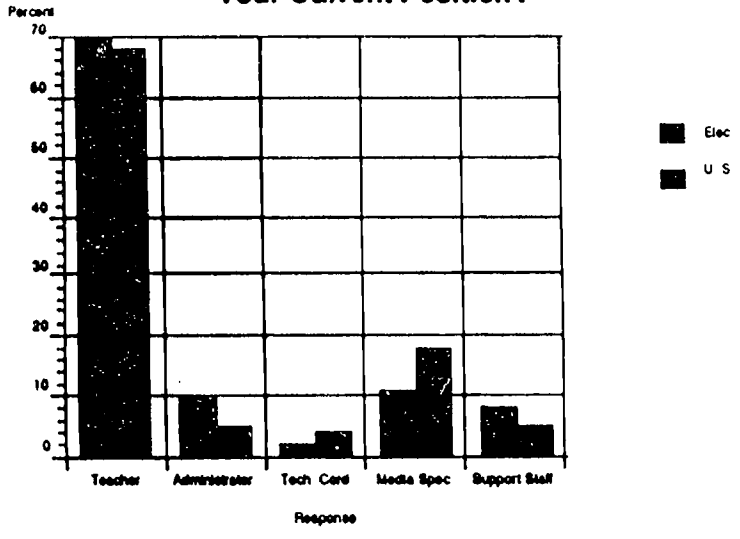

Video Disc Proficiency
Percent
45
40
35
30
25
20
15
10
5
0
Unfamiliar
Low
Medium
High
Response
Year 1
Year 2


Telecommunications Proficiency
Percent
45
40
35
30
25
20
15
10
5
0
Year 1
Year 2
Low
Medium
High
Response

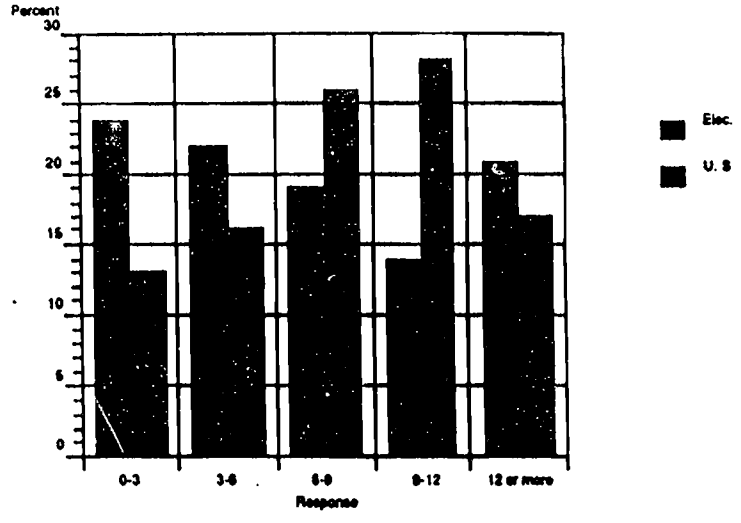
Appendix E

Post-Training Survey Graphs

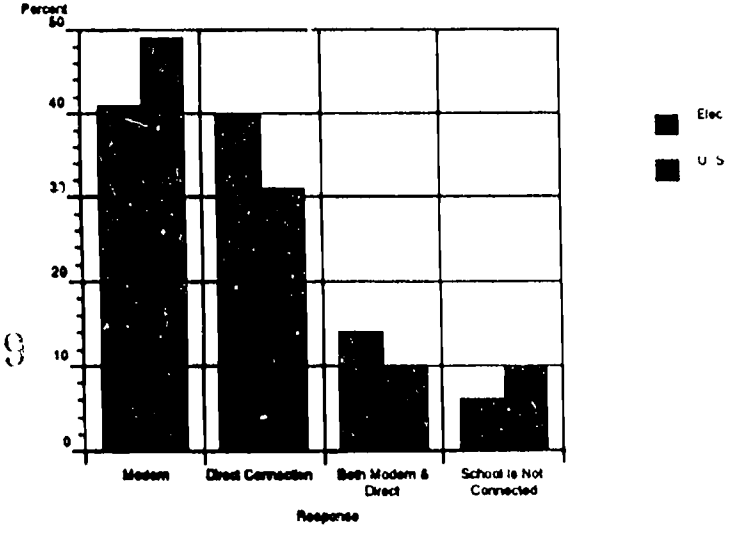
What Response Best Describes Your Current Position?



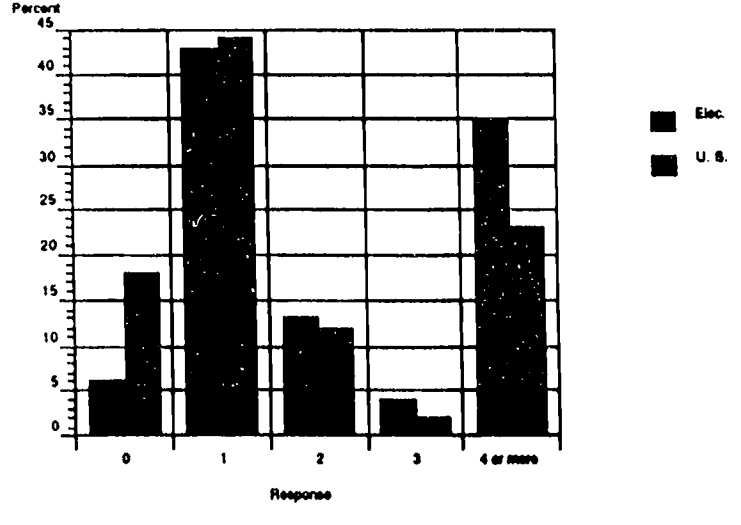
How Many Months Have You Used the Internet?



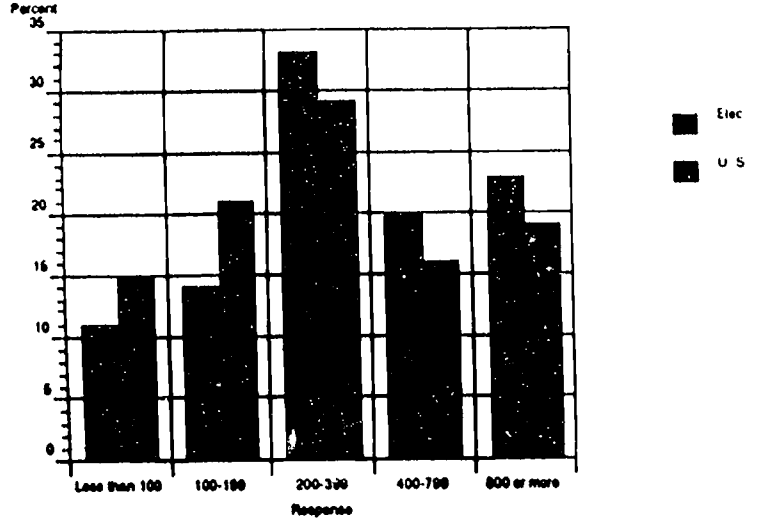
How is Your Building Connected to the Internet?



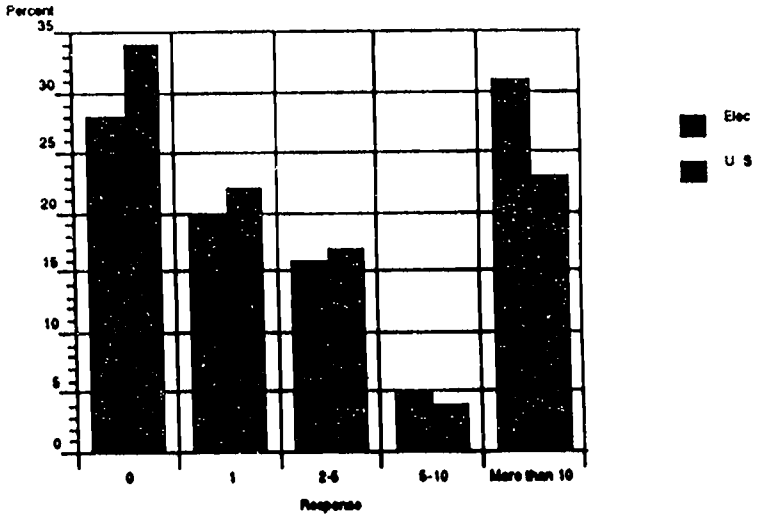
How Many Internet- Connected Computers Are Available to You Personally?



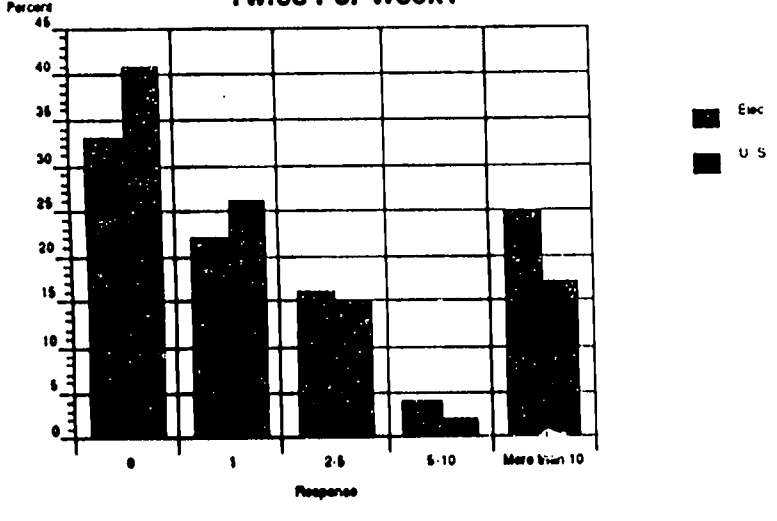
How Many Students Are in Your Building?



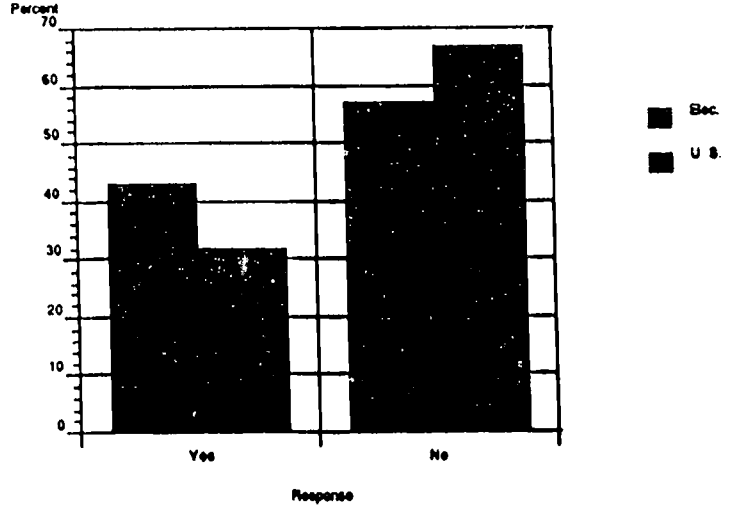
How Many Internet- Connected Computers Are Available to Students?



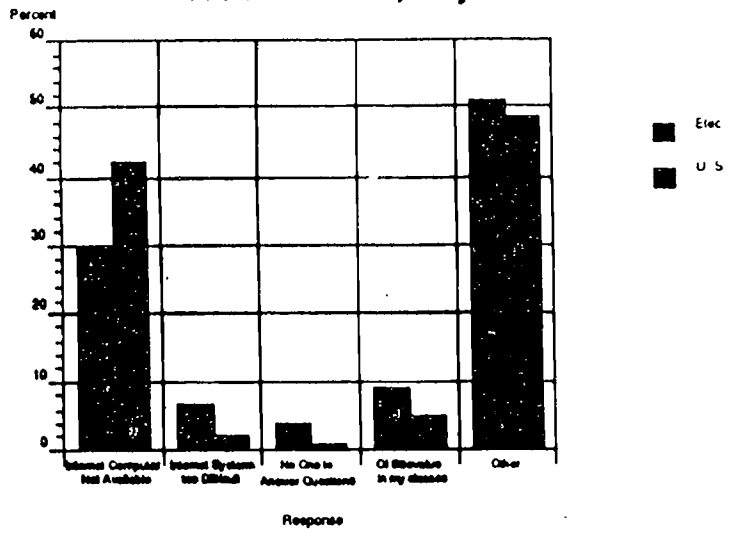
Of the Internet- Connected Computers, How Many Are Available to Your Students Twice Per Week?



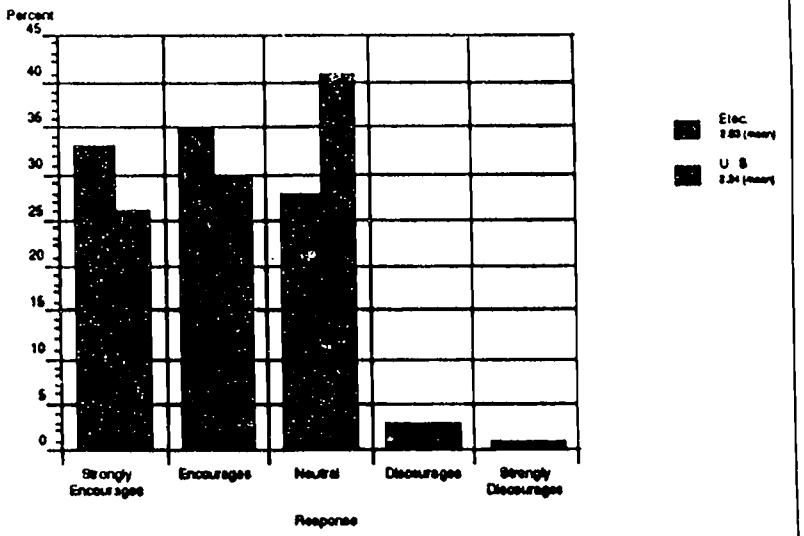
Have You Had Your Students Use the Internet?



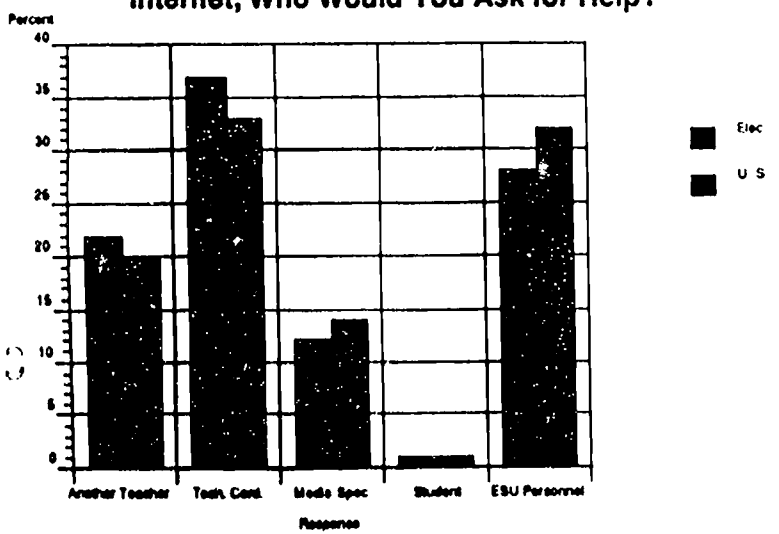
If You Have Not Had Your Students Use the Internet, Why Not?



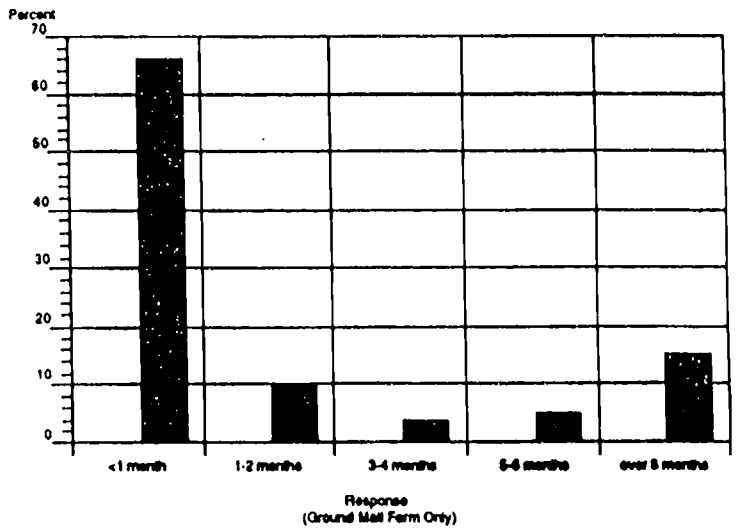
Principal's Support of Student Internet Use

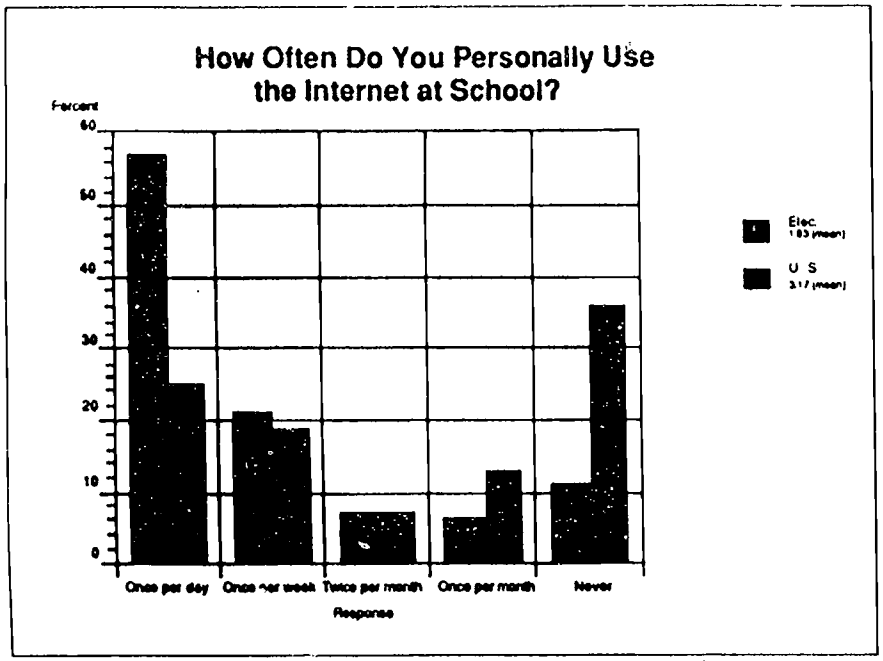


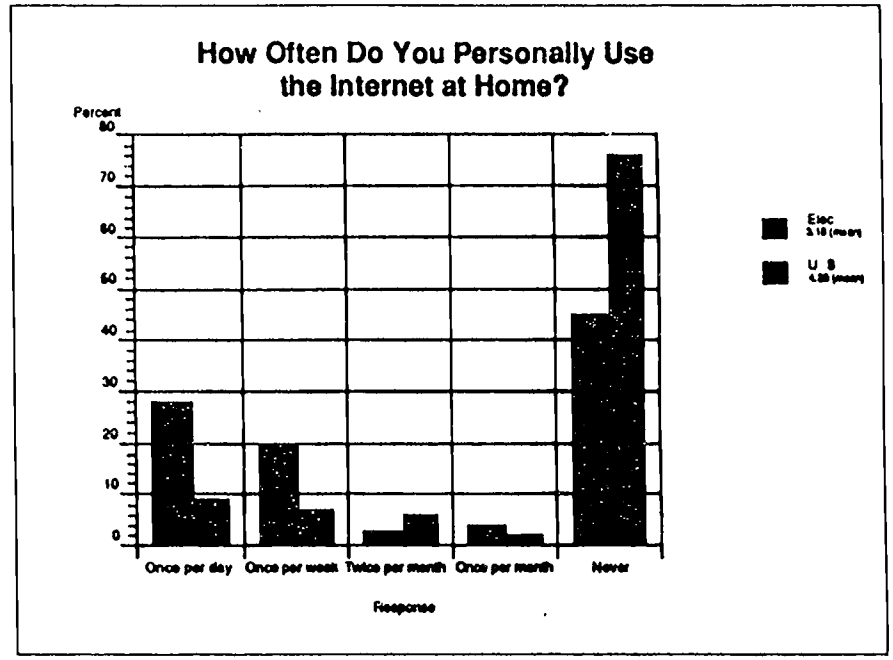
If You Had Questions About Using the Internet, Who Would You Ask for Help?

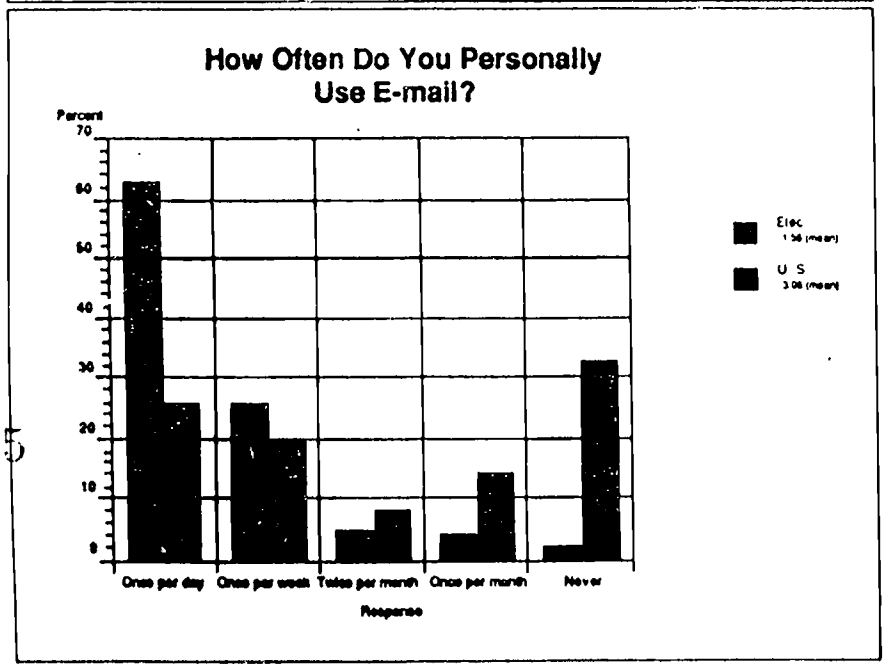


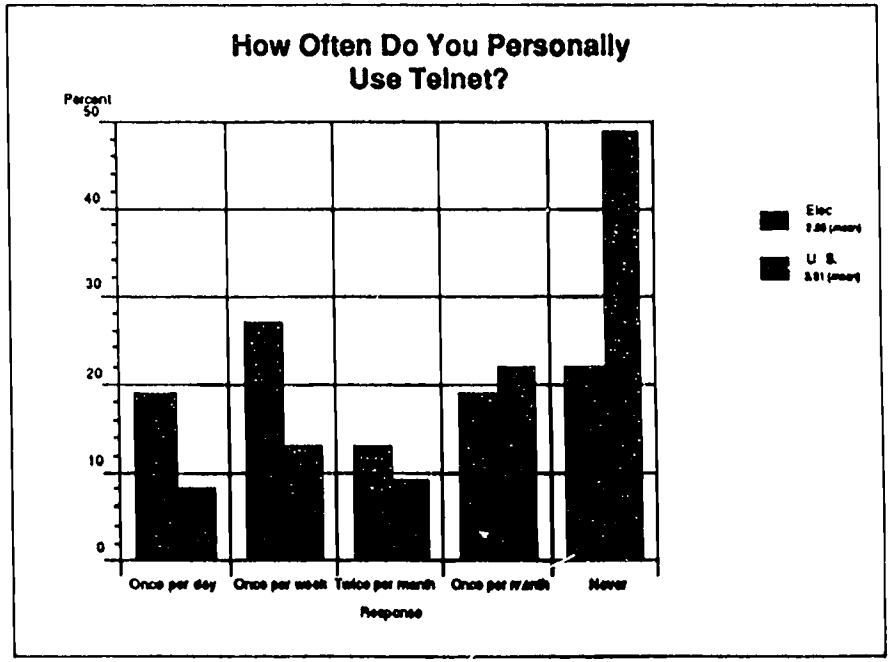
How Long Ago Did You Last Use the Internet?

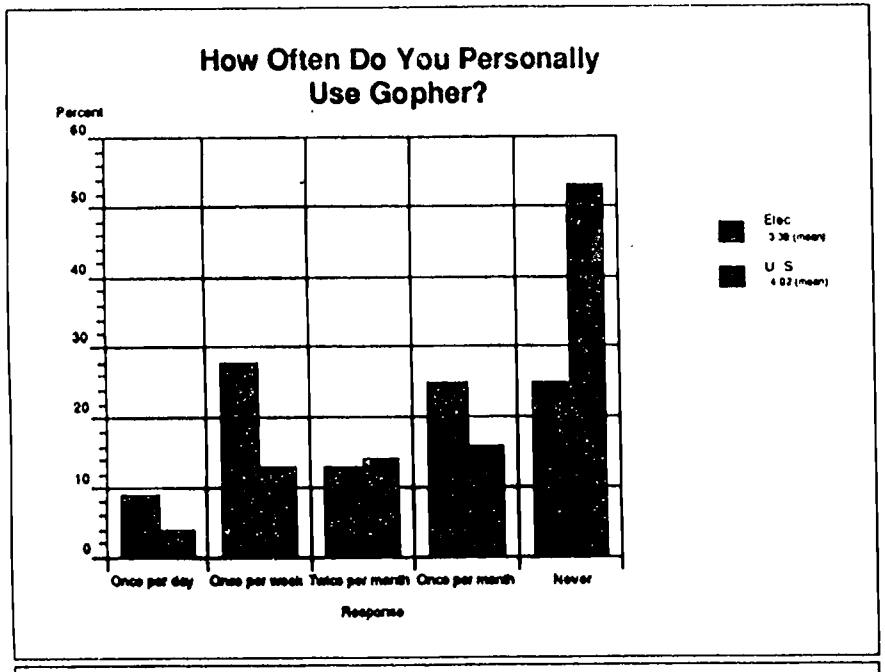


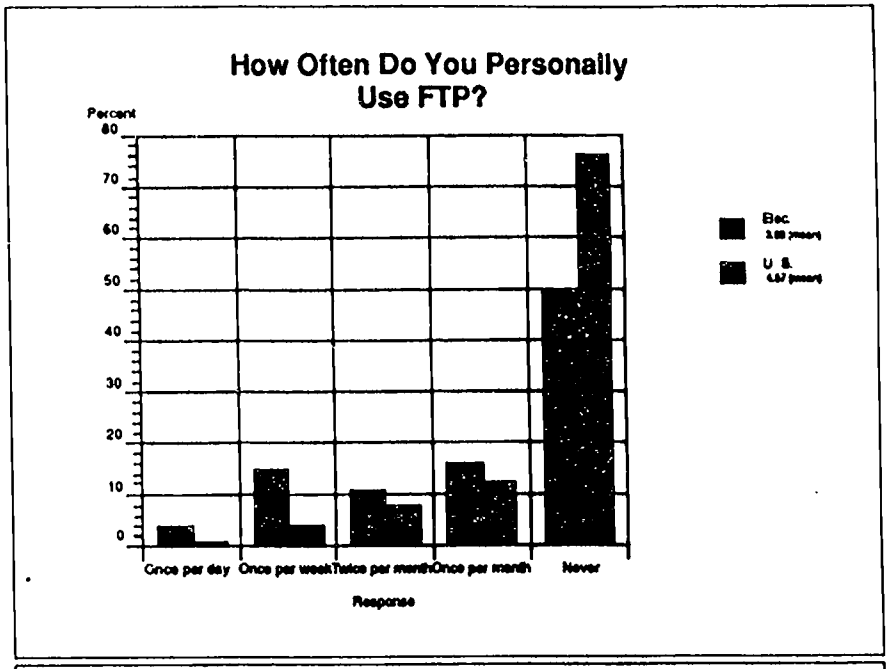

How Often Do You Personally Use the Internet at School?
Percent
60
50
40
30
20
10
0
Once per day
Once per week
Twice per month
Once per month
Never
Response
Elec.
U S

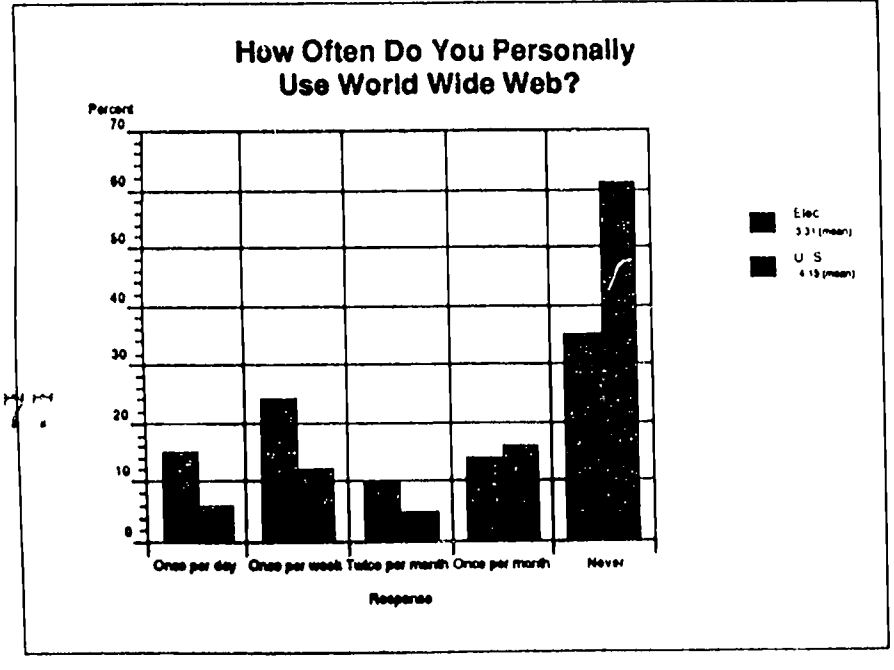

How Often Do You Personally Use the Internet at Home?
Percent
80
70
60
50
40
30
20
10
0
Once per day
Once per week
Twice per month
Once per month
Never
Response
Elec
U S

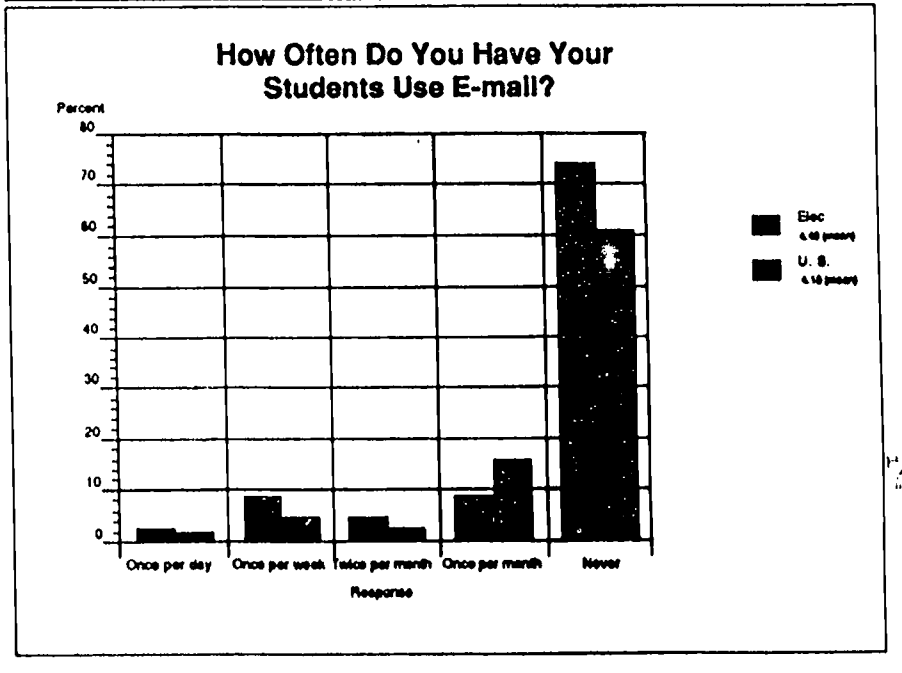

How Often Do You Personally Use E-mail?
Percent
70
60
50
40
30
20
10
0
Once per day
Once per week
Twice per month
Once per month
Never
Response
Elec
U S


How Often Do You Personally Use Telnet?
Percent
50
40
30
20
10
0
Once per day
Once per week
Twice per month
Once per month
Never
Response
Elec
U S

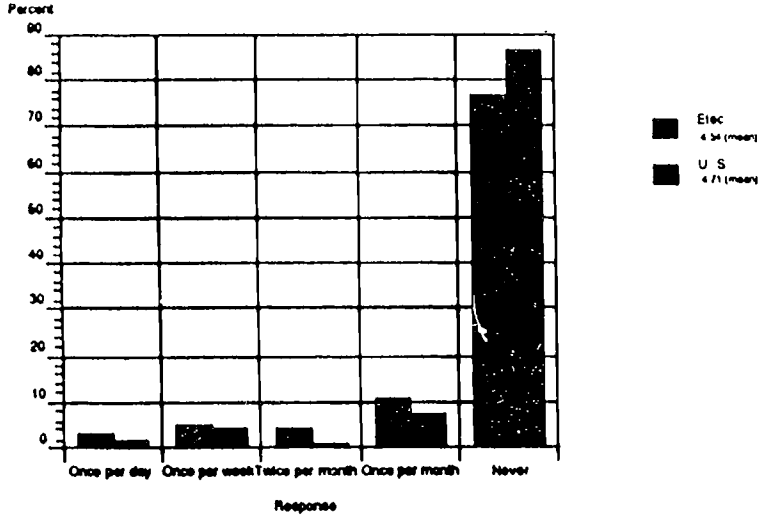

How Often Do You Personally Use Gopher?
Percent
60
50
40
30
20
10
0
Once per day
Once per week
Twice per month
Once per month
Never
Response
Elec
U S


How Often Do You Personally Use FTP?
Percent
80
70
60
50
40
30
20
10
0
Once per day
Once per week
Twice per month
Once per month
Never
Response
Elec
U S

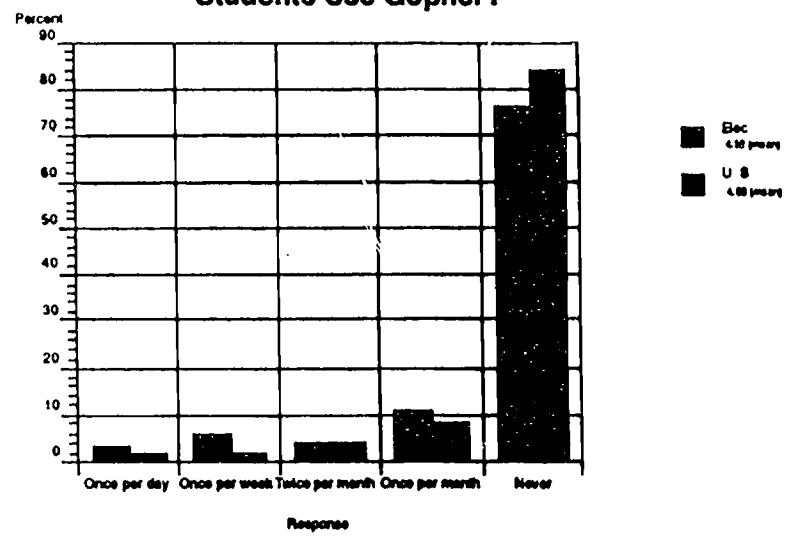

How Often Do You Personally Use World Wide Web?
Percent
70
60
50
40
30
20
10
0
Once per day
Once per week
Twice per month
Once per month
Never
Response
Elec
U S


How Often Do You Have Your Students Use E-mail?
Percent
80
70
60
50
40
30
20
10
0
Once per day
Once per week
Twice per month
Once per month
Never
Response
Elec
U. S.

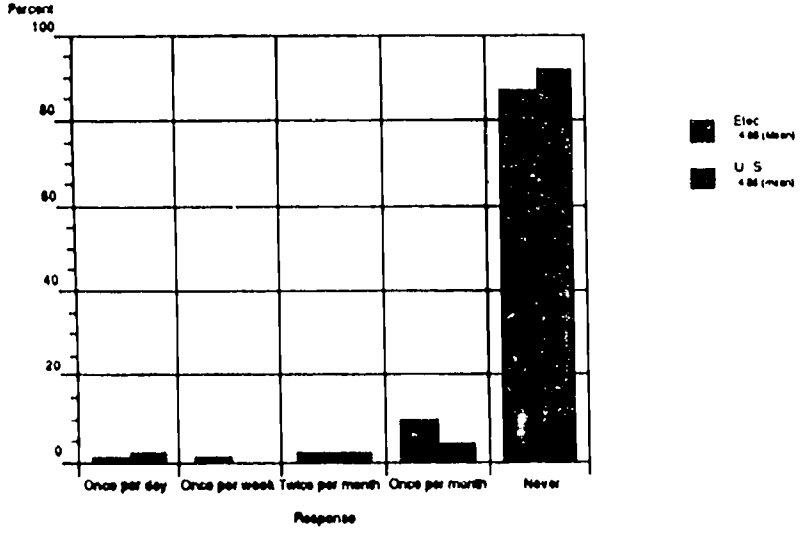
How Often Do You Have Your Students Use Telnet?



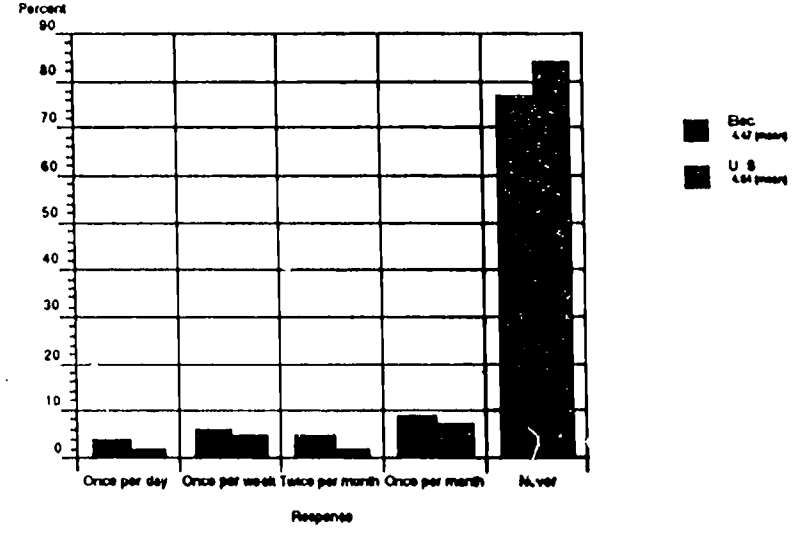
How Often Do You Have Your Students Use Gopher?



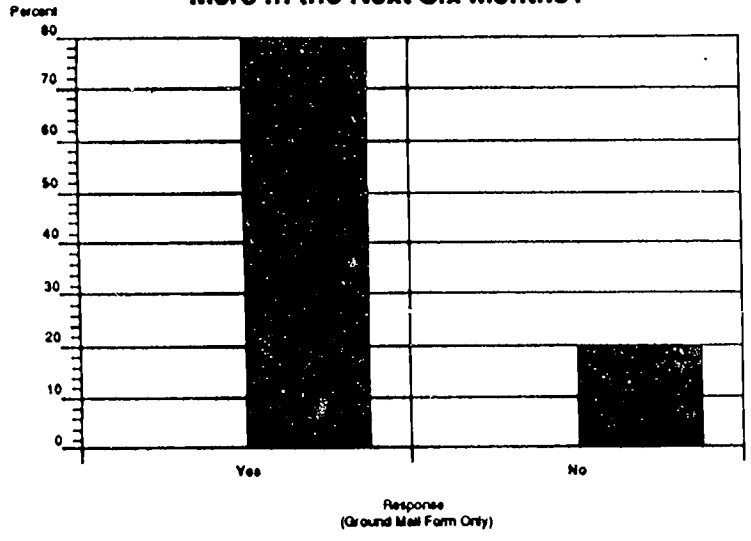
How Often Do You Have Your Students Use FTP?



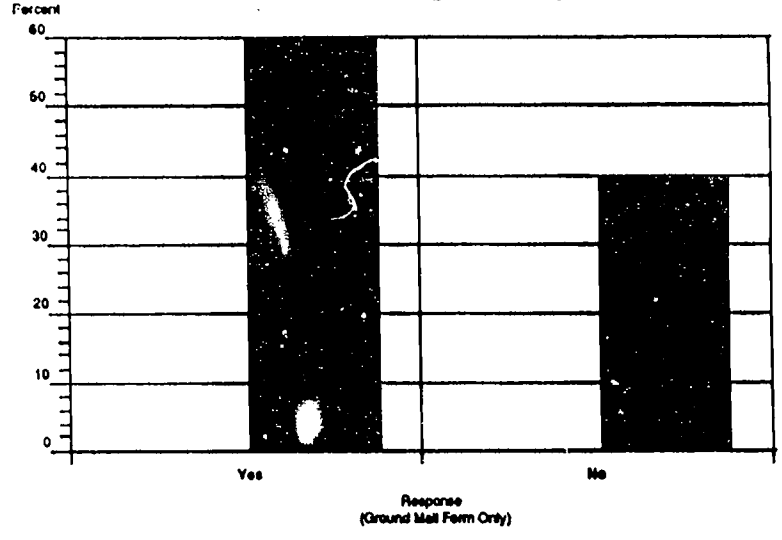
How Often Do You Have Your Students Use World Wide Web?



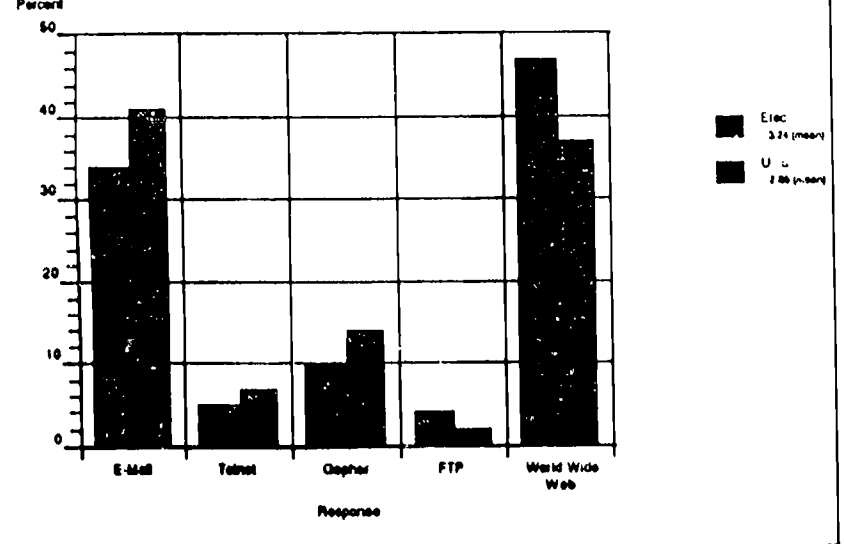
Do You Plan on Using the Internet More In the Next Six Months?



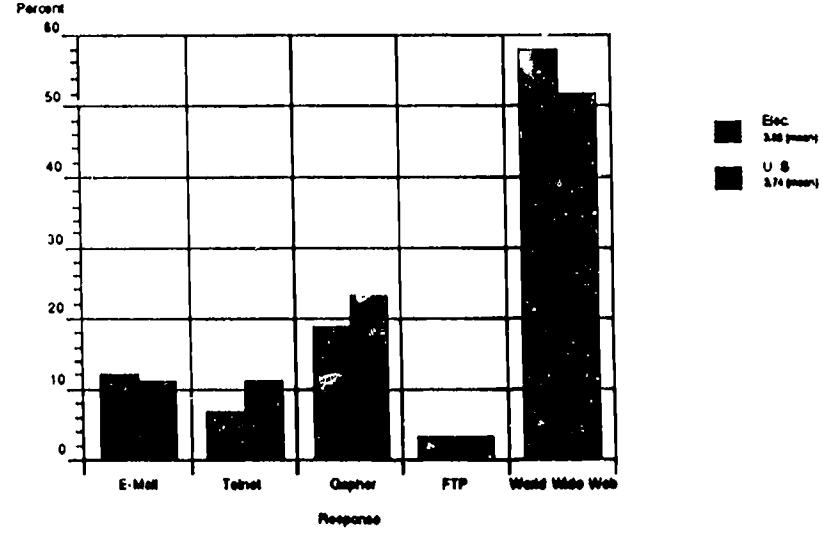
Do You Plan on Having Your Students Use the Internet Significantly More?

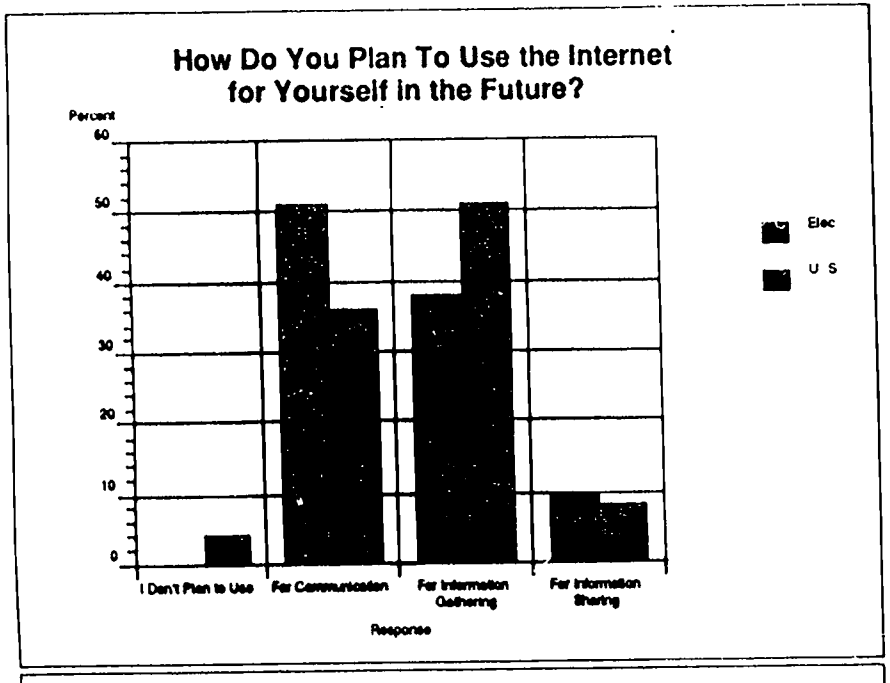


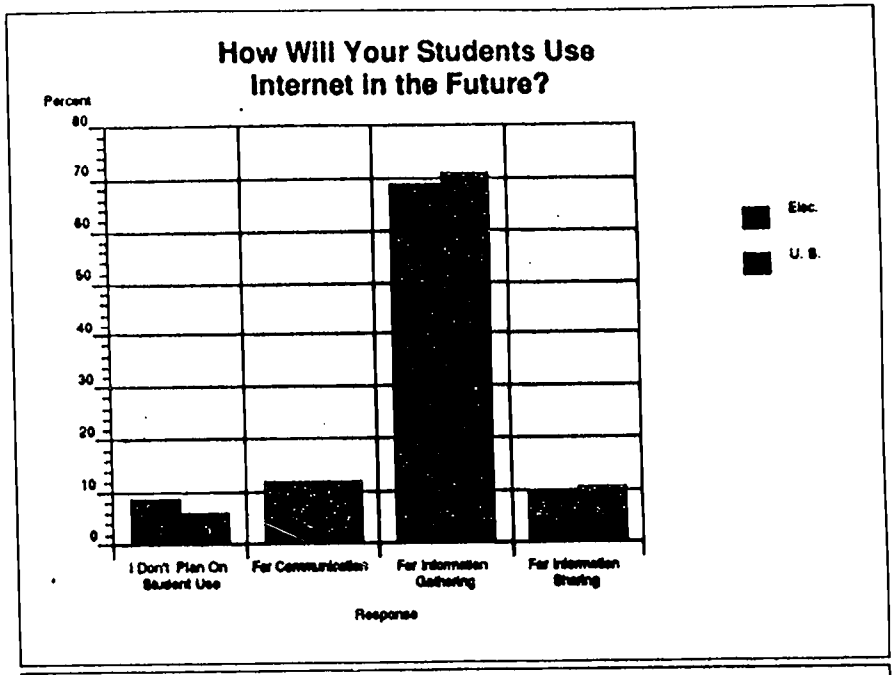
Which Internet Application Has the Most Potential for You as a Teacher?

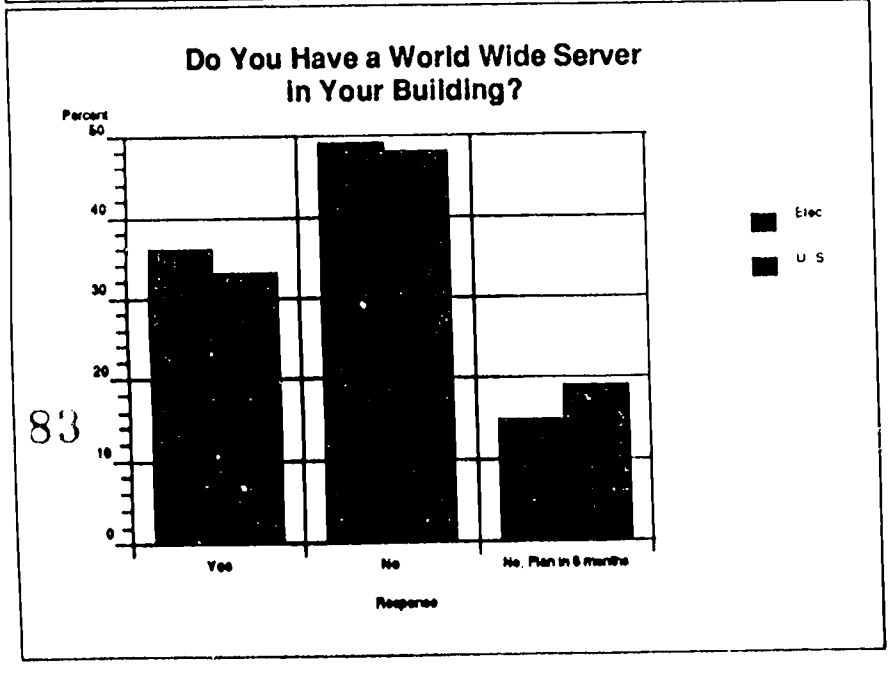


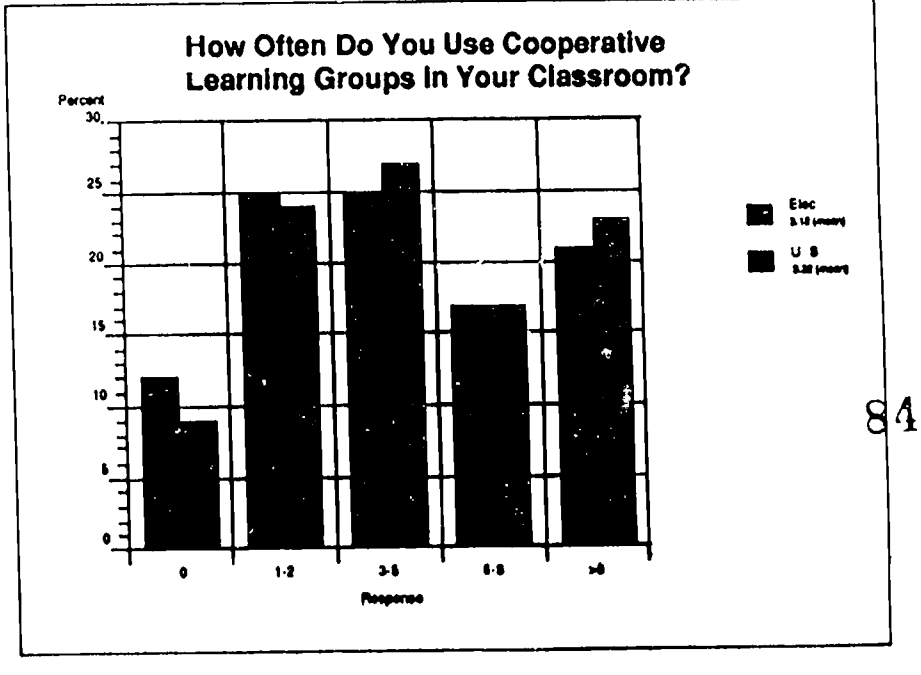
Which Internet Application Has the Most Potential For Your Students?

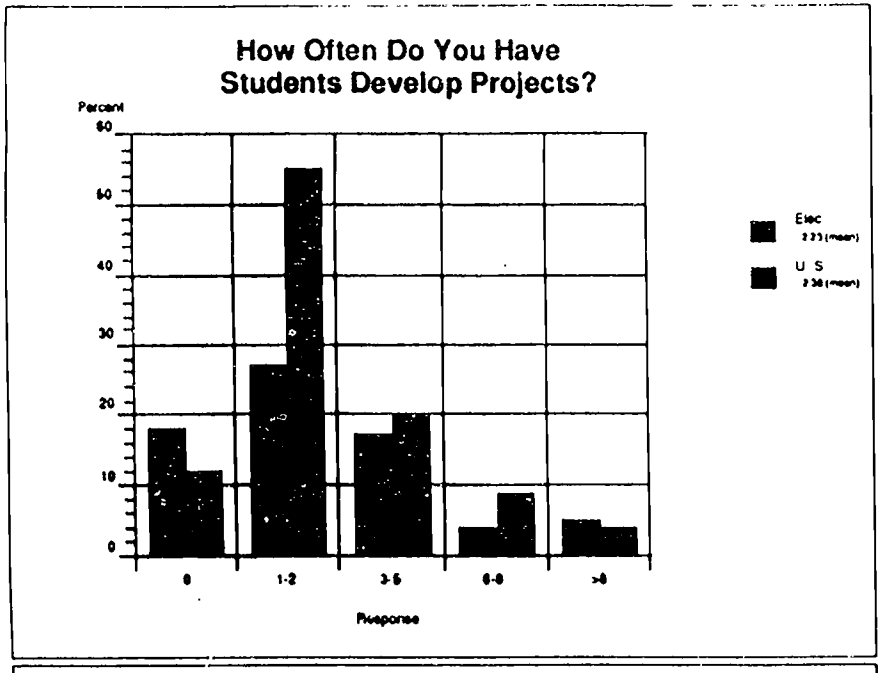


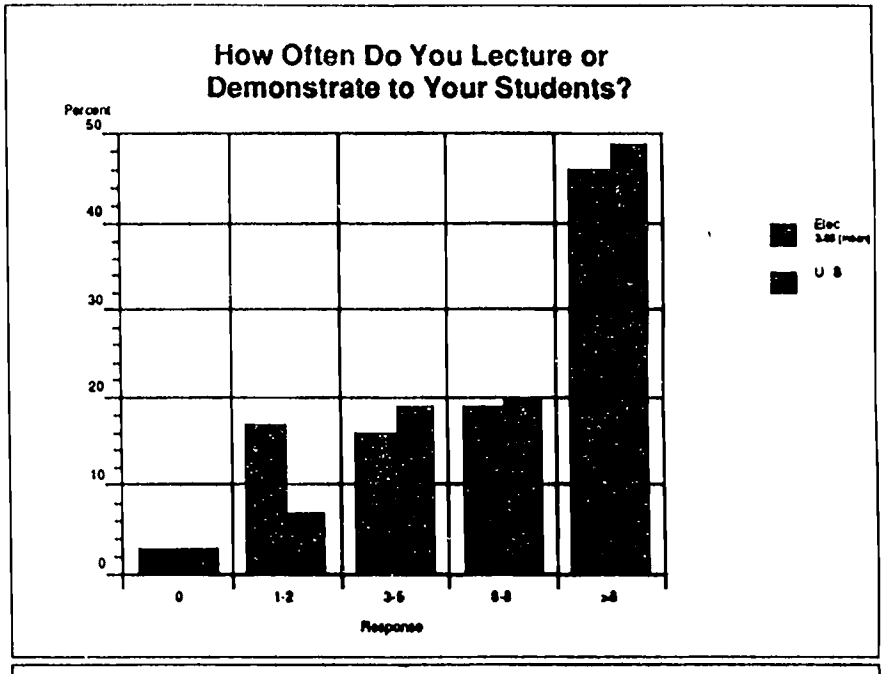

How Do You Plan To Use the Internet for Yourself in the Future?
Percent
60
50
40
30
20
10
0
I Don't Plan to Use
For Communication
For Information Gathering
For Information Sharing
Response
Elec
U S

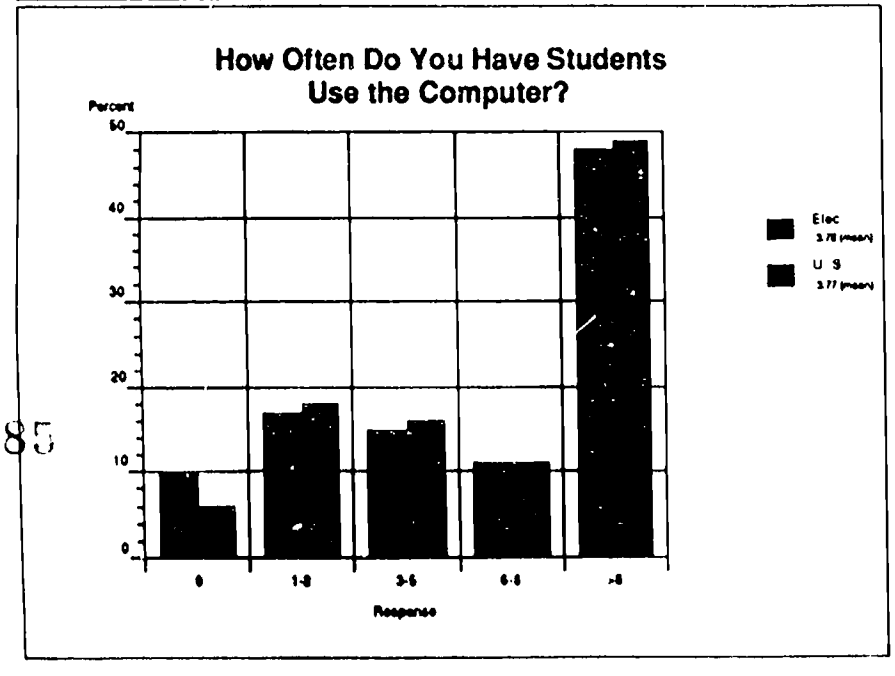

How Will Your Students Use Internet in the Future?
Percent
80
70
60
50
40
30
20
10
0
I Don't Plan On Student Use
For Communication
For Information Gathering
For Information Sharing
Response
Elec.
U. S.

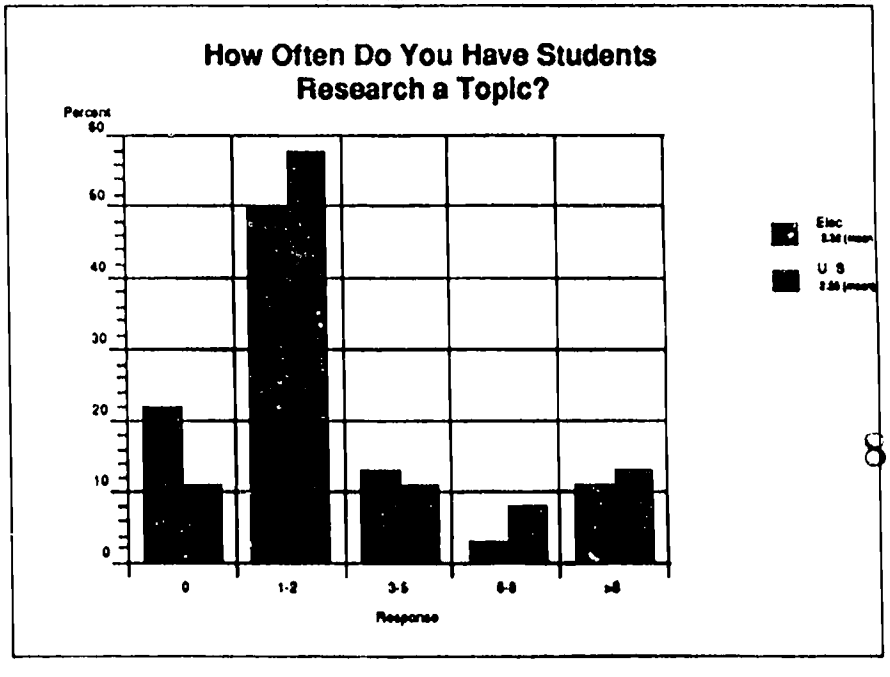

Do You Have a World Wide Server in Your Building?
Percent
50
40
30
20
10
0
Yes
No
No, Plan in 6 months
Response
Elec
U S

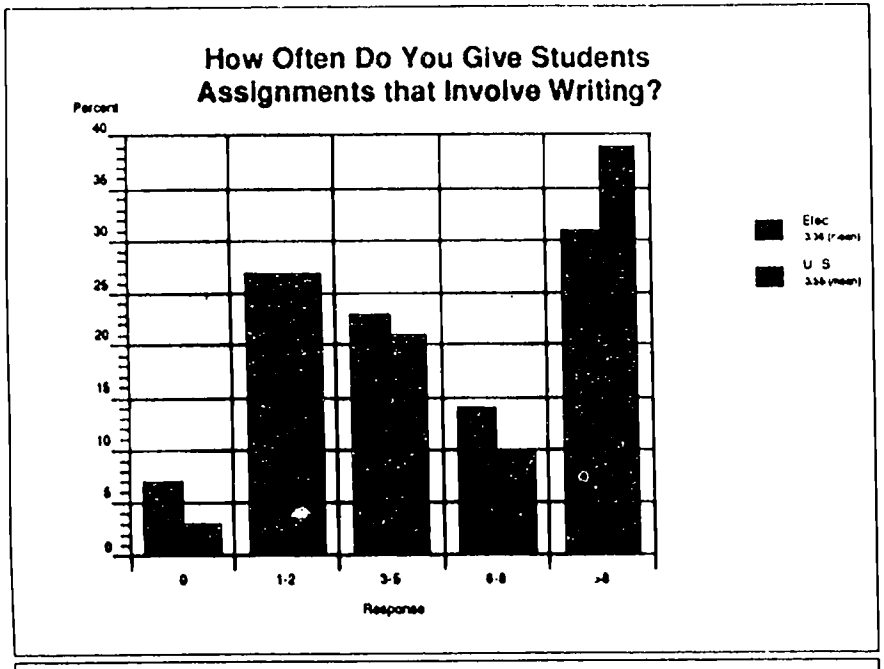

How Often Do You Use Cooperative Learning Groups In Your Classroom?
Percent
30
25
20
15
10
5
0
0
1-2
3-5
6-8
>8
Response
Elec
U S

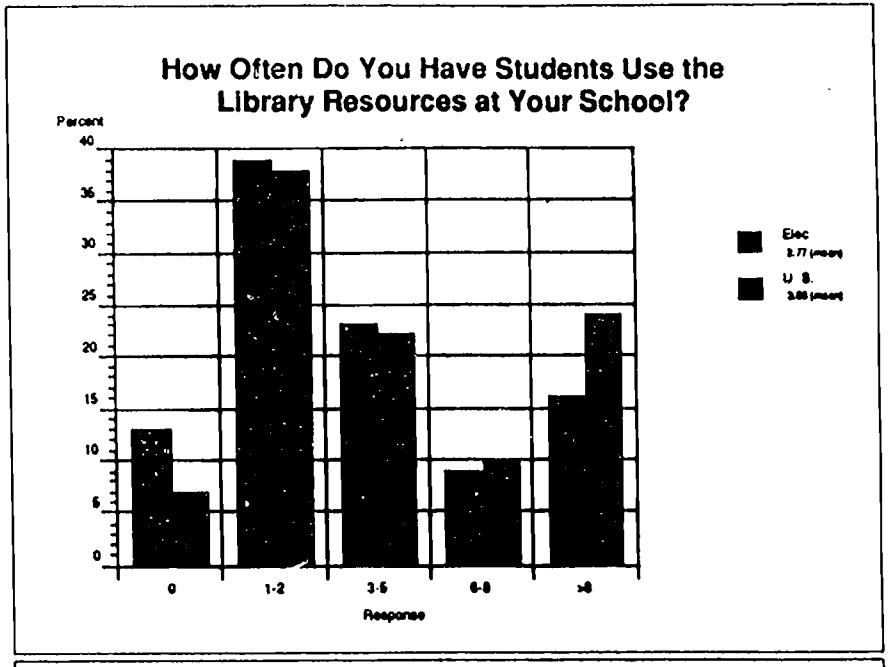

How Often Do You Have Students Develop Projects?
Percent
60
50
40
30
20
10
0
0
1-2
3-5
6-8
>8
Response
Elec
U S

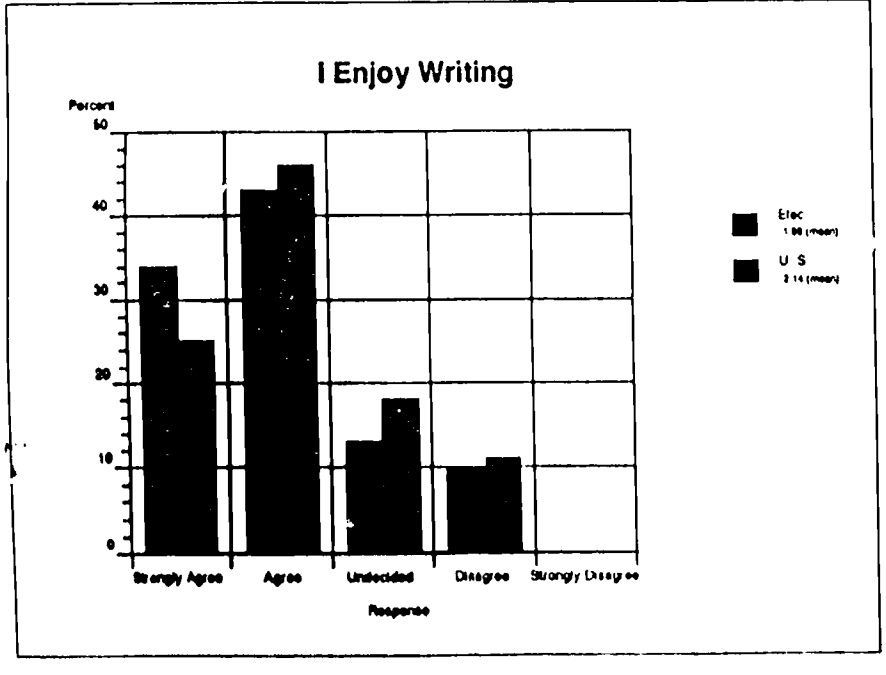

How Often Do You Lecture or Demonstrate to Your Students?
Percent
50
40
30
20
10
0
0
1-2
3-5
6-8
>8
Response
Elec
U S

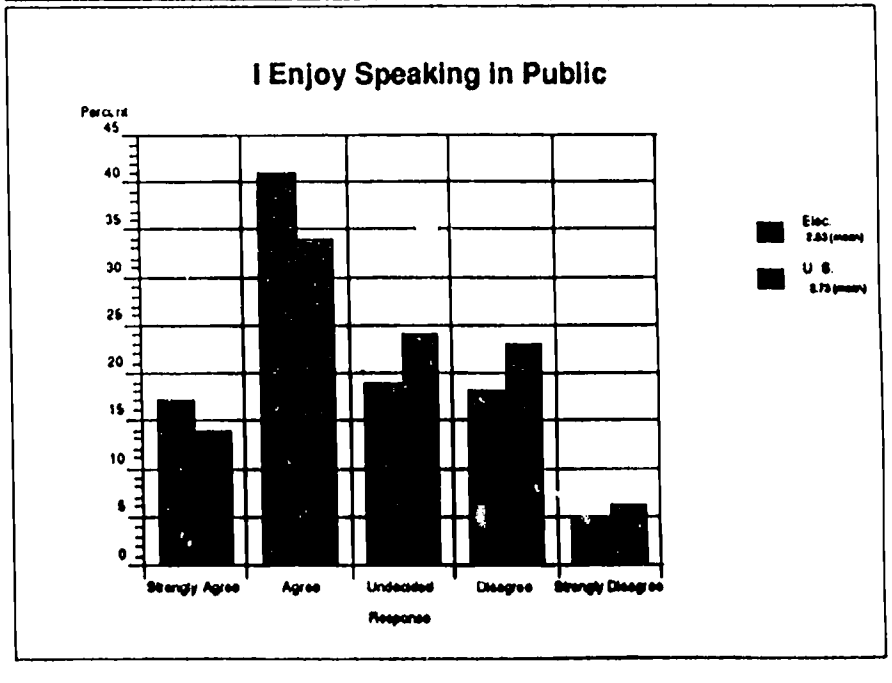

How Often Do You Have Students Use the Computer?
Percent
50
40
30
20
10
0
0
1-2
3-5
6-8
>8
Response
Elec
U S

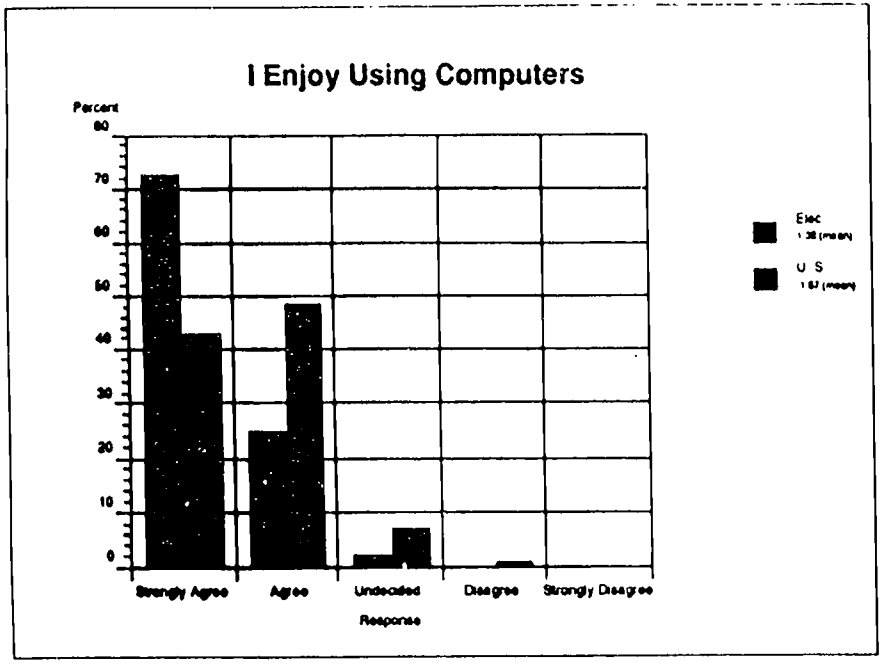

How Often Do You Have Students Research a Topic?
Percent
60
50
40
30
20
10
0
0
1-2
3-5
6-8
>8
Response
Elec
U S

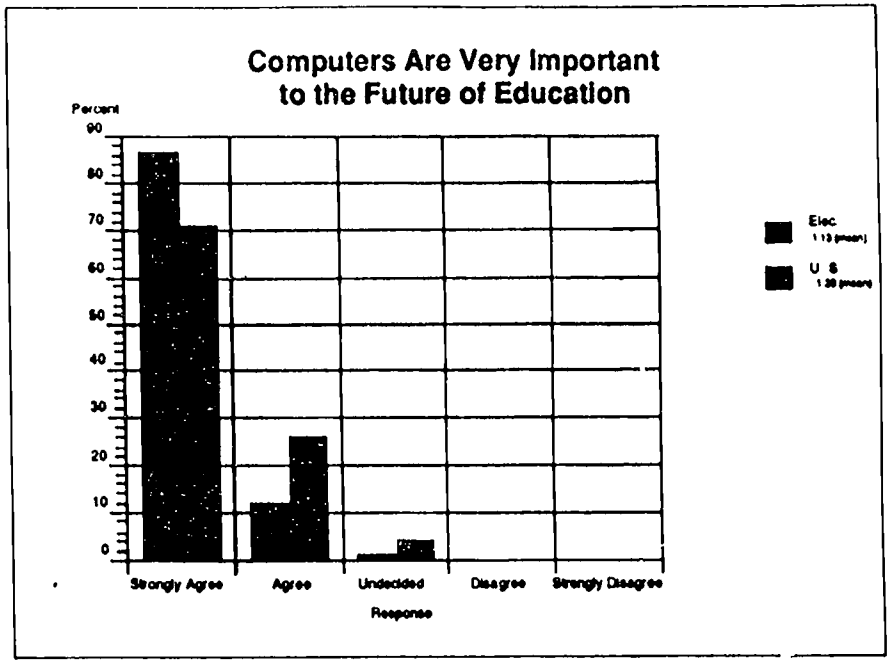

How Often Do You Give Students Assignments that Involve Writing?
Percent
40
35
30
25
20
15
10
5
0
0
1-2
3-5
6-8
>8
Response
Elec
U S


How Often Do You Have Students Use the Library Resources at Your School?
Percent
40
35
30
25
20
15
10
5
0
0
1-2
3-5
6-8
>8
Response
Elec
U S.


I Enjoy Writing
Percent
50
40
30
20
10
0
Strongly Agree
Agree
Undecided
Disagree
Strongly Disagree
Response
Elec
U S


I Enjoy Speaking in Public
Percent
45
40
35
30
25
20
15
10
5
0
Strongly Agree
Agree
Undecided
Disagree
Strongly Disagree
Response
Elec
U S.


I Enjoy Using Computers
Percent
80
70
60
50
40
30
20
10
0
Strongly Agree
Agree
Undecided
Disagree
Strongly Disagree
Response
Elec
U S


Computers Are Very Important
to the Future of Education
Percent
90
80
70
60
50
40
30
20
10
0
Strongly Agree
Agree
Undecided
Disagree
Strongly Disagree
Response
Elec
U S

Appendix F

Internet Coordinator's Data Request

University of Nebraska at Omaha

Teacher Education Department
Omaha, Nebraska 68182-0163
(402) 554-3666

Dear _____,

The evaluation process for the statewide Internet activities, as contracted by the Nebraska Educational Service Units, is proceeding nicely, and you will soon be receiving our third six month report at the end of July. As part of that report, we would like to ask you, as the Internet coordinator at your particular ESU, a few questions related to the Internet activities and growth of your area. As with all our data, your responses will only be reported as part of the statewide totals described within our report, and not as individual ESU. We are requesting some of the information as a "double-check" for our other sources, and for other information, your response will be the primary source. You may estimate this information, although we hope that you will try to be as accurate as possible.

Please answer the questions directly on the letter below, and return it with the enclosed envelope as soon as possible. We would of course be happy to answer any questions that you have regarding this request. We are pleased that the evaluation process that you hired us to do is proceeding on schedule, and that so much is happening in Nebraska related to the Internet. Thank-you very much for your assistance. and we look forward to our further collaboration in the future.

Sincerely,

Neal Grandgenett, Ph.D.
University of Nebraska at Omaha
Omaha, Nebraska 68182

Neal Topp, Ph.D.
University of Nebraska at Omaha
Omaha, Nebraska 68182

Survey completed by: _____ (only used for follow-up clarification)
On behalf of ESU(s) _____

Please answer the following questions:

1) Approximately how many "users" is your system currently supporting? _____
(as either formal account holders or individuals estimated to be accessing direct connections)

2) Approximately how many schools are "directly connected" in your area? _____
(exclude any schools where modem access is their only access)

3) Approximately how many other schools plan to be "directly connected" within the next year? _____ *(exclude schools from #2, we understand that this will be a "rough" estimate)*

4) Approximately how many "individuals" have gone through the Internet training sessions that your ESU is supporting? _____ *(since training sessions began)*

5) What "barriers" or "issues" are confronting your area/ESU in the use of Internet?

6) Any other comments? *(use back side of page for more room if necessary)*

Appendix G

Innovative User Electronic Mail Protocol

Interview questionnaire To be used with data form

Hello, I'm <your name here> and I'm calling from the University of Nebraska at Omaha's Office of Internet Studies. We understand that you (and some of your colleagues) are doing some exciting things with Internet in your school. We'd really like to know more about how you are infusing the internet into education. We would greatly appreciate it if you could spare a few moments to answer some questions about your Internet activity. We here at the Internet Studies Office hope to share your innovative ideas with other Nebraska teachers and also incorporate your success into some research we are doing about education and Internet use in Nebraska We first need to know some demographic information about you. your students and your school.

A. Your school's full name is.....?
B. And your school is in.....?
C. How many students attend your school?
D. How many teachers were involved in the internet project? What were their full names and what grade level do they teach?
E. What was/were the grade level of the students involved?
F. Is your school direct connected or do you access the internet via modem?

Thanks! Now, I'd like to ask you about the activity itself.

G. What subject area did the activity incorporate?
H. Getting more specific, what particular topic(s) was/were covered in the activity?
I. What was your activity like? In other words, what did you and/or the students actually do to use the internet
J. What would you say were the most positive aspects of the activity?
K. What part would you describe as negative or a limitation of the activity?
L. What are your thoughts about what students are learning by using the internet?
M. Do you plan to try other activities?

We really appreciate your input and are excited to hear about innovative teachers using the internet. Thanks for your time, we hope to hear from you in the future!

Appendix H

Innovative User Interview Protocol

Interviewer's Name:	Date:

Teachers Using the Internet

Interview Form

Demographic Information

A. Name of School/Institution		
B. School Location		
C. Approximate Size of School	# of students	
D. Teachers Involved in internet use (by name and grade level)	Name(s)	Grade Level(s)
E. Grade level of the students involved?	Grade Level(s)	
F. Direct connected or Modem?		

Description of Activity

G. Subject area (s) of activity	
H. General topics covered	
I. Brief description of the project.	
J. Positives of project.	
K. Negatives of project.	
L. Teacher's perceptions/comments	