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ABSTRACT

The Alaska Science Pilot was a one-semester pilot study, undertaken from January to June of 1989 and funded largely by federal Migrant Funds. Students used the high school level general science course called "Alaska Science," which is comparised of ten 3-week text workbook units of study which deal primarily in Alaskan applications of science topics. Ten classroom teachers in districts representing many regions of the state took part in the pilot, beginning with over 100 primarily migrant students. Students and instructors used audioconferences and the University of Alaska Computer Network (UACN) electronic mail service for distance delivery of this course and coordination of this pilot. This pilot investigated three basic questions: (1) Is the revised print-based curriculum format, reading level, and style appropriate for Alaskan migrant students? (2) Does the addition of audio, video, computer, and/or other technological-based lessons enhance learning in migrant students? (3) Do the use of electronic mail and/or other distance delivery mechanisms contribute motivation, student-teacher communication, learning, and the completion rate of science units? Results of this study indicate that electronic mail is a useful classroom tool, increasing student communication skills, motivating and providing incentive for student study, and enriching student knowledge of computer capabilities. The text workbooks wre very well received, and the reading level was appropriate for the majority of students. Students and teachers alike enjoyed the Alaskan perspective and the independent nature of the lessons. The number of units students were able to complete varied from one to five, depending on the activities at the pilot site. The videotaped lessons enhanced instruction and student retention of concepts. Audioconferences were well attended and provided an excellent forum for training and coordination as well as discussion of progress and problems. (Author/KR)

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LEARNING ALASKA SCIENCE AT A DISTANCE

Alaska Science Pilot Evaluation Report

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◆ ABSTRACT ◆

The Alaska Science Pilot was a one-semester pilot study, undertaken from January to June of 1989 and funded largely by federal Migrant Funds. Students used the high school level general science course called Alaska Science, which is comprised of ten three-week text workbook units of study which deal primarily in Alaskan applications of science topics. Ten classroom teachers in districts representing many regions of the state took part in the pilot, beginning with over 100 primarily migrant students. Students and instructors used audioconferences and the University of Alaska Computer Network (UACN) electronic mail service for distance delivery of this course and coordination of this pilot.

This pilot investigated three basic questions:

◆ 1) Is the revised print-based curriculum format, reading level, and style appropriate for Alaskan migrant students?

◆ 2) Does the addition of audio, video, computer, and/or other technological-based lessons enhance learning in migrant students?

◆ 3) Do the use of electronic mail and/or other distance delivery mechanisms contribute motivation, student-teacher communication, learning, and the completion rate of science units?

Results of this study indicate that electronic mail is a useful classroom tool, increasing student communication skills, motivating and providing incentive for student study, and enriching student knowledge of computer capabilities. The text workbooks were very well received, and the reading level was appropriate for the majority of students. Students and teachers alike enjoyed the Alaskan perspective and the independent nature of the lessons. The number of units students were able to complete varied from one to five, depending on the activities at the pilot site. The videotaped lessons enhanced instruction and student retention of concepts. Audioconferences were well attended and provided an excellent forum for training and coordination as well as discussion of progress and problems.

◆ ALASKA SCIENCE COURSE DESCRIPTION ◆

Alaska Science is a one credit, high school general science course presented in part by distance learning techniques. It consists of ten individual units, each containing about three weeks of instruction, which are designed to help a student find out about science in his or her community. Each of these units can be completed independently or with a class.

The procedure for completing each unit entailed reading all objectives and introductory materials and gathering any necessary equipment or resources. There were required lessons within each unit as well as a number of choice lessons, which provided for variation in learning styles. Students corrected their own work where indicated. Upon completion of the unit review and test, all assignments, the review, and the test were returned to the teacher for evaluation.

Science topics taught during the ten units are as follows:

Alaska Science, Semester 1

Unit 1: Alaskan Ecology –Topics include food chains, webs, and pyramids, Alaskan ecosystems, succession, Alaskan producers, and field study choices such as pond water succession, transect study, stream profiles, or various animal or plant collection and identification projects.

Unit 2: Alaska Wildlife and Resource Management –Topics include resource management of terrestrial animals, timber management, individual animal studies, hunting, trapping, subsistence, state and federal refuges and parks, northern adaptations, bears and bear attacks, reindeer, musk ox, fur farming, and recreation.

Unit 3: Geology –Topics include mineral resources and mining, Alaskan geologic features, topographic maps, earthquakes, tsunamis, volcanoes, glaciers, and soils.

Unit 4: Energy for Alaska –Topics include energy reserves of fossil fuels, energy options–geothermal, solar, wood, electricity, hydro power, and energy conservation.

Unit 5: Weather Watch –Topics include weather and climate for immediate area, constructing and using meteorological tools and instruments, collecting weather data, wind patterns, Chinook and Willawaw winds, wind chill, types and patterns of Alaska precipitation, making and using forecasts, icefog, satellite weather observation, marine and aviation weather forecasts, and air inversions.

Alaska Science, Semester 2

Unit 6: Ice is Nice -Topics include information and experiments about snow, ice, sea ice and icebergs, glacier ice, avalanches, icefields, glacier research and the greenhouse effect, snow and ice safety, and permafrost.

Unit 7: Safety and First Aid -Topics include basic first aid information on shock, bleeding, breathing, poisoning, safe food handling, broken bones, burns, fire safety, infection, illness, animal bites, exposure to heat, cold or fire, choking, hypothermia, CPR, confined space, stress, and cabin fever.

Unit 8: Wilderness Survival -Topics include basic survival rules, trip preparation, wilderness travel, survival and comfort kits, navigation with a compass, and use of topographic maps.

Unit 9: The Ocean Environment -Topics include ocean topography and profiles, physical properties of oceans, ocean currents, tides and tide tables, ocean producers, and ocean pollution.

Unit 10: Marine Animals -Topics include a survey of marine invertebrate and vertebrate phyla, including classification differences and dissection, marine environments, PSP, marine mammal and fisheries management, mariculture, and commercially important marine life.

◆ PILOT DESCRIPTION ◆

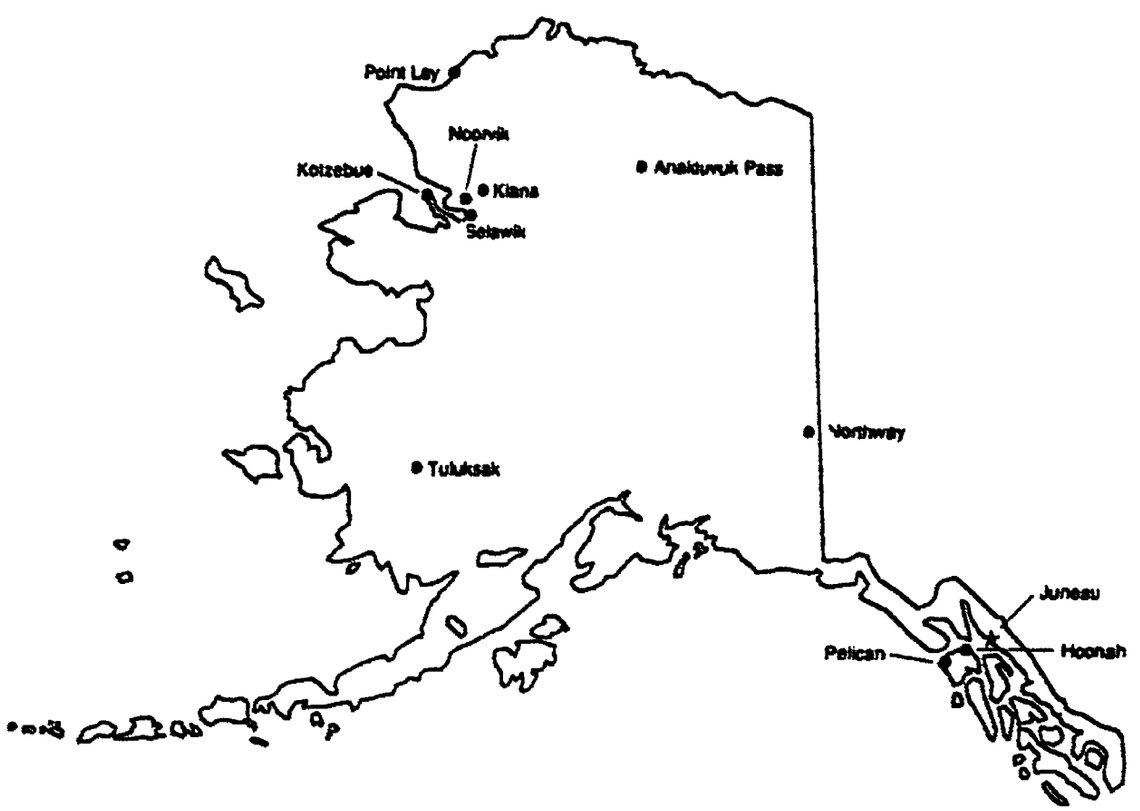
The pilot student class consisted of approximately 100 students from among six districts with migrant programs: Pelican, Northwest Arctic, Alaska Gateway, Hoonah, North Slope,and Yupiit. Students were situated in nine science classrooms, and one student studied independently, for a total of ten. Each pilot teacher had an electronic mailbox, and students were paired in their own electronic mailboxes through the University of Alaska Computer Network.

◆ ALASKA SCIENCE PILOT SITES ◆

LOCATION	SCHOOL NAME	TEACHER	NUMBER OF STUDENTS*
Pt. Lay	Cully School	Steve Beharski	8
Hoonah	Hoonah H.S.	Jan Skaflestad	6
Kiana	Kiana H.S.	Martin Leonard	9
Noorvik	Noorvik Aqqulak H.S.	Jeff Walters	13
Kotzebue	NW Arctic Corres. School	Walter Parret	1
Anaktuvuk Pass	Nunamiut School	Mark Voss	4
Pelican	Pelican School	Wayne Clark	5
Selawik	Selawik H.S.	Chuck Johnston	8
Tuluksak	Tulkisarmiut Yupik H.S.	Mike McGuire	23
Northway	Walter Northway School	Carol Jean Clay	11

*Student numbers fluctuated during the pilot. These numbers reflect March 1989 count.

Location of Pilot Sites

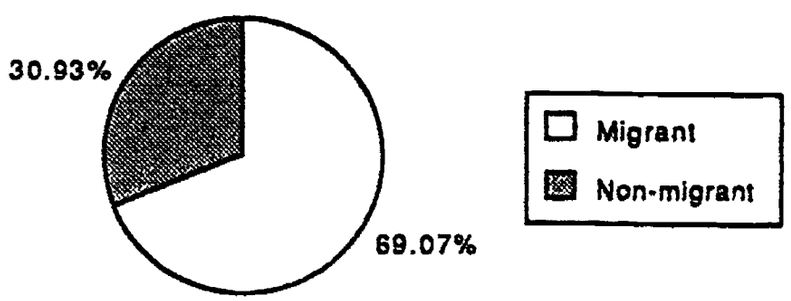


The teaching services were provided by a partnership between the subject-area specialist/project coordinator for Alaska Science in Juneau and the district classroom teacher. Each student received up to five individual units that included the reading material, the assignments and activities, and a key for correcting activities. There was a unit test that the student took after completing the required assignments. The classroom teachers adapted the units to fit the particular learning situation where necessary. They assisted the students with their work and graded the activities for which there was a key if they didn't wish the student to do so. Students also mailed their work to Juneau, or sent assignments via electronic mail. Student progress was assessed, then returned along with a letter and any necessary supplementary help. The classroom teachers could accept the grade given the student, or could use their own judgment to arrive at a grade for the student.

Every classroom was connected by electronic mail to their Juneau teacher and to the other classroom sites via the University of Alaska Computer Network. For schools without them, laptop computers with modems were provided during the pilot.

♦ Student Profile ♦

There were a number of migrant and non-migrant students in the pilot. It became clear during the search for pilot sites that there were no classrooms which had 100% migrant students. Study sites were chosen which contained a majority of migrant students in their classroom.



Pelican and Hoonah migrant students were declared so primarily because their families were commercial fishers, while subsistence fishing was the primary activity at the other sites.

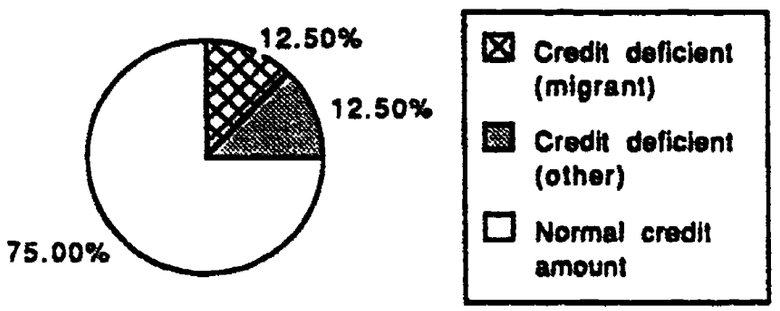
Due to black cod season and the wrestling schedule, I have been without most of my students most of the week. I have picked up two new returning students from the lower 48. This will give me a chance to see how quickly the new individuals will pick up on what we are doing. This school truly has become migrant!

We have finished our last unit and hope to begin the unit on weather this week. It will be a treat if I have a full classroom again.

Wayne Clark, Pelican, recs044

Migrant students often are deficient in credits towards graduation because of their migrant-related travels. Seven of ten teachers provided the following information about 48 Alaska Science pilot students. Twenty five percent of these students were deficient in credits. Six were credit-deficient because of migrant activities, and six more students were deficient in numbers of credits for other reasons, which were based primarily on lack of interest and motivation.

CREDIT DEFICIENT STUDENTS AT SEVEN PILOT SITES



Students who participated in this pilot were all from small village schools. Their science classes often contained a mixture of ninth, tenth, eleventh, and twelfth graders. Students exhibited a variety of reading and writing levels. Previous experience with computers varied widely.

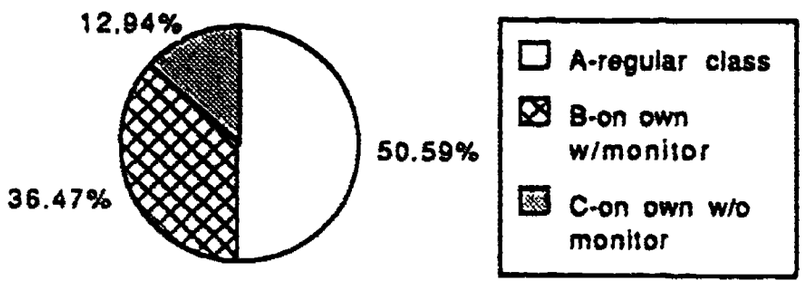
◆ PRINT-BASED FINDINGS ◆

Each Alaska Science print-based unit includes reading selections and directions for activities such as worksheets, experiments, videotape lessons, and research topics. There is a limited amount of equipment sent with various units, but no accompanying books, except for a short workbook with Unit 7. Units are designed to be used individually, in varying order, and can be used in a classroom situation or for independent study. Students complete some assignments in these text workbook units and use their own paper for other assignments. There are certain required lessons plus a number of choice lessons within each unit to provide for various learning styles. A unit test evaluates student progress. This instructional design was chosen in the hope that it would complement migrant student needs.

Data from the pilot was collected to determine whether the revised print-based curriculum format, reading level, and style was appropriate for Alaskan migrant students. A student evaluation was attached to each unit test (see Appendix 1) and anecdotal reports were gathered from pilot teachers. Each unit was evaluated separately for readability and appropriateness of content. Results were combined to arrive at a total picture of print-based findings as detailed in the information which follows and in Appendix 2.

Alaska Science pilot students as well as regular Correspondence Study students completed the evaluation reports. About half the students completed their units in a classroom situation, with another third studying independently with the help of a teacher or monitor. Another 13% worked entirely on their own, with no assistance. No students completed units while travelling for migrant activities.

UNIT COMPLETION

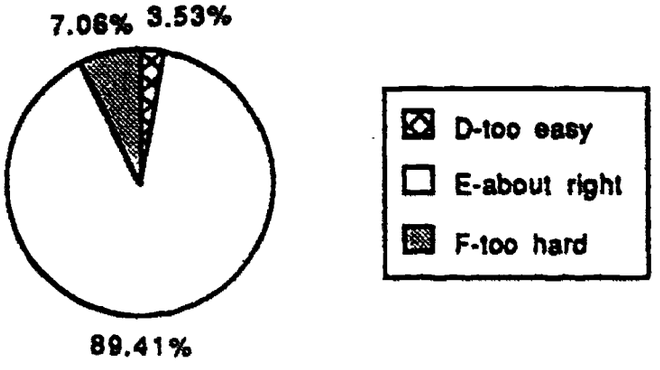


Approximately 85% of the students found the lessons easy to follow, the requirements clear, and the type and illustrations easy to read. There were some problems with diagrams and charts being too small for easy reading in a few lessons. Sixty-seven percent of the students questioned about lesson length found them to be just right, and the reading level was about right for 89% of the students.

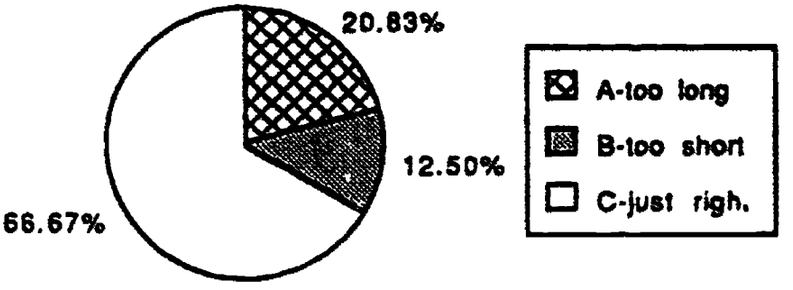
Kids are cruising on the units on their own and like the materials. I've worked the program into a proposal to the district science curriculum as a viable method to reach many students at sites where science courses are limited by staff. This is the biggest application for use in the NWABSD. With one science teacher with numerous commitments to other non-science classes, we can now offer a substantial variety of courses via this program. I honestly feel this is a major step.

Martin Leonard, Kiana, recs048

READING LEVEL



LESSON LENGTH



Student comments about favorite and least favorite lesson content were many and varied. Students seemed to favor assignments where they knew exactly what was to be accomplished and where the content was personally interesting to them. Puzzles, crosswords, and word finds were popular. Lessons requiring reports were the least favorite of many students. Other lessons which were not popular were those that were too long.

A little more than one-quarter of the students used electronic mail in conjunction with Alaska Science. The students who used electronic mail had no problems using it and felt it contributed to unit completion. More than 50% of the students chose to complete choice lessons which involved videotapes. The videotaped lessons were judged *appropriate* for the unit in one-third of the occasions and *somewhat appropriate* for another 39% of the instances. Over half of the students felt they learned from the videotaped lessons.

◆ VIDEOTAPE LESSONS ◆

◆ Description ◆

Through the use of videotaped lessons during this pilot, we hoped to discover whether use of these lessons enhanced learning in migrant students. Previously produced videos for which DOE owns duplication rights were used throughout the pilot. Lessons which used the videos were set up as choice lessons to accommodate students without video capabilities. The videos were condensed to three tapes, with each tape containing three or four segments associated with various lessons throughout the curriculum. Each pilot site was given a set of the videotapes.

◆ Videotape findings ◆

Most sites felt that the video lessons augmented the science lessons very well. They found that students were receptive to the tapes and the lessons that accompanied each tape. Videotaped lessons were often the choice lessons completed during each unit.

Pilot teachers felt the videotapes lent themselves very well to illustrating particular science concepts. In fact, they pointed out that with the variations in ecosystems, climates, and geography within the state, additional videotapes were needed to illustrate these disparities to students who have not experienced them. Video lessons enabled students to visualize the concept being taught and provided an excellent basis for discussion.

◆ Technical problems ◆

Since every pilot site had videotape viewing capability, there were no hardware problems. Most reported that the tapes themselves were of good quality.

◆ DISTANCE DELIVERY ◆
Distance Delivery Methods

Does the use of electronic and/or other distance delivery mechanisms to the student's site of learning contribute toward motivation, student-teacher communication, learning, and the completion rate of science units? This is what we were trying to discover during the pilot study. The distance delivery methods investigated were (1) electronic mail via UACN, (2) audioconferencing, and (3) use of TALKBACKS. These methods were chosen primarily because of their efficiency, availability, and cost-effectiveness. The primary emphasis was on electronic mail because all school districts already had access to the University of Alaska Computer Network, and it was felt there might be some familiarity with the system. Electronic mail involves a computer-to-computer link-up via telephone lines, so anyone with a telephone line could readily access this communication network. Audioconferences are an established method of communication within the vast state of Alaska, and the intent was to use this medium as a communication mechanism rather than an instructional tool. TALKBACKS involve one-way video and two-way audio communications, and were used where the TALKBACK subjects corresponded with Alaska Science topics.

Electronic Mail

◆ Electronic mail training ◆

The basic premise of the pilot was first to train site educators in the use of electronic mail. These teachers were then to train their students in electronic mail use. Review of basic e-mail procedures as well as more advanced techniques were a part of each audioconference session. Jason Ohler, UAS Technology Instructor, allocated and coordinated e-mail userids (user identification codes) for the pilot, and provided training in the use of electronic mail.

Pilot teachers were gathered for a workshop held in the computer training room at the UAA library Tuesday, January 17, 1989. Jo Dahl, Jason Ohler, and Linda Schultz attended along with teachers from Northway, Selawik, Noorvik, Kiana, Pt. Lay, Anaktuvuk Pass, and Tuluksak. A teacher from Sand Point also joined in for the electronic mail portion, and Paul Hampton, of Bits and Bytes, who supplied the laptops, also spent the morning with us. The teachers from Hoonah and Pelican were unable to attend; however, they did receive training at the Juneau office. Teachers were trained in the basics of electronic mail use and were shown how to assemble and operate the student laptop computer systems that were loaned to them for the pilot. Upon completion of teacher training, they in turn instructed their students in the use of electronic mail.

E-mail training was also provided during part of each of the teacher audioconferences held approximately every three weeks. The inservice addressed any problems/concerns the pilot sites may have had. Specific e-mail operating procedures were also detailed via e-mail messages. The e-mail handbook called "Learning Electronic Mail by Using Electronic Mail" was also a training tool for e-mail users, and copies were provided for each teacher and all students.

Teachers who had few hardware problems and good telephone access and who were reasonably comfortable themselves with electronic mail procedures were able to train their students much more successfully. Those teachers with

fewer students also had less difficulty in getting each student on-line. Where pilot sites involved eight or more students in the class, teachers had a great deal more difficulty in getting the students on-line. Most felt they needed to teach students in small groups, and this required more time and resources than they had available.

While teachers felt comfortable with electronic mail during the training session with immediate help at hand, it was a different matter altogether to set up equipment, access UACN, and then train students once they were back at their schools. The evaluation of the training workshop revealed that almost every teacher felt it would have been better to allow two days for training purposes, spending parts of each day on electronic mail training and parts of each day on Alaska Science orientation.

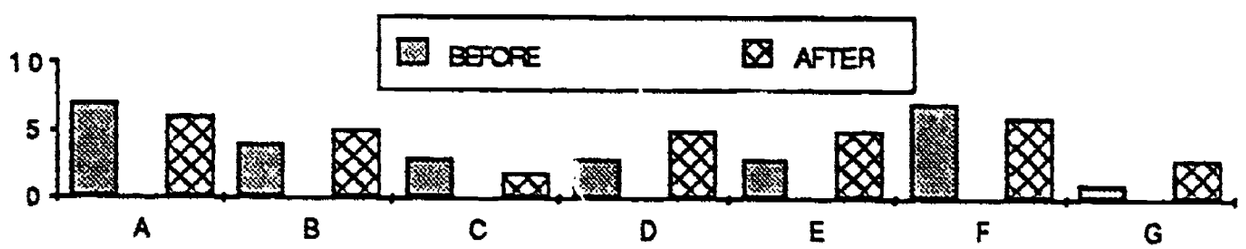
• Changing computer attitudes •

To assess whether use of electronic mail affected teacher and student feelings about computer use, an attitude profile was completed at the beginning and again at the end of the pilot period (Appendices 3 and 5). Data from the attitude profiles is included in this report as Appendices 4 and 6.

Most teachers reported that they owned or had use of a computer, and all teachers had at least three months experience with a computer. About half the teachers had more than one year of experience with computers, although only one teacher had previous experience using electronic mail. The primary uses of computers previous to the Alaska Science pilot were in playing games and using educational software. The use of electronic mail during the pilot caused the teachers to increase their use of computers for word processing, building databases, communicating by electronic mail, and accessing on-line databases.

At the beginning of the pilot, 86% of the teachers characterized their dealings with computers as friendly, and this increased to 100% at the end of the pilot. Teachers remained in agreement that they enjoyed using computers and that computers are a valuable classroom tool that can enhance learning. Teachers were in unanimous agreement that electronic mail increased their comfort level with computers.

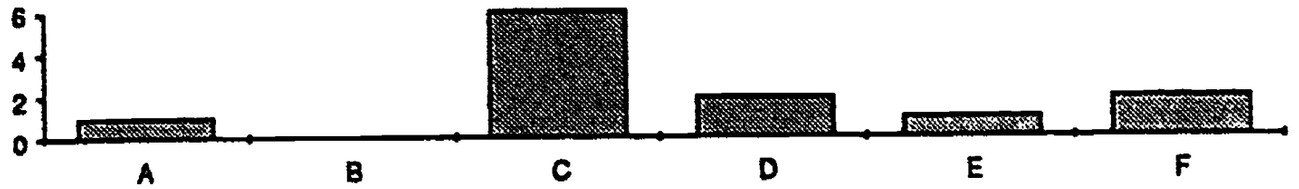
TEACHERS HAVE USED A COMPUTER FOR THESE TASKS



A) PLAYING GAMES
B) WORD PROCESSING DOCUMENTS
C) CREATING SPREADSHEETS
D) BUILDING DATABASES
E) COMMUNICATION BY ELECTRONIC MAIL
F) USING EDUCATIONAL SOFTWARE
G) ACCESSING ON-LINE DATABASES

Eighty-three percent of the teachers reported that learning to use a computer for electronic mail was easy. The main problem teachers encountered when learning electronic mail was in getting on-line for the first time. Some difficulty was also reported in finding time to practice electronic mail and in sending and receiving files.

THE MAIN PROBLEMS ENCOUNTERED WHEN LEARNING ELECTRONIC MAIL WERE



A) SETTING UP THE HARDWARE
B) GETTING A USERID
C) GETTING ON-LINE FOR THE FIRST TIME
D) FINDING TIME TO PRACTICE ELECTRONIC MAIL
E) USING THE INSTRUCTION BOOKLET
F) SENDING AND RECEIVING FILES

At the beginning of the pilot 66% of the students owned or had use of a computer, and this increased to 83% at the end of the pilot. Of the students who had not used a computer, the primary reason for non-use was lack of access. Fifty-three percent of the students initially reported they had used a computer for more than one year, and use during the pilot increased this number to 64% of students.

Student Comments from the Beginning of the Pilot

I like computers.

The use of computers to me both helps me and affects me, but since in my future years I might need some experience on computers for something so I wish to use computers as much as I can.

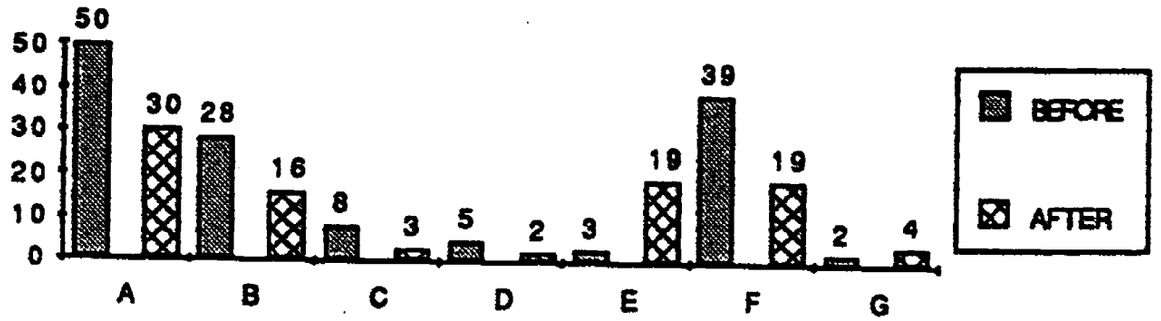
I'm not very good with computers, but when I'm on them, it usually helps me quite a bit.

I love working on a computer because it mainly helps me in all of these things.

Computers are worthless.

Students, like teachers, reported use of computers mainly for playing games, using educational software, and word processing. As was expected, the pilot increased their use of computers for electronic mail.

STUDENTS HAVE USED A COMPUTER FOR THESE TASKS:



A) PLAYING GAMES
B) WORD PROCESSING DOCUMENTS
C) CREATING DOCUMENTS
D) BUILDING DATABASES
E) COMMUNICATION BY ELECTRONIC MAIL
F) USING EDUCATIONAL SOFTWARE
G) ACCESSING ON-LINE DATABASES

Students continued to characterize their dealings with computers as friendly. In the initial attitude survey, 83% of the students felt that computers made learning easier and more enjoyable, and at the end of the pilot this number had increased to 92%. Seventy-nine percent of the students reported they liked using computers prior to the beginning of the pilot, and 96% liked using computers by the end of the pilot. Although computers did not help students to increase their spelling skills, students did report improved keyboarding skills.

Where teachers reported that learning electronic mail was easy, students felt is was a difficult skill to master. Eighty-nine percent of the students reported that as a result of using electronic mail, their comfort level with computers had increased.

◆Frequency of electronic mail use◆

> *My students really enjoy checking their mailbox each morning and have sent more messages than I knew about. I was surprised to see an answer to science stuff 3 that I didn't even know was sent!*
> *Wayne Clark, Pelican, recs044*

One of the measures used to determine the success of electronic mail as a teaching tool was the frequency with which it was used. Examination of the numbers and types of messages that were sent and received during the pilot revealed that a majority of the messages involved the Juneau site.

Approximately 70% of student messages were either to or from the Juneau mailbox of Linda Schultz. Another 12% of student messages were generated by other students. Of the total of 38 student mailboxes nine or approximately 25% were very active. The other student mailboxes were accessed rarely, or were never used by the students. Electronic mail for those students who did use it on a regular basis was a very effective communication tool.

Teachers fared much better in electronic mail proficiency, with nine of ten teachers becoming very active users. Sixty percent of their messages involved communications with Linda Schultz, with approximately 40% of these messages being received from Juneau, and another 20% of the messages being sent by pilot teachers to Juneau. The other use of electronic mail was among the pilot sites themselves.

> *Tuluksak is operational but hasn't been on-line for over a week now. The kids remain enthusiastic about e-mail even after a long break from it. Several of the kids are able to get on-line by themselves, but most need help partly because there are often new and unfamiliar problems. Most of the students have a short attention span and become bored if we don't get on-line after a couple of attempts. I think all messages sent so far have been in the form of casual letters which they really enjoy, especially if there is a prompt reply.*
>
> *Mike McGuire, Tuluksak, recs049*

♦ How electronic mail was used ♦

Electronic mail was used in three different modes of communication:

1. Teacher-to-teacher

With Jason Ohler acting as the electronic mail expert and Linda Schultz acting as the Alaska Science expert, pilot teachers were free to send and receive messages dealing with progress, problems, or questions. They kept track of pilot progress by writing to a weekly on-line journal called "Teacher Talk" (Appendix 7). The kinds of messages sent were

electronic mail questions of Jason
Alaska Science questions of Linda
Alaska Science and e-mail updates and information from Linda
weekly Teacher Talk Journal entries shared among all teachers
friendly messages

2. Student-to-teacher

Students were encouraged to interact with both Jason and Linda as part of their electronic mail training. In addition, they sent and received assignments and lessons and wrote to a "Science Stuff" Magazine (Appendix 8) that was published weekly for all Alaska Science students to read via electronic mail. The kinds of messages sent and received were

friendly messages
Science Stuff magazine articles
completed lessons
electronic mail instructions and assignments

3. Student-to-student

> *The main reason I like electronic mail is because you can send messages really fast throughout the state. You also have the chance to learn different facts about different cities all over Alaska.*
>
> *The only reason I dislike electronic mail is because it takes so long to get everything situated. It took us almost a month to get everything working.*
>
> *Renee, Hoonah, recs079*

All pilot teachers encouraged students to send messages to other student participants. A participant booklet with pictures and biographical information on each student greatly assisted students in finding other students with which to correspond. In addition, classes of students in three of the pilot locations completed some Weather Watch assignments jointly through electronic mail. The kinds of messages sent and received were

friendly messages
questions of other pilot sites
weather data and information

> *The electronic mail is a combination of a phone and typewriter. It gets interesting once you learn it. We can send letters to other students in the state. The thing I like about it is that we can use it anytime we have free time.*
>
> *Rhoda and Barb, Point Lay, recs062*

• Technical problems with use •

There were two ways that the pilot sites could access University of Alaska Computer Network (UACN): directly through local UACN nodes or indirectly through Alaskanet. Most pilot sites dialed directly to the closest local node, although this required dialing long distance for some sites. If access could not occur at one node, another node was often called. One site using Alaskanet had continual problems getting access. Their only solution seemed to be trying a number of times to get UACN access, which required a great deal of precious class time. Once UACN access was granted, the electronic mail session usually proceeded without problems.

A more serious problem which developed at several sites was access to a telephone line from the classroom. Often, the only telephone lines at the school run into the principal's office, and the school may only have one line. Teachers would have to move the computers into the office, and then supervise students both in the office and in their classrooms. During the time students were on-line, no calls could be taken at the school.

Using e-mail continues to be a bit of a logistical nightmare. When I finally got two students on-line this week, the line we were supposed to use wasn't functioning, so we ended up using the phone in the principal's office. Fortunately he didn't mind relocating for an hour and a half. Then one of the students was making an entry into Science Stuff when the line evidently went down. It was pretty frustrating. Maybe next time...

Jeff Walters, Noorvik, recs046

Several sites had telephone lines installed in their classrooms, which gave these sites much better access to UACN. Students in these situations were able to be much more independent learners and made much greater use of electronic mail.

In cases where a teacher had a number of students, the time involved in getting every student on-line was far more than was available during that class period. Sites with fewer students had much better access to e-mail. Pilot teachers felt that the minimum requirements for a classroom of students involved in electronic mail should be two telephone lines into the classroom. Limiting the numbers of students on each computer to two or three also gives them much more time to create the files and messages to be delivered by electronic mail. Sites with good computer and telephone line access had very independent students who could use electronic mail successfully on their own with little teacher direction.

Teachers also suggested that much more time be spent on electronic mail training itself before students were required to use it as part of their classwork. Some members of the pilot team felt it would be helpful to offer a one semester, half-credit, computer skills class as a prerequisite to use of electronic mail with the Alaska Science course or with other courses. While this class would focus on electronic mail use, it would acquaint students with other useful computer features and tools as well.

• Response time for messages •

As a general rule, electronic mail is a less expensive and less immediate medium than a telephone call, but vastly superior to letters and messages sent via U.S. mail. As coordinator for the pilot, Linda Schultz read and responded to electronic mail on the average of three times per day–in the early morning, right before lunch, and again near the end of the workday. Jason Ohler, as e-mail expert, kept a similar schedule for reading and responding to e-mail messages. Thus, students and teachers could get a response as soon as they signed onto their mailbox again, either later that same day or the following day.

There were times when both the sender and receiver of messages were on-line at the same time. In that case, it was a matter of minutes (message composition time) before a response was received.

♦ Cost per student ♦

Because of the large number of students involved in the pilot and the limited number of mailboxes available, students were assigned to mailboxes in pairs, or in a few cases as groups of three or four. Pilot teachers specified groupings. Those students who had poor school attendance generally were assigned to mailboxes with three or four students. Base cost of a userid (mailbox) was $10/month, or approximately 1½ hours of time logged into the userid. Costs per userid increased according to the time spent on the system. Heavy users could use up resources much faster, spending as much as $100 monthly in certain cases. Students who had never logged onto the UACN system still generated that $10/monthly fee if mailboxes had been assigned to them.

As discussed previously, there were a total of 38 mailboxes used by students. Nine were very active, and used the majority of funds. The other 29 mailboxes were charged just the base monthly fee if students had accessed them. Figuring the monthly per student costs for those students who were active users, the average monthly cost per student was $23.

♦ Some teacher comments about e-mail ♦

Teachers were asked to comment on two questions dealing with the electronic mail:

How has e-mail added to or detracted from your classroom?

How does e-mail work as a communications tool?

During the April 27 audioconference, the following comments were collected and reflect the teacher dialogue in response to these questions.

Linda Schultz, Juneau

E-mail is an easy way for me to communicate with you, but I realize it is often hard for you to regularly read your mail. I like the immediateness of e-mail to respond to daily situations. It should be a good way for students to send and receive assignments.

Jason Ohler, Vancouver

We want e-mail to be something helpful to open doors. The time crunch of only having one semester is unfortunate. E-mail needs a longer lead-in time before it becomes transparent to students.

Wayne Clark, Pelican

I agree–we needed more time. The students are now over their initial shyness and know how the system works, and it is time to quit. E-mail is a big asset to me. It provides access to information and an easy way to communicate. Everything you need to communicate is right there with commands for doing whatever needs to be done. Use of e-mail is much more real to students now that they are in study groups. We need more access to e-mail during class. We have only one laptop, and it is hard to get everyone on-line during the class period.

Carol Clay, Northway

The time crunch is hard. The kids are really getting into it now that it is time to end. I think e-mail is an excellent tool for the classroom.

Jan Skaflestad, Hoonah

I think it is best to take several weeks to teach e-mail, then start on coursework. I am not even monitoring the students' e-mail use anymore. They are having a good time with it and seem not to need help using the system. Now the problem is to get them motivated in getting their science work done. The students are excited about e-mail.

Jason Ohler, Vancouver

The excitement is good for now, but e-mail should then become transparent and be used as a learning tool.

Mark Voss, Anaktuvuk Pass

I don't know how useful e-mail will be when it is not a pilot. Maybe, if students don't have a science teacher it will be more valuable to be connected to one via e-mail. E-mail is too difficult for some individual students to go through by themselves, but I have a couple of hotshot students who really like e-mail, and they are helping me with the others. E-mail and computers are part of our school's curriculum because we feel everyone needs to know about this tool that is so much a part of our lives. Personally, I really enjoy e-mail and am trying to get the school to hook me up to Compuserve.

Jason Ohler, Vancouver

I would recommend Mix over Compuserve.

Steve Boharski, Point Lay

I enjoy e-mail although, with science class in the morning, it is hard. We seem to have limited access to UACN in the morning. It is a technical problem associated with the telephone lines. We usually dial Kotzebue, and, if that doesn't work, we dial Anchorage. I have to sit with the kids to help them through it. It takes lots of time to let everyone on with only one phone line.

Mike McGuire, Tuluksak

I agree with everyone about needing more time. My large class size makes it hard to work with a big group. I have a problem getting access to a telephone line, but, once the computer is connected, my access to UACN is good.

In a separate survey, teachers were also asked what general benefits electronic mail provided. The most mentioned benefit was that students became more computer literate. Students also greatly improved their communication skills with others and became more self-confident. Their fears of computers decreased.

• E-mail as a motivational, communication, and educational tool •

Teachers asked to rate the benefits of electronic mail to their students felt that its most useful function was as a motivational tool. It enabled the students to see a larger picture than their small village class. They were a part of an all-Alaska science class, communicating with similar students in various communities throughout the state. Those students who got proficient at electronic

mail really got hooked, and, if they needed any encouragement, it was to continue with their science work as well as their electronic mail work. Many of the initial interactions among students involved general and friendly comments, rather than messages relating to their science work. The electronic mail medium removed the threat of face-to-face confrontation with a stranger and allowed students to get acquainted with a neutral medium.

> *E-mail was a lot of fun. It showed me how to send messages to other villages. It's cool when you write a message and in a few minutes someone in another village will have it. Learning e-mail was easy especially when you use it.*
>
> *Rhoda, Pt. Lay, recs062*

Pilot teachers felt that electronic mail with the Alaska Science teacher provided additional motivation. Using electronic mail helped some students to complete their assignments. The increased communication and interaction with other people and the general enjoyment students received from using electronic mail were powerful motivating factors which also increased self-confidence. One site felt that electronic mail was not a useful motivating device since lower ability students could not relate to the use of a computer.

Communication was the second most useful function of electronic mail as rated by the pilot teachers. Electronic mail was a good way to get timely messages about science, electronic mail instructions, or the pilot itself. One way the immediateness of e-mail was used was in sending special lessons that dealt with scientific ramifications of the Prince William Sound Oilspill. Students received these via e-mail on the very day they were written.

Electronic mail as an educational tool got third billing by the pilot teachers. Although several educational uses were demonstrated, most teachers felt that one semester was too short a period of time to really delve into all the special ways electronic mail could contribute to the teaching of Alaska Science. Students who were grouped together to complete Weather Watch lessons became much more proficient in using e-mail for educational purposes, and e-mail contributed greatly to their understanding of the larger weather patterns across the state. However, because of the shortness of the pilot, many students did not get the opportunity to work together with other students. Other students did send and receive lessons to Juneau via e-mail, but this did not become a regular occurrence, again because of time constraints.

Probably the biggest surprise to come of the use of electronic mail was the assistance it gave to students in small villages in finding out more about other Alaskan students and realizing that there was life outside their own little classroom and school. It allowed students to "meet" and interact together in a non-threatening manner. Electronic mail also increased confidence and thus improved communication skills in other areas of school.

I am studying e-mail for the credit and to learn more about computers. I like what I do with e-mail, I wrote my cousin in Selawik, but I didn't receive a letter back from him, although I've gotten letters from other kids all over the state and I had written back also. E-mail is a lot of fun. I've learned a lot about it, although I would like to learn a lot more. I hope a lot of kids study e-mail.

Elsie, Kotzebue, recs051

Audioconferences

• Teacher and student audioconferences •

Teachers held a total of nine audioconferences as a whole group and several additional audioconferences as small groups. Small groups of students held a total of three audioconferences. Audioconferences were an instructional, informational, and motivational tool.

Care was taken to provide times convenient for the pilot participants, and a standard time of 3-4 p.m. was set for each large group conference. Attendance at audioconferences varied. Teacher audioconferences were held approximately every three weeks, providing information, services, and training to all pilot sites. In addition to electronic mail, audioconferences were used extensively with pilot teachers, both as a training mechanism and as a way of sharing pilot information among the pilot sites.

An agenda for each audioconference was sent to participants by both electronic and U.S. mail for the first several conferences and solely by electronic mail for subsequent audioconferences after teachers were competent in downloading files. (See Appendix 9.) Participants used the list and the discussion suggestions and time sequences to work through the conference agenda with Linda Schultz generally acting as moderator.

Audioconferences were also used in a limited sense with students. For instance, groups of students conferenced to discuss the upcoming TALKBACK in which they would be participating. Another group used audioconferencing to discuss their shared Weather Watch assignments. To facilitate individual school scheduling and to maintain student interest, these conferences were limited to one-half hour. Students were able to hear the voices of those other students to whom they had been e-mailing. Teachers reported that the student participants took a while to become accustomed to the technology itself and had to overcome initial shyness. By sharing information on a specific subject, students received a much clearer understanding of other Alaskan communities.

At least we were able to advance to Lesson 5 of the weather unit and to participate in the audio-conference with Point Lay and Hoonah. It is great to see the students who are so brash in the classroom, suddenly go silent for lack of words in front of the microphone. The chance to speak to someone in another community was a completely new experience for them. We will be sharing weather reports all next week with two other schools so this should be a good experience too.
Wayne Clark, Pelican, recs044

◆Technical and logistic problems◆

Of 15 audioconferences held, only one had to be rescheduled because of problems with the bridge. On two other occasions, there were technical difficulties with some sites that resulted in poor reception, and some sites had to be dropped from the conference. For the remaining conferences, the technology worked perfectly. The conference personnel were easy to work with and provided adequate scheduling with a limited amount of notice. Since they also use UACN electronic mail, a phone call was not always necessary to set up a conference.

◆Audioconference costs◆

Costs for audioconferencing are $38/hr/site. The Alaska Teleconferencing Network bills per conference on the basis of number of sites participating and the amount of time spent on the conference. Thus, if a site is required to drop off early or joins the audioconference after the initial start time, only the time on conference is counted towards the price. Average cost for the hour-long teacher conferences regularly held throughout the pilot was $336.25 for the 12 possible sites.

There was an average of 8 sites participating in each of these conferences. In general, those sites which were most active in the pilot were the ones which chose to attend the audioconferences.

◆What teachers said about the audioconferences◆

Audioconferences were a chance to discuss problems and hear the progress of other sites. Teachers didn't feel so isolated, because they were able to meet regularly with other pilot teachers via the audioconference network. They liked picking up the agenda via e-mail. In the first few audioconferences, too much time was spent on individual problems, which made the conferences less interesting for other participants. This problem was solved in subsequent audioconferences by selectively choosing to answer some of these problems by individual telephone consultations after the audioconference ended. Phone calls and e-mail reminder messages were a help in remembering the conference dates. Audioconferences gave teachers a chance to use other pilot sites as educational tools with students.

TALKBACKS

♦ TALKBACK coordination with the pilot ♦

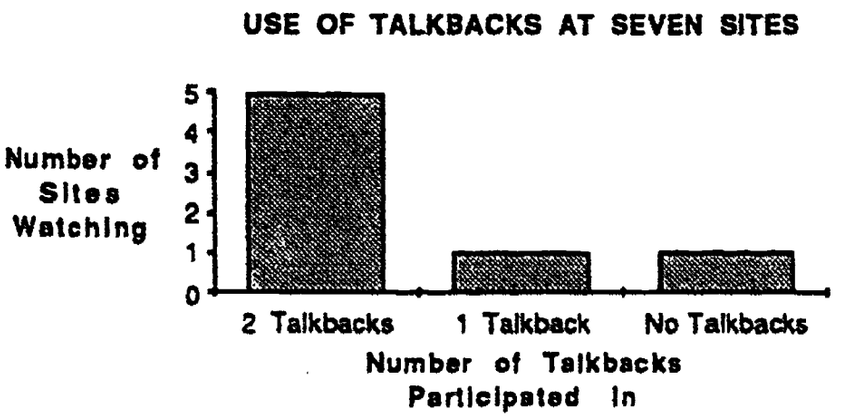
TALKBACKS are educational television programs that are produced by the Alaska Department of Education for use by the teachers and students of Alaska. They are live programs carried by RATnet that take telephone calls from students who have questions about the program content. To use these programs, sites need a television monitor, the ability to receive the local RATnet channel, and a telephone for use in asking questions during the program.

During the spring of 1989, there were several TALKBACKS that dealt with science and health topics: Marine Debris, AIDS, Health Issues, and the Prince William Sound Oilspill.

Students were encouraged to participate in the first TALKBACK on Marine Debris, and several audioconferences were held prior to this TALKBACK to acquaint students with the procedure. Background information and encouragement was also sent to each site concerning the Oilspill TALKBACK.

♦ TALKBACK participation ♦

Of the seven sites who responded to the survey, five reported they had watched both the suggested TALKBACKS, and one site watched one TALKBACK. A few students were able to get calls through to the programs.



♦ Student reaction to TALKBACKS ♦

Students who were able to get questions on-line were very pleased, and this enhanced their self-image. Other students were too shy to attempt a question of the TALKBACK experts and were content to listen. Even though they didn't ask a question directly, they derived benefit from listening to other student questions. Teachers liked the TALKBACKS because they are a way to present current issues.

It was hard for several sites to take advantage of the TALKBACKS because of the crowded school schedules. Several pilot sites felt the TALKBACKS were frustrating because it was very hard to get their questions through the limited number of phone lines provided by the TALKBACK program. They felt that the telephone access was not good and should be improved. In addition, because they had no telephone lines in their rooms, it was difficult for some sites to watch the program and at the same time try to get a question through. The students would have to go to another room to get telephone access. One suggestion was to link TALKBACKS and electronic mail for increased communication possibilities.

◆ IMPLICATIONS FOR MIGRANT STUDENTS ◆

It was the original premise of this pilot that electronic mail coupled with individual Alaska Science units would be a very useful tool for students undergoing migrant travels. However, the nature of migrant activities for Alaskan families doesn't lend itself to electronic mail use or even much study time for students during these activities. Basically, the migrant students in this pilot were of two categories: commercial fishing families from southeast Alaska and subsistence fishing families in northern and interior Alaska.

Commercial fishing families have short periods of intense fishing activities in the spring and early fall, depending on the type of fishery in which they are participating. There is almost no time for these students to be involved in schoolwork during the fish openings, as every minute counts. Schools tend to alter the school calendar to spend more time in school during the winter months (sometimes Saturday sessions) to allow for fishing activities. There is a device which could be used to send electronic mail messages from a computer over VHS radios found in fishing vessels, but none was used because of the intense nature of the fisheries. A few Pelican students were given the Alaska Science unit to take with them on the fishery openings, but most of the work was made up once the student returned to school. The individual Alaska Science units, since they are written to be studied independently as well as with a class, lend themselves very well to the varied attendance patterns of migrant students.

Subsistence fishers of the northern and interior portions of Alaska tend to be in fish camp during the summers. Their school attendance is not affected so much by the migrant activities as by participation in other school functions. It would be very unusual to have telephone access in fish camps, so electronic mail is not easily feasible in these situations. If students had a desire to study and time to spare for it, they could independently use the Alaska Science units. However, they would not be able to get help over electronic mail. For these students, electronic mail access coupled with Alaska Science units during the school year could help them overcome credit deficiencies since they could complete the course in addition to their regular course load.

◆ SUMMARY ◆

The Alaska Science Pilot involved over 100 students at 10 pilot sites in six districts representing many regions of Alaska during the second semester of the 1988-89 school year. Pilot teachers were given electronic mail training and orientation in the Alaska Science course, which is a full-year high school general science course. They were given five Alaska Science units per student, choosing those which would best match their original second semester curriculum plans. A total of 23 laptop computer systems, which contained built-in word processing and telecommunications programs as well as internal modems, were loaned to the sites on a request basis. The pilot sites also had the videotapes and materials which accompanied their choice of units and selected library books for reference.

Although five units comprises a full semester of Alaska Science, the students in the pilot completed varying numbers of units, depending on the activities and curriculum needs at their particular school. The format and content of Alaska Science was very well received. The reading level and lesson length were appropriate for a majority of the students. Videotapes provided a good method of acquainting students with science topics for which they had no local resources or examples, and they proved to be very popular.

TALKBACKS provided good motivation although it was hard for students to get calls through to the program. Some schools had a hard time providing time for the TALKBACKS.

Audioconferences were regularly scheduled for pilot teachers and provided additional electronic mail and Alaska Science training, information, and sharing times, generally coordinating pilot activities for the semester. A limited number of audioconferences were scheduled for students, providing chances for them to work together orally. Some students had a difficult time overcoming their shyness during this relatively new experience.

Electronic mail was heavily used by 90% of the pilot teachers and 25% of the pilot students. A majority of the electronic mail messages involved communication with Linda Schultz, Juneau-based Alaska Science Pilot Coordinator. Electronic mail was a powerful motivator that greatly increased communication skills in those students who became proficient in its use. For teachers, electronic mail provided a vital communication link with fellow educators. Some difficulty was experienced at several pilot sites because there were too many students to train in the use of electronic mail, and because there was no adequate access to telephone lines. The average cost for active student users was $23/month.

No opportunities were available during the pilot to test this delivery system on migrant students during their migrant travels, but data on needs of these particular migrant students does not indicate that this is a necessary option. Alaska Science combined with distance delivery methods in a classroom or individual setting provides a good mechanism for migrant students as well as other students to achieve science credit and increase their communication skills.

◆ RECOMMENDATIONS ◆

The results of the pilot study indicate that both electronic mail and Alaska Science have great potential to augment the science offerings at small rural high schools and to provide independent study for those students who are credit deficient. Specific improvements to this delivery system are as follows:

*Six Alaska Science units per semester is too much work. Provide five units per semester and let individual school sites choose the amount sufficient for their students to study.

*In some Alaska Science lessons, the reading level is too high for certain students. Provide lower level reading assignments or other assistance to deal with the reading level problems.

*Continue the Alaskan emphasis and unit style approach with choice lessons. This format provides activities for a variety of learning styles while allowing for independent study.

*Augment the videotape selections to provide experiences and footage for students whose corner of Alaska might not provide a particular ecosystem, animal, or scientific phenomena as described in the lessons.

*Provide a two-day workshop for teachers involved in the Alaska Science distance delivery course. The one-day workshop format doesn't allow enough time for all the training necessary.

*Provide adequate time for learning electronic mail before students are required to use electronic mail with Alaska Science. Students need more time to become comfortable with electronic mail. Suggestions ranged from a one-semester computer skills course prior to electronic mail use in Alaska Science to a sister school approach, pairing students at one school with students from another school during electronic mail instruction to just encouraging electronic mail pen pals.

*Provide at least two telephone lines within the classroom for easy access to electronic mail.

*Provide one computer to every two or three students to allow for adequate computer access for preparing files and getting on-line.

*Use the nearest available node rather than Alaskanet access nodes since the UACN nodes are more dependable.

*Continue to use TALKBACKS and audioconferences since both proved to be worthwhile tools to increase science understanding.

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APPENDIX 1

■ Unit Evaluation ■

This is the pilot year for the revised Alaska Science course. Please give your opinion on the following for this specific unit:

1. How I Completed This Unit (Choose one)

❑ In a regular science class, with classmates also studying this unit.

❑ On my own, outside of class, with a teacher or parent monitor to help me.

❑ On my own, outside of class, with no monitor to help me.

❑ While I was traveling for migrant activities.

Comments:

_____
_____
_____
_____

2. Format and Style

Were the lessons easy to follow?
❑ Yes ❑ No

Did you understand what was required for each lesson?
❑ Yes ❑ No

Were the type and illustrations easy to read?
❑ Yes ❑ No

Comments:

_____
_____
_____
_____

3. Reading Level

Were the lessons: ❑ too long
❑ too short
❑ or just right?

Were they: ❑ too easy
❑ about right
❑ or too hard to read?

Comments:

_____
_____
_____
_____

4. Lesson Content
Which lesson that you completed was your favorite? Why?

_____
_____
_____
_____

Which lesson that you completed was your least favorite? Why?

_____
_____
_____
_____

Comments:

_____
_____
_____
_____

5. Electronic Mail

Did you use electronic mail with this unit?
❑ Yes ❑ No

Did you have any problems with using it?
❑ Yes ❑ No

Did electronic mail help you to complete this unit and learn from it?
❑ Yes ❑ No

Comments:

_____
_____
_____
_____

6. Technologically Enhanced Lessons

Did you choose to complete any lessons based on videotape or computer programs?
❑ Yes ❑ No

Were they appropriate for this unit?
❑ Yes ❑ Somewhat ❑ No

Did you learn from them?
❑ Yes ❑ Somewhat ❑ No

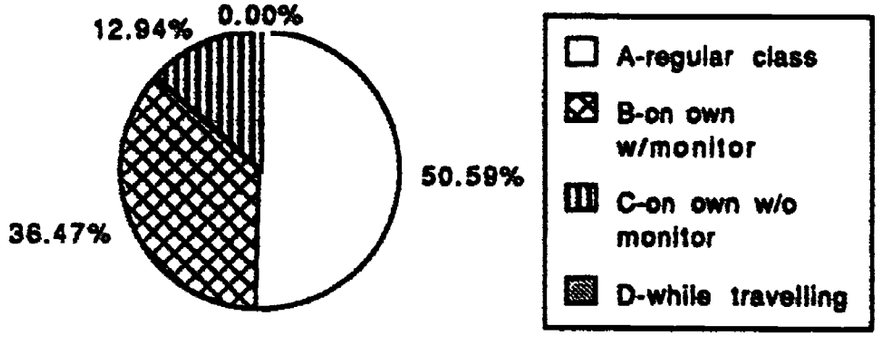
Comments:

_____
_____
_____
_____

APPENDIX 2

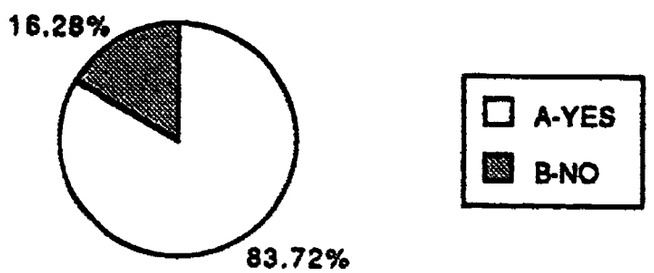
Results of Unit Evaluation (Consult Appendix 1)

1. Unit Completion

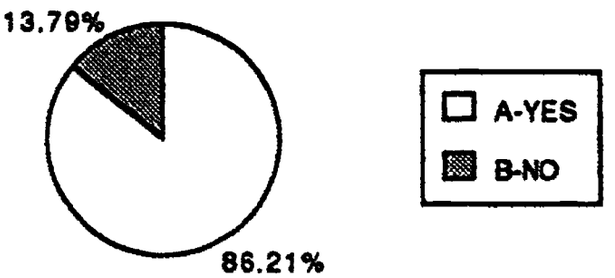


2. Format and Style

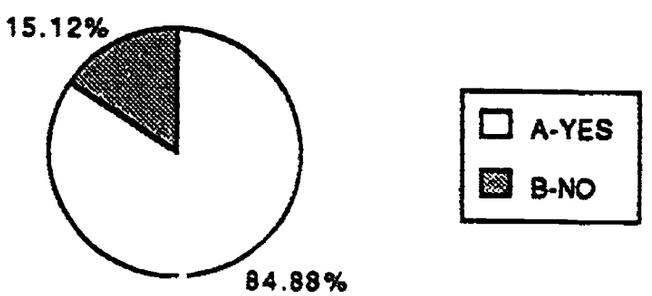
WERE THE LESSONS EASY TO FOLLOW



DID YOU UNDERSTAND WHAT WAS REQUIRED FOR EACH LESSON

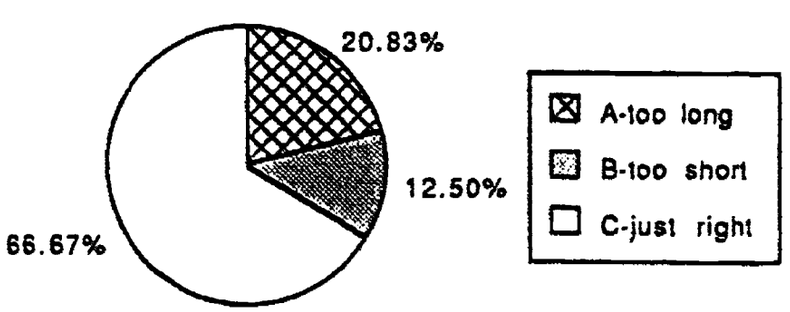


WERE THE TYPE AND ILLUSTRATIONS EASY TO READ

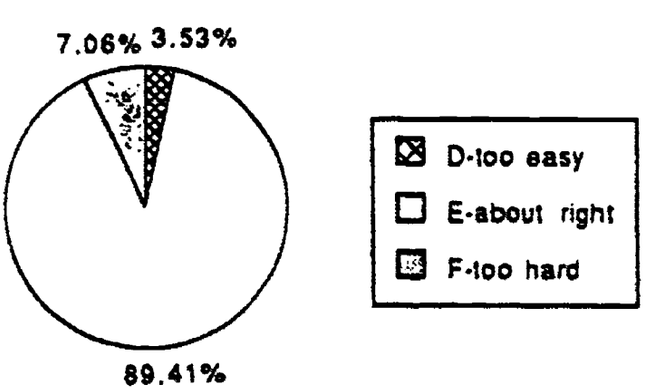


3. Reading Level

LESSON LENGTH

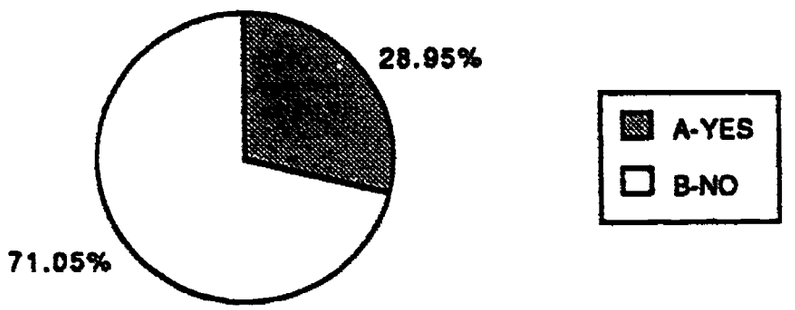


READING LEVEL

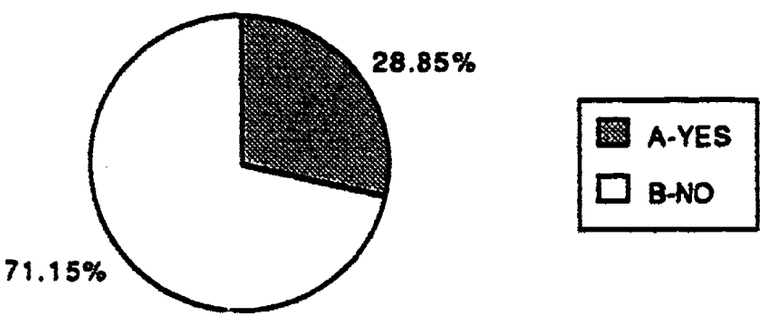


5. Electonic Mail

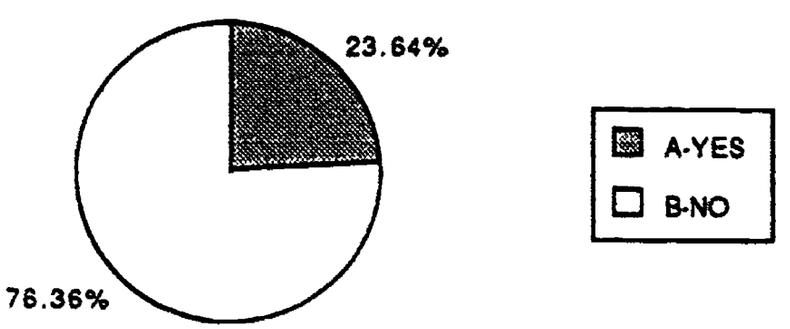
DID YOU USE ELECTRONIC MAIL WITH THIS UNIT



DID YOU HAVE ANY PROBLEMS WITH USING IT

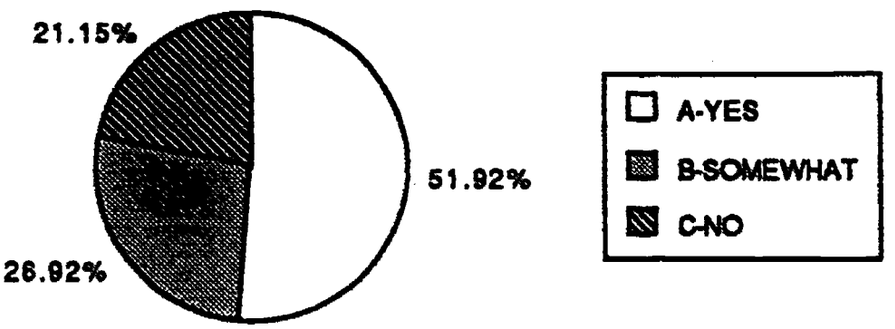


DID ELECTRONIC MAIL HELP YOU TO COMPLETE THIS UNIT AND LEARN FROM IT

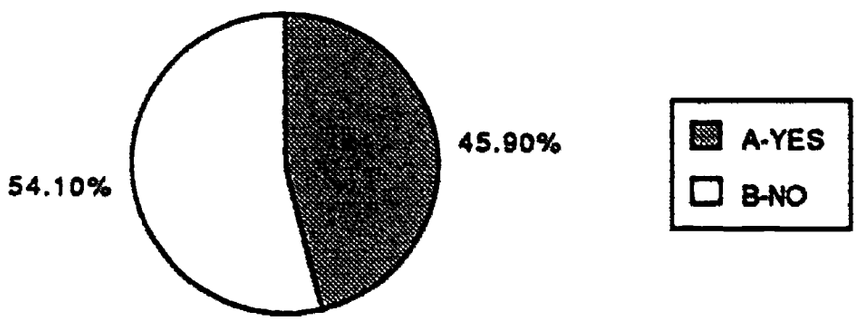


6. Technologically Enhanced Lessons

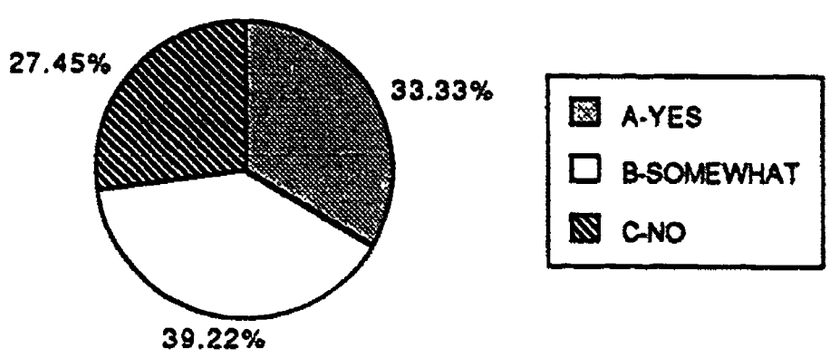
DID YOU LEARN FROM THE VIDEOTAPES OR COMPUTERS PROGRAMS



DID YOU CHOOSE TO COMPLETE ANY LESSONS BASED ON VIDEOTAPE OR COMPUTER PROGRAMS



WERE THE VIDEOTAPES OR COMPUTER PROGRAMS APPROPRIATE FOR THIS UNIT



APPENDIX 3

ALASKA SCIENCE

Centralized Correspondence Study
P.O. Box GA Juneau, Alaska 99801
907-465-2835
UACN: jsics or rmccs

TEACHER ATTITUDE PROFILE

For the purposes of pilot evaluation, we are asking each participant to complete an attitude profile at the start of this project, and again at the end. Your answers will help to indicate any changes in your feelings about using computers with classes. Please answer the following questions by circling the letter for the best answer:

1. I own or have use of a computer.
   a) Yes (skip to question 3)
   b) No (go to question 2)

2. The reason I haven't used a computer is
   a) I don't have access to one
   b) I don't see their value
   c) I am afraid of computers
   (Now skip to question 5)

3. I have used a computer
   a) less than 3 months
   b) 3 months to one year
   c) more than one year.

4. I have used a computer for these tasks:
   a) playing games
   b) word processing documents
   c) creating spreadsheets
   d) building databases
   e) communication by electronic mail
   f) using educational software
   g) accessing on-line databases

PLEASE RATE THE FOLLOWING QUESTIONS: 1 2 3 4 5 6

5. I would characterize my dealings with computers as unfriendly friendly

Comments:

6. Computers are a valuable classroom tool. agree disagree
7. Computers make learning easier. agree disagree
8. Computers make learning more enjoyable. agree disagree
9. I like using computers. agree disagree

. . . . . .

ANSWER THESE QUESTIONS AT THE END OF THE ALASKA SCIENCE PILOT:

10. Learning to use a computer for electronic mail was easy difficult
11. As an educational and communications tool, I would characterize electronic mail as

extremely valuable not valuable

12. As a result of using electronic mail, my comfort level with computers has

increased decreased

13. Electronic mail use greatly increased my understanding of Alaska Science.

agree disagree

14. The main problems encountered when learning electronic mail were

a) setting up the hardware

b) getting a userid

c) getting on-line for the first time

d) finding time to practice electronic mail

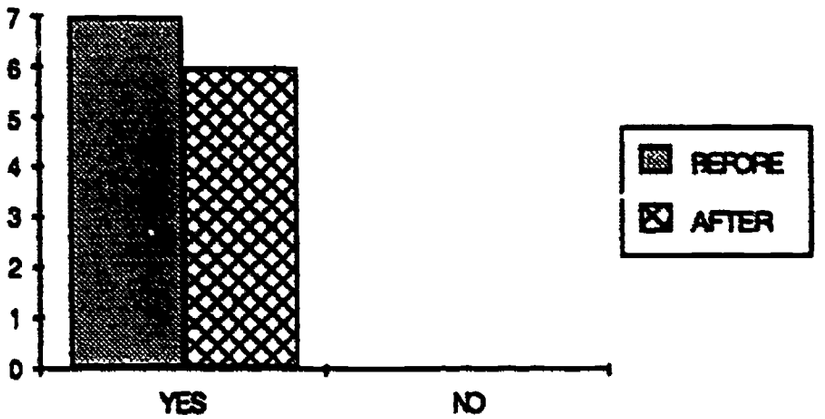
e) using the instruction booklet

f) sending and receiving files

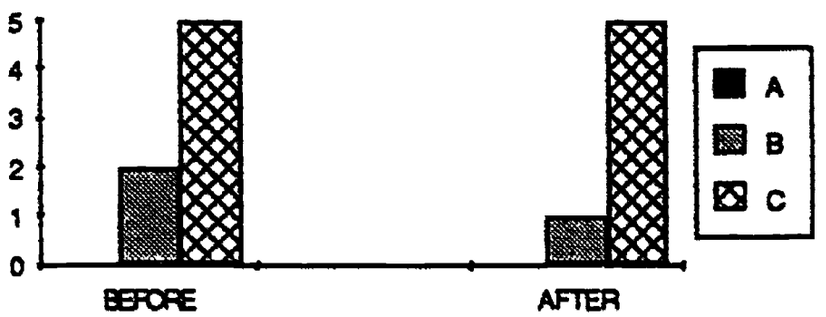
APPENDIX 4

Results of Teacher Attitude Profile (Consult Appendix 3)

I OWN OR HAVE USE OF A COMPUTER

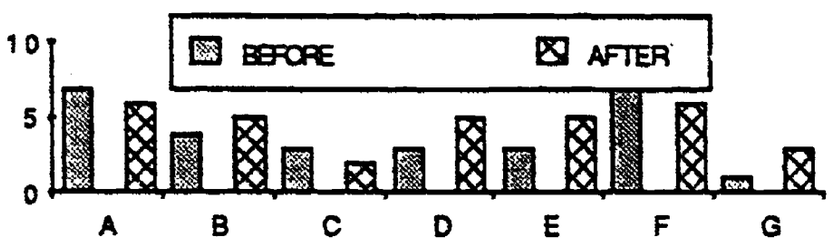


I HAVE USED A COMPUTER



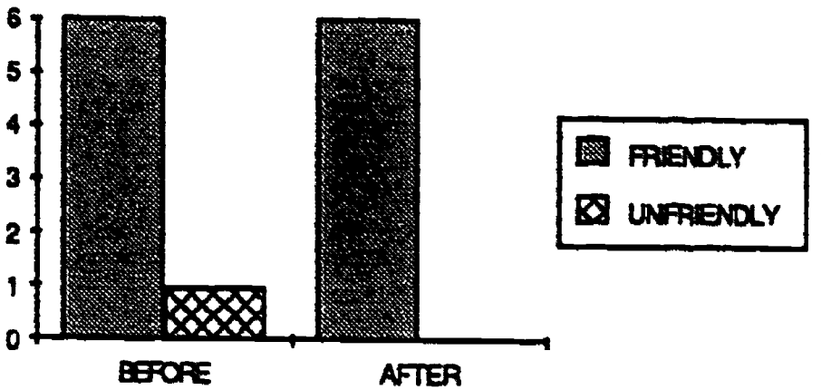
A) LESS THAN 3 MONTHS
B) 3 MONTHS TO 1 YEAR
C) MORE THAN ONE YEAR

I HAVE USED A COMPUTER FOR THESE TASKS

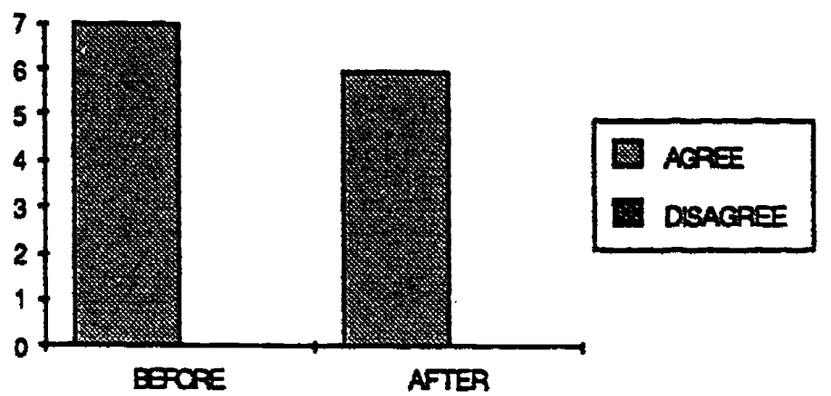


A) PLAYING GAMES
B) WORD PROCESSING DOCUMENTS
C) CREATING SPREADSHEETS
D) BUILDING DATABASES
E) COMMUNICATION BY ELECTRONIC MAIL
F) USING EDUCATIONAL SOFTWARE
G) ACCESSING ON-LINE DATABASES

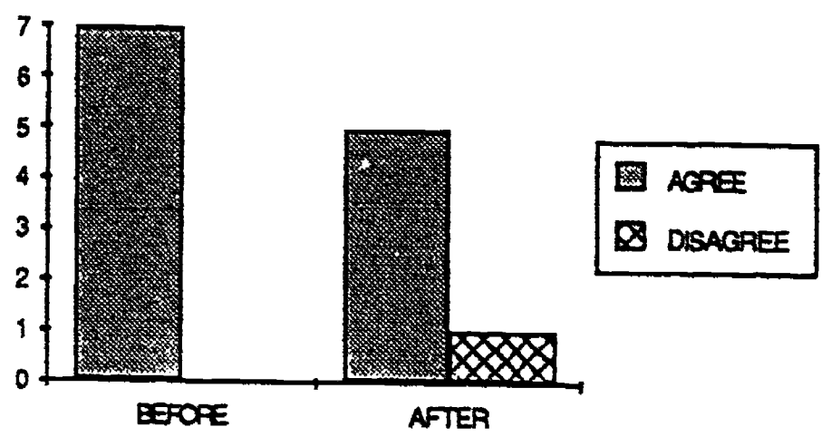
I WOULD CHARACTERIZE MY DEALINGS WITH COMPUTERS AS



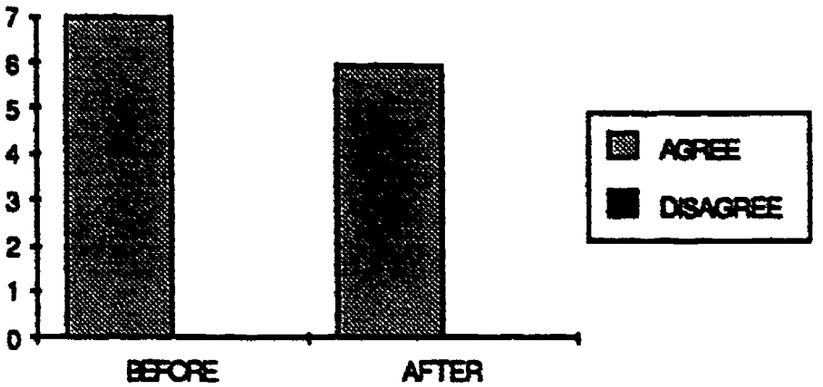
COMPUTERS ARE A VALUABLE CLASSROOM TOOL



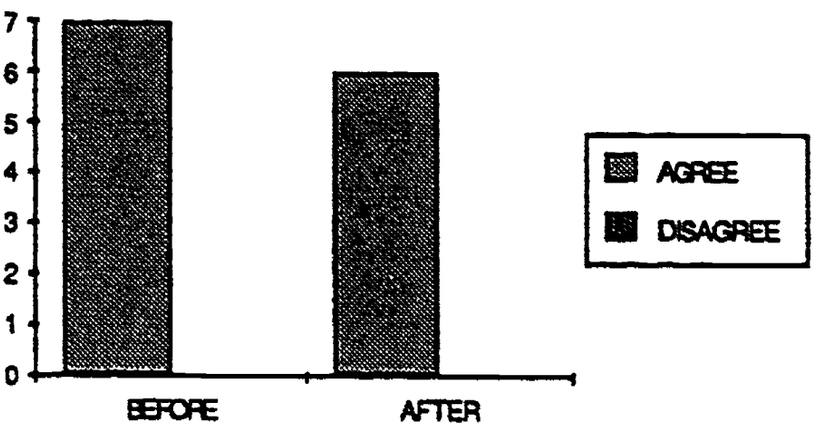
COMPUTERS MAKE LEARNING EASIER



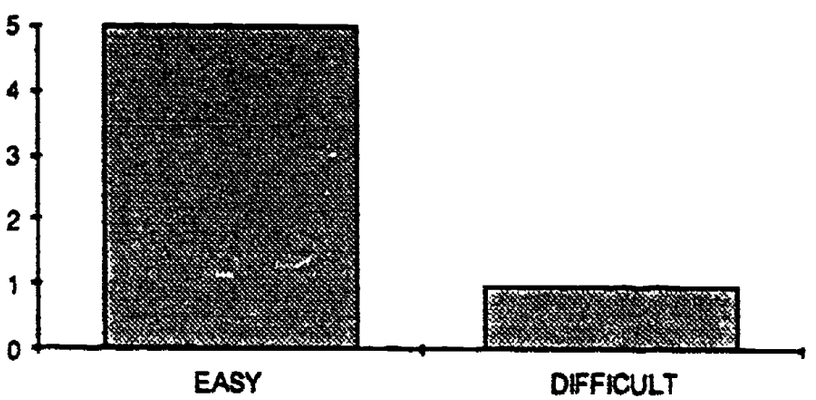
COMPUTERS MAKE LEARNING MORE ENJOYABLE



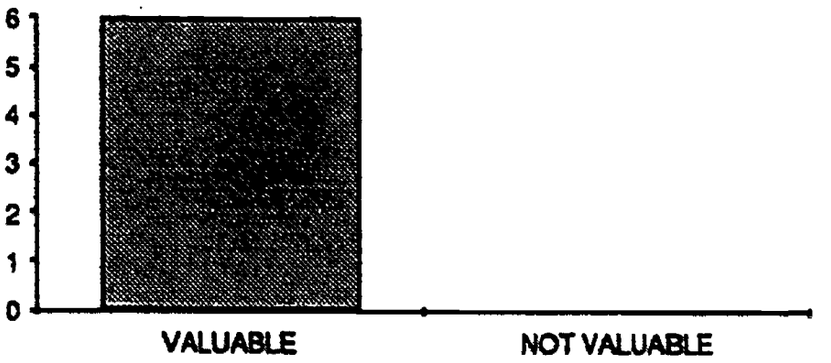
I LIKE USING COMPUTERS



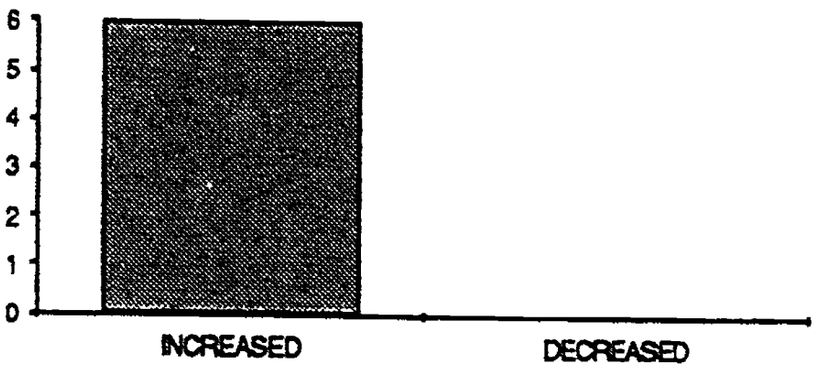
LEARNING TO USE A COMPUTER FOR ELECTRONIC MAIL WAS



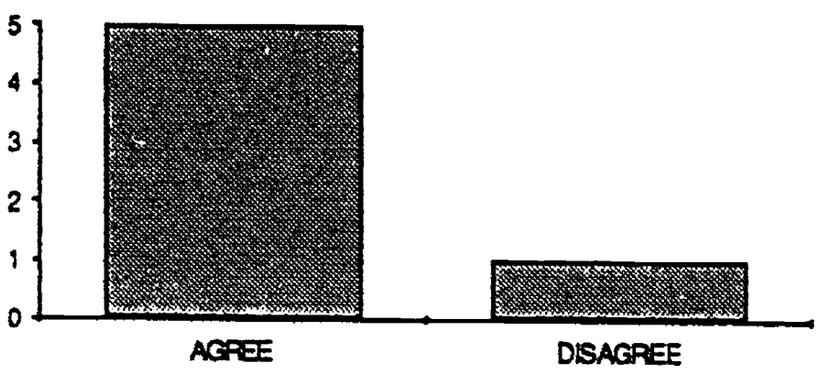
AS AN EDUCATIONAL AND COMMUNICATIONS TOOL, I WOULD CHARACTERIZE ELECTRONIC MAIL AS



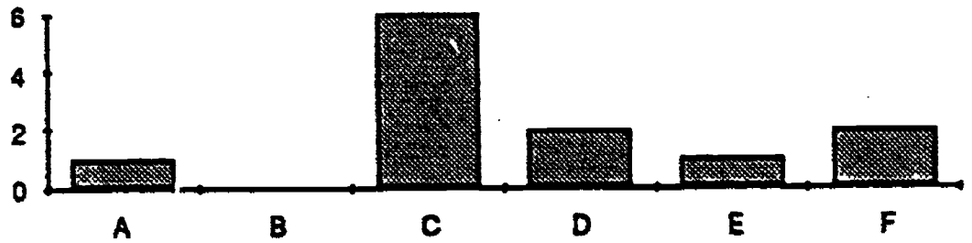
AS A RESULT OF USING ELECTRONIC MAIL, MY COMFORT LEVEL WITH COMPUTERS HAS



ELECTRONIC MAIL USE GREATLY INCREASED MY UNDERSTANDING OF ALASKA SCIENCE



THE MAIN PROBLEMS ENCOUNTERED WHEN LEARNING ELECTRONIC MAIL WERE



A) SETTING UP THE HARDWARE
B) GETTING A USERID
C) GETTING ON-LINE FOR THE FIRST TIME
D) FINDING TIME TO PRACTICE ELECTRONIC MAIL
E) USING THE INSTRUCTION BOOKLET
F) SENDING AND RECEIVING FILES

APPENDIX 5

ALASKA SCIENCE

Centralized Correspondence Study
P.O. Box GA Juneau, Alaska 99801
907-465-2835
UACN: jslcs or rmccs

STUDENT ATTITUDE PROFILE

For the purposes of pilot evaluation, we are asking each participant to complete an attitude profile at the start of this project, and again at the end. Your answers will help to indicate any changes in your feelings about using computers with classes. Please answer the following questions by circling the letter for the best answer.

1. I own or have use of a computer.
   a) Yes (skip to question 3)
   b) No (go to question 2)

2. The reason I haven't used a computer is
   a) I don't have access to one
   b) I don't see their value
   c) I am afraid of computers
   (Now skip to question 5)

3. I have used a computer
   a) less than 3 months
   b) 3 months to one year
   c) more than one year.

4. I have used a computer for these tasks:
   a) playing games
   b) word processing documents
   c) creating spreadsheets
   d) building databases
   e) communication by electronic mail
   f) using educational software
   g) accessing on-line databases

PLEASE RATE THE FOLLOWING QUESTIONS: 1 2 3 4 5 6

5. I would characterize my dealings with computers as friendly unfriendly

Comments:

6. Computers make learning easier. agree disagree
7. Computers make learning more enjoyable. agree disagree
8. I like using computers. agree disagree
9. Using computers increases my spelling skills. agree disagree
10. Using computers increases mywriting skills agree disagree
11. Using computers improves my keyboarding skills. agree disagree

. . . . . .

ANSWER THESE QUESTIONS AT THE END OF THE ALASKA SCIENCE PILOT:

12. Learning to use a computer for electronic mail was easy difficult
13. As a result of using electronic mail, my comfort level with computers has

increased decreased

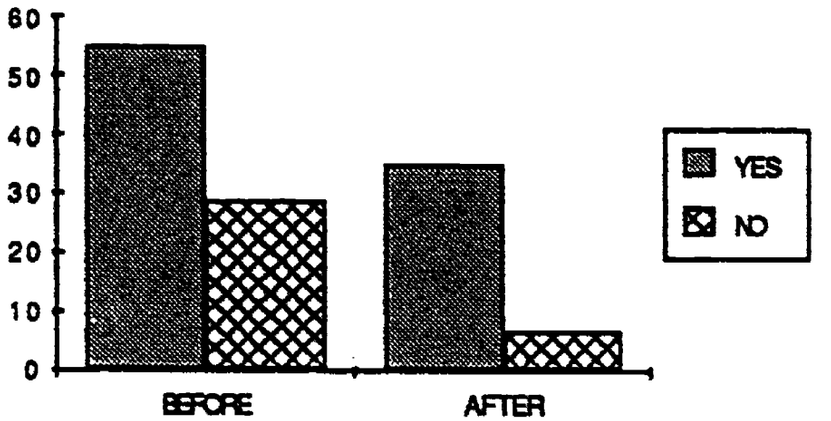
14. Electronic mail use greatly increased my understanding of Alaska Science.

agree disagree

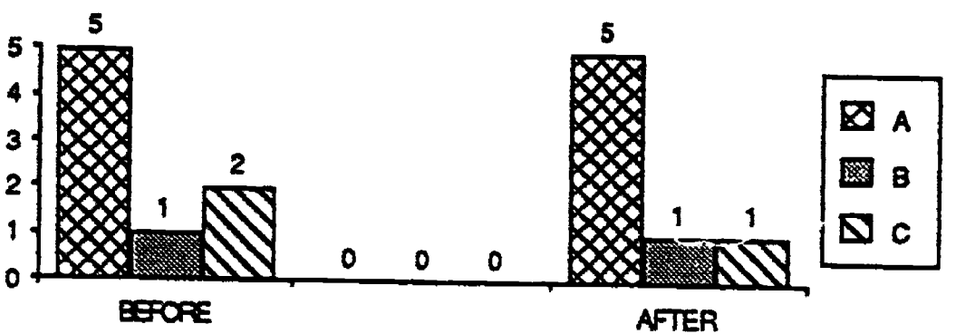
APPENDIX 6

Results of Student Attitude Profile (Consult Appendix 5)

I OWN OR HAVE USE OF A COMPUTER

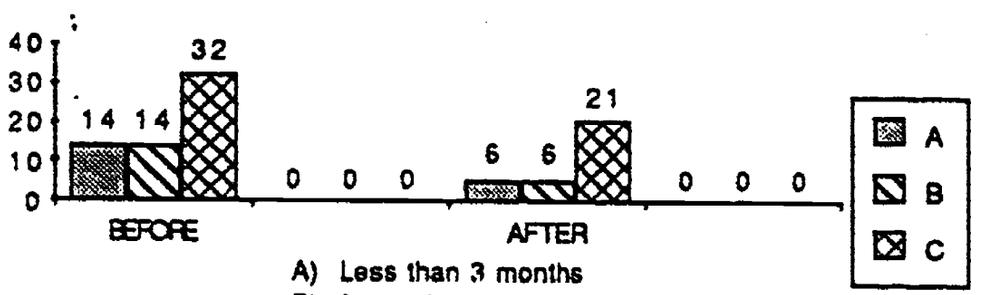


THE REASON I HAVEN'T USED A COMPUTER IS



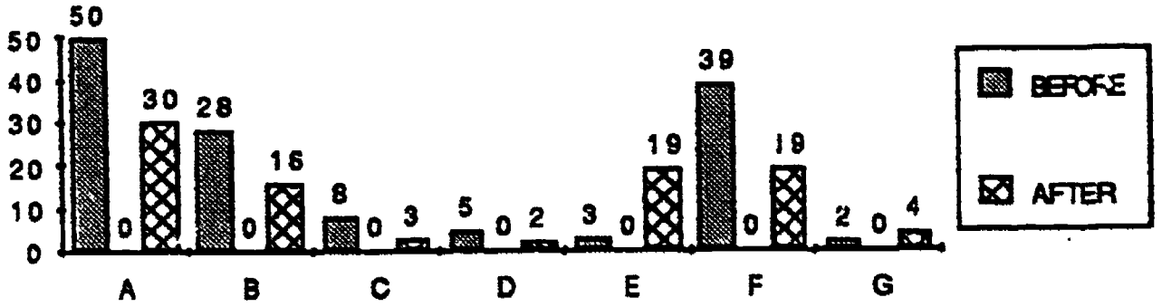
A) I don't have access to one
B) I don't see their value
C) I am afraid of computers

I HAVE USED A COMPUTER



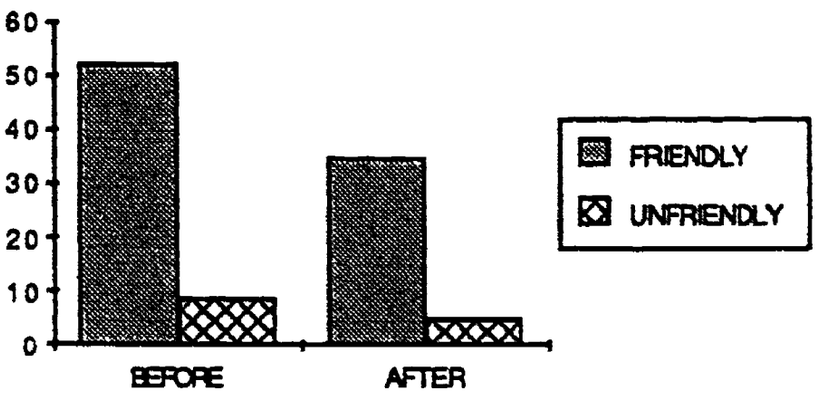
A) Less than 3 months
B) 3 months to one year
C) more than one year

I HAVE USED A COMPUTER FOR THESE TASKS

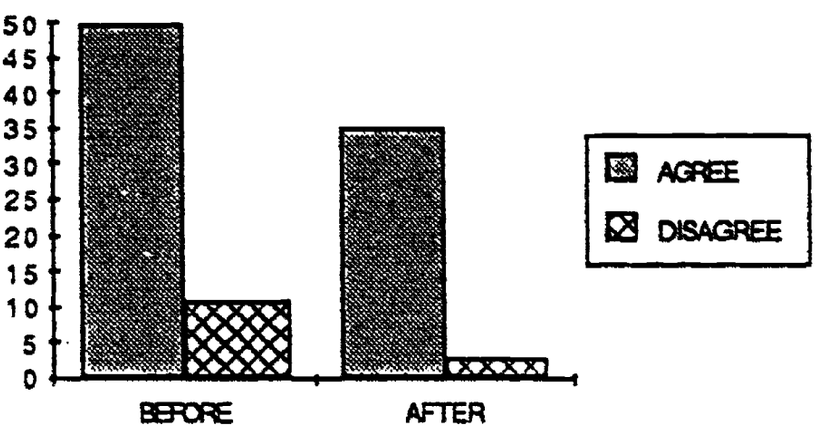


A) PLAYING GAMES
B) WORD PROCESSING DOCUMENTS
C) CREATING DOCUMENTS
D) BUILDING DATABASES
E) COMMUNICATION BY ELECTRONIC MAIL
F) USING EDUCATIONAL SOFTWARE
G) ACCESSING ON-LINE DATABASES

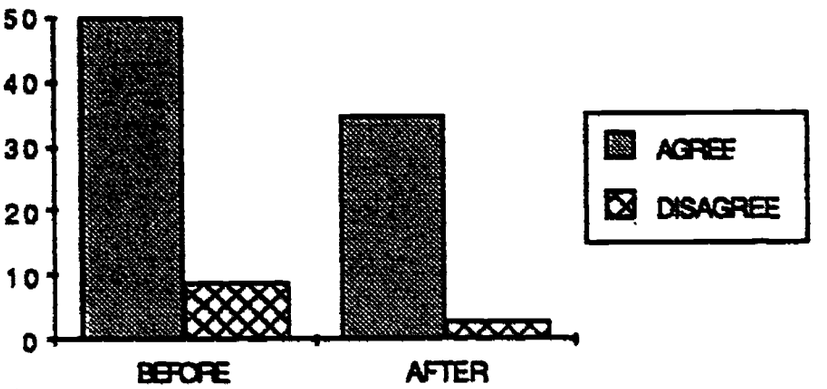
I WOULD CHARACTERIZE MY DEALINGS WITH COMPUTERS AS



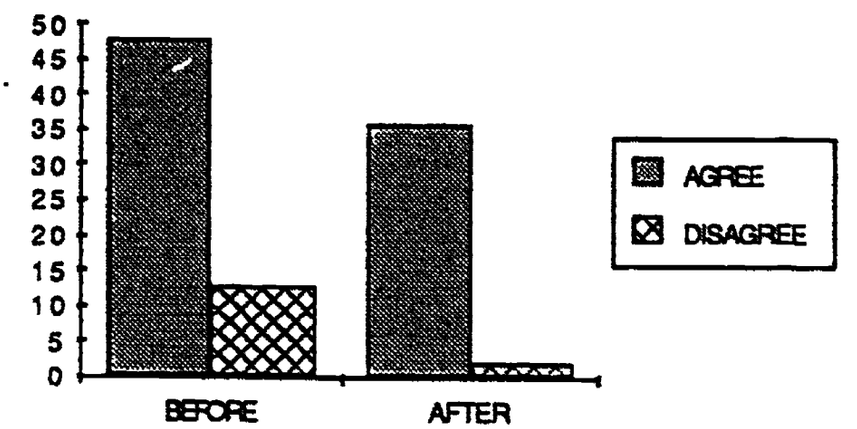
COMPUTERS MAKE LEARNING EASIER



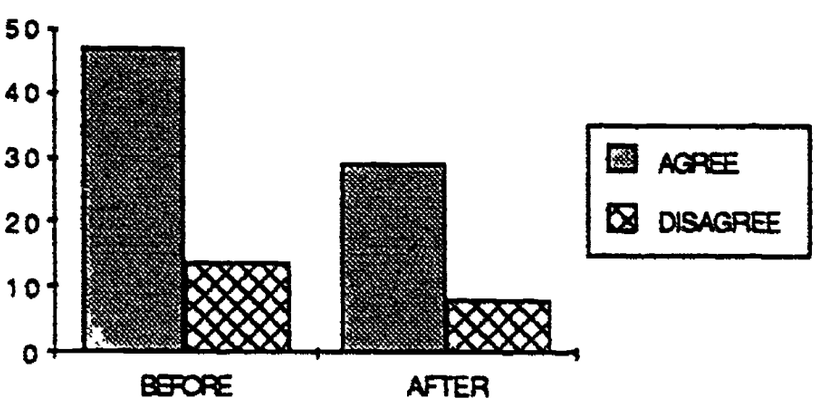
COMPUTERS MAKE LEARNING MORE ENJOYABLE



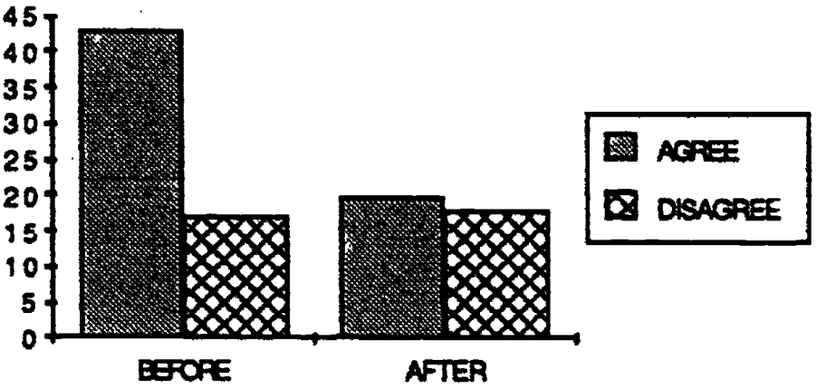
I LIKE USING COMPUTERS



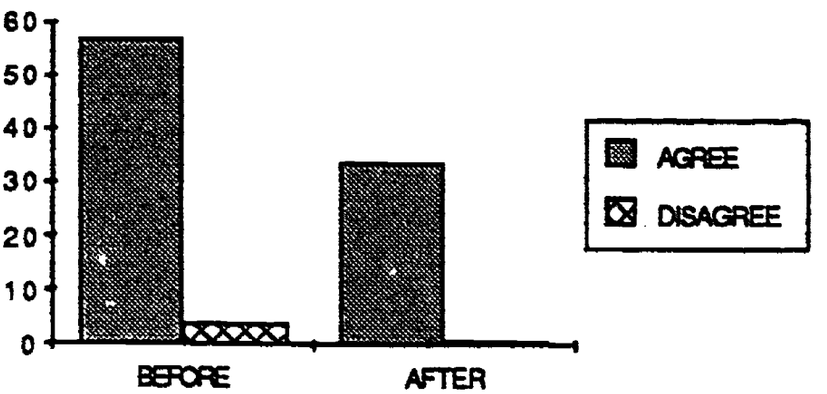
USING COMPUTERS INCREASES MY SPELLING SKILLS



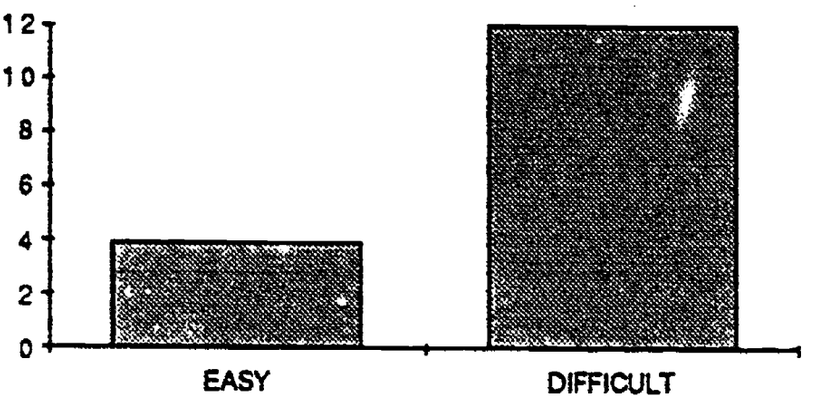
USING COMPUTERS INCREASES MY WRITING SKILLS



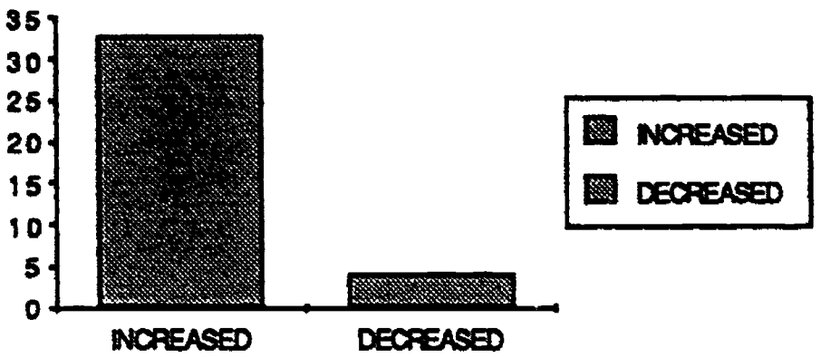
USING COMPUTERS IMPROVES MY KEYBOARDING SKILLS



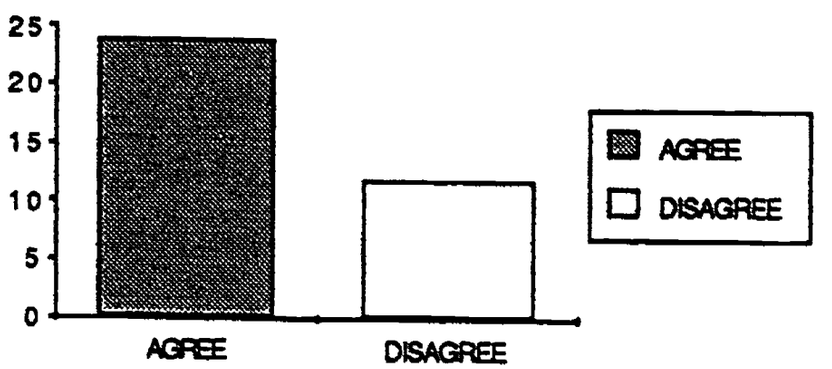
LEARNING TO USE A COMPUTER FOR ELECTRONIC MAIL WAS



AS A RESULT OF USING ELECTRONIC MAIL, MY COMFORT LEVEL WITH COMPUTERS HAS



ELECTRONIC MAIL USE GREATLY INCREASED MY UNDERSTANDING OF ALASKA SCIENCE



APPENDIX 7

Teacher Talk 4

This is a journal of the Alaska Science Pilot for April 3-7, 1989.

☞From Hoonah

I interrupted the weather unit with the Physical Science students to spend three days on the Alaska Oilspill lessons. The two wrestlers were gone on Thursday and Friday. I think it is important to study this current event in the making but I don't like slowing down the pace for the students. I like the timeline and to push the students. If you don't they won't get as much work done. We also had parent teacher conferences on Wednesday and Thursday and it was really nice to have the prior units' work back from Linda. I plan on working on the weather unit one more week.
Jan Skaflestad, Hoonah, recs043

☞From Noorvik

Well, this was a quiet week as far as "Alaska Science" was concerned. Unfortunately, nothing happened. SRA tests took up most of the week, plus we've had a lot of absences because of a blizzard and a big basketball tournament being held here. I hope to have more to report next week.

Has spring come to Southeast? It got up to 34° today, but we also got a foot and a half of wet snow.
Jeff Walters, Noorvik, recs046

☞From Pelican

Due to black cod season and the wrestling schedule, I have been without most of my students most of the week. I have picked up two new returning students from the lower 48. This will give me a chance to see how quickly the new individuals will pick up on what we are doing. This school truly has become migrant!

We have finished our last unit and hope to begin the unit on weather this week. It will be a treat if I have a full classroom again.
Wayne Clark, Pelican, recs044

☞From Selawik

Al Hazelton called this morning to discuss the students' progress, and I thought I'd share a little bit of this with all of you. The students are still not on-line yet, because neither he nor Chuck have time to teach them. Instead, they are hoping a teacher's aide can instruct them, but she has not had training in electronic mail either. The students are progressing in Alaska Science, and need only two more units to complete. One of the big problems with Selawik is the telephone line itself. Al has to disconnect the one line into the school while the students are on e-mail, and he doesn't feel justified in tying up that telephone for longer than 20 minutes or so. Of course, the phones were out during our supposed e-mail training period in January also. Al and I discussed the possibility of me assisting the students over the telephone until they understand e-mail, and then trying to have them use e-mail immediately after school when the lines were not so busy.
Al Hazelton, Selawik, recs031

☞From Jason

As you know, Jason is in England until April 26, and during this time, Donna Ostrowski is taking over his system responsibilities. Be assured that no matter what the introductory remarks say when you dial onto e-mail, your accounts are good through June 30 of this year, so you will have plenty of time to continue using electronic mail. Jason sent the students a message via Bitnet. Bitnet is a worldwide computer network that hooks our University of Alaska Computer Network with other university networks. Here is the student message:

I am in York, England, about midway in the country and will be driving in Edinborough, Scotland. Can you find this on the map? The weather is about the same as in Vancouver, BC, where I left from. It is sort of flat and very windy here (I think there is a connection between the two). That's all for now.

We will still have the students write to Jason in this Friday's Science Stuff, and they will know that their messages are reaching halfway around the world.

Jason Ohler via Linda Schultz, jaccs

☞From Juneau

The biggest news for this past week is that we finally got the Who's Who booklet in the mail to you. The pictures did not turn out nearly as well as we wished, but at this point, we needed to get it out to you finally! I hope your students are enjoying it. If you would like more copies, please let me know.

I was also able to get some of your lessons back to you. I enjoyed reading the students' work. It is a big help when you score their work, and send the green score sheet to me. Thanks. I did not send a third oilspill lesson as promised yet, but may have time to later this week to write one. I am also revising the units as I get the feedback from you and your students. The students didn't seem to be using e-mail very much this week, and I am searching for ways to involve them more. With only five weeks to go, I still feel like we have barely started with our project, and wish there was much greater participation.

Linda Schultz, Juneau, jslcs

This is the end of Teacher Talk 4, April 10, 1989. Don't forget to add your weekly journal to Teacher Talk 5 by sending it to me before 10:00 a.m. on Monday, April 17, 1989.

APPENDIX 8

Science Stuff 1 Magazine

March 17, 1989
written by Alaska Science Students

This week's questions: What do you like or dislike about electronic mail?

Here are your answers:

The disadvantage of e-mail is that if there is any surges the program doesn't work. The program is very touchy about what you type "on-line," if you make one mistake you don't get any farther.

The advantages to e-mail is that you don't have to worry about postage for the stamps to send to your teacher. And you don't have to worry about your teacher not getting your work, because all he/she has to do is go to her/his mailbox and get it. also you can make new friends on e-mail by writing back and forth. What I like about e-mail is it is a new experience for me about computers.
Jeni Erlandsen, Homer, recs010

The electronic mail is a combination of a phone and typewriter. It gets interesting once you learn it. We can send letters to other students in the state. The thing I like about it is that we can use it anytime we have free time.
Rhoda Long and Barb Neokok, Point Lay, recs062

The three main things I like about EMS are:

1. Instead of calling on a telephone over and over again, your message is quickly sent to their computer where it can be instantly recalled when they want to read it.
2. EMS is easier than sending a letter with correct capitals and punctuation. Additionally, such a letter could get lost in the mail and retrieval would not be possible.
3. Talking to the same people every day becomes boring. With EMS you can talk to different people taking the same course as you.

Eric Lundahl, Pelican, recs069

What I like about electronic mail is that you can talk to people all around the state without having to pay for the call. I can ask questions about the interior from kids that live in the area I am interested in. It is an interesting way to use a little computer and you can gain quite a bit of experience from it. I will bet to know a lot more students around the state using electronic mail.
Russell Dick, Hoonah, recs078

I find e-mail a lot of fun. For one thing it is a new experience. I also think that it is neat to be connected with so many other people. Hopefully, I will learn how to get better at this stuff.
Ray Skaflestad, Hoonah, recs078

Electronic mail is pretty neat! sometimes we need more of the laptop computers but hey help a lop. One reason I like it is because we can get mail right back without even having to wait a couple of days. We can call people in other parts of Alaska. We can also send in our homework or ask questions if we need to. I actually like it a lot!
Jennifer Botts, Hoonah, recs079

The main reason I enjoy electronic mail is I can do it over a computer. I've always enjoyed using a computer, and this is just another good reason to use one. It helps me with some of my classes liking typing, and science. Another good reason is that I get to talk to new, and different people.
Thad Meyer, Hoonah, recs080

I like the electronic mail because it gives me a chance to work on computers and I like to work on computers. I like the fact that I can send messages to people all over the state. People can send me a message and it only takes a few seconds to get to me, unlike letters. I wrestled Rick Strahm from Pelican and he's also doing the electronic mail. I makes the world seem smaller and more friendly.
Todd Stafford, Hoonah, recs080

The main reason I like electronic mail is because you can send messages really fast throughout t... tate. You also have the chance to learn different facts about different cities all over Alaska.
The only reason I dislike electronic mail is because it takes so long to get everything situated. It took us almost a month to get everything working.
Renee Pinard, Hoonah, recs079

Electronic mail is new in the school. Kids in my class have learned how to use it pretty good.
Mike Kuwonna, Point Lay, recs062

I like electronic mail because I can quickly send a message to many people around the state. It is much cheaper than a telephone call. I can send questions, information, or messages. It is fun to use the computer in this way. I feel connected to lots of places within Alaska and Outside. I can get answers to my messages as quickly as other read their mail. Sometimes I have problems helping people to get on-line, or getting on-line myself, but I have learned a lot more about computers by using electronic mail.
Linda Schultz, Juneau, jslcs

APPENDIX 9

Agenda for Alaska Science Pilot Audioconference 5:

2:50 - 3:00 Call bridge number to join audioconference
February 9, 1989
1-800-478-5070

3:00 - 3:05 Greetings (Dawn)
Greet your fellow participants

3:05 - 3:20 Electronic Mail Progress (Jason)
Ask any electronic mail questions you may have
Report on electronic mail progress with your students
Uploading and Downloading files
Student requirements for e-mail uniT

3:20 - 3:30 Pilot Evaluation (Jason)
Overview of some evaluation techniques for project
Weekly anecdotal journal requirements

3:30 - 3:35 February 16 Talkback (Dawn)
Final plans for student audioconferences next week
Ask your Talkback questions here

3:35 - 3:55 Round Robin about science progress (All sites)
Each site take a minute or so to report on science progress

3:55 - 4:00 Signoff
Next audioconference March 9, 3:00 pm

Audioconference 5 Participants:

Dawn Middleton Jo Dahl	Moderator ITS Projects Administrator	465-2835
Jason Ohler	Vancouver, B.C	604-732-9452 jaccs
Wayne Clark	Science Teacher Pelican High School	735-2236 recs044
Jeff Walters	Science Teacher Noorvik High School	636-2160 recs046
Al Hazelton Chuck Johnson	Site Administrator Teacher Selawik High School	484-2142 recs031
Carole Clay	Science Teacher Northway High School	778-2287 recs042
Jeff Skaflestad Jan Skaflestad	Science Teacher Teacher Hoonah, Alaska 99829	945-3611 recs043
Mark Voss	Teacher Anaktuvuk Pass, Alaska 99721	661-3226 recs040
Steve Boharski	Teacher Point Lay, Alaska 99759	833-2311 recs040
Martin Leonard	Teacher Kiana High School	475-2115 recs048
Mike McGuire	Teacher Tuluksak High School	695-6112 recs049
Walter Parrot	Kotzebue	442-3341, ext 407 recs051