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ABSTRACT

The distance education and instructional technology projects that have been undertaken in Alaska over the last decade are detailed in this paper. The basic services offered by the "Learning Alaska Network" are described in relation to three user groups: K-12 education; postsecondary education; and general public education and information. The audio conferencing services of the network are also described, and the declining financial fortunes of all but the audio conferencing network are detailed. Some observations from these experiences are made, and issues that should be addressed in future projects are identified. (EW)

# *Distance Learning in Alaska's Rural Schools*

William J. Bramble

For the last decade the Alaska Department of Education has had a keen interest in using modern electronic technologies to address the needs of schools. In particular it has attempted to employ technology to address the issues of equity and educational quality. A number of approaches have been tried, several of which have involved distance education, broadly defined. The level of success of the projects undertaken has varied, and the intensity of project activity has been subject to a host of political winds and other conditions. When considered as a whole, however, the work provides a great deal of information and insight into distance education.

It is from this perspective that this paper was written. It summarizes projects that have been undertaken in Alaska in the distance education and instructional technology areas. The paper lists some observations from these experiences and identifies issues that need to be addressed in future projects. This paper defines distance education as an instructional process, program, or activity in which the teacher is not physically present with the student at the time of instruction. It discusses project activities and issues that are broader than those that would apply under a definition of distance education that encompassed only formal, for-credit courses, for example. However, the definition chosen for the paper allows for the discussion of techniques that our experience has shown to have a great deal of potential for education and that should receive further consideration.

# Background

Alaska is an immense state, incorporating a land area almost 20 percent that of the continental United States. Its geography is rugged. Its climate is often harsh. Its economy resembles that of a developing nation. The largest economic sectors include natural resource extraction, military use, state and federal government, and tourism. Alaska's borders are closer to the Soviet Union than to the continental United States. Its population is small (just over one-half million), yet quite diverse. The majority of its population lives in and around three major population centers: Anchorage, Fairbanks, and Juneau. The balance of the population lives in several hundred small and often isolated communities. Because road systems are limited, transportation of people and goods is often possible only by air or water. Prior to the last few years, communications systems were similarly limited. With the advent of high-power satellite systems, however, communities in the state could be linked by telephone, computer, and television communications.

In this context, providing students high-quality educational opportunities on an equitable basis has proven to be a considerable challenge. The state's 103,000 K–12 students are served by more than 500 schools in 55 largely autonomous school districts. Most of the funding for public schools is provided by the state, at an annual cost of about a half-billion dollars. The average per-student costs, teacher and administrator salaries, building construction and maintenance costs, fuel costs, and other components are the highest to be found anywhere in the nation.

Education in the major population centers resembles that of urban or suburban schools in the lower forty-eight in both organization and quality. In rural areas of Alaska the situation and challenges are in many ways similar to those in rural areas of some Western states. However, there are important differences. A single school district comparable in size to the state of Ohio may include only a half-dozen to a dozen schools; some of the schools in the district may be in villages several hundred miles distant from the district office. The villages are often inaccessible by road, and the K–12 population in a typical village varies from 25 to 150. A small village school may contain only a dozen or so K–12 students and two teachers, who are expected to provide a comprehensive education to students at all grade levels. The population of most small villages is predominantly Alaska native. Many residents follow a subsistence life style that does not fit well with the traditional school-year calendar.

# Projects Undertaken

In the early 1970s the Alaska Department of Education began exploring the potential of technology to assist in providing more equitable opportunities to rural school children. At that time NASA and the U.S. Department of Education wished to demonstrate the educational potential of high-power satellite technology in connection with NASA's Applications Technology Satellite (ATS) program. A grant from the National Institute of Education provided a two-year opportunity for the State of Alaska to carry out a demonstration project. The project utilized audio and video communications via NASA's ATS-1 and ATS-6 satellites to deliver instructional programming to students and teachers in remote communities. The results of this project demonstrated that satellite communications have the potential for serving educational needs and for establishing a general communications system that would, for the first time, interconnect the far-flung communities of the state. In the mid-1970s the State of Alaska and the state's long-lines carrier, Alascom, embarked upon an ambitious, decade-long program to install a satellite-based communications system in the state.

At about this same time the computer industry introduced low-cost microcomputers, which appeared to hold special promise for addressing educational needs in the state. In 1977 the Alaska Department of Education initiated a five-year project (Educational Technology for Alaska, or the ETA Project) jointly funded by the National Institute of Education and the State of Alaska. This project addressed educational needs through computer and communications technologies. The three objectives of the demonstration project were (1) to develop and install an electronic mail and data communications system to assist in the administration of public schools, (2) to develop and install a computerized data base of instructional materials and other resources available to schools, and (3) to design, pilot test, and produce a set of ten computer-based courses for students in rural high schools. The project was conducted with the assistance of the Northwest Regional Educational Laboratory. The results of this project were encouraging. Many of the computer-based courses are still used in rural schools. A statewide data communications system is still operating today. Although the original (broad educational) data base has not been retained, the concept of using remotely accessible data bases for more targeted purposes is receiving renewed attention.

A great deal of enthusiasm for the use of computers in education resulted from the experiences of educators with the ETA Project. In the space of a few years Alaska's schools purchased microcomputers until the student/computer ratio reached about 1/15. A more favorable ratio exists in rural schools. Computer usage in classrooms began with rather primitive educational software and instruction in computer programming. Today computers are used in a wide variety of areas. Most recently, interest has centered upon the appropriate use of the computer as a tool in specific curriculum areas such as writing and science.

As Alaska's satellite communications capacity developed in the late 1970s, increasing interest in television was expressed. Many remote communities had no television broadcast service at all. Urban areas in the state received limited service. Cable systems were in their infancy, and the major networks had not transferred their services to satellite. For several years a television demonstration project provided a single channel of video delivered by satellite to 50 or so communities. Time on this channel was divided between education and entertainment. Education was allocated much of the school day, and broadcast instructional programming selected from national distributors. Evening and weekend hours were used for entertainment (and a small amount of public television programming) and provided a mixed fare from the major networks.

As the project evolved, everybody wanted more service. Home viewers wanted a greater variety of entertainment programs. Schools wanted greater access to the channel for instructional uses. Teachers resented pre-emption of instructional programs for sports and special events. There was enthusiasm for expanding the capacity of the network. The concurrent availability of revenue from oil production at Prudhoe Bay enabled the Alaska State Legislature in 1980 to fund the development of a second statewide video channel and designate one for education and one for entertainment.

# Learn Alaska Network

Out of this legislation was born the Learn Alaska Network. The network was developed and jointly managed by the Alaska Department of Education and the University of Alaska. It was designed to serve the needs of both K–12 and postsecondary students. An additional priority of the network was to serve the needs of the general public for continuing education, avocational skills development, and information about Alaska and the world. The network was designed to permit flexible use as an instructional delivery system. Thus it included not only a video channel, but also an interactive audio capacity. Data communications networks operated by the department and the university were available to users as well, but integration of the data networks into the instructional offerings was minimal. Ultimately there were 350 audio conferencing sites served by a 140-line audio conferencing bridge in Anchorage and 250 ITV sites fed by satellite and with local distribution by minitransmitter or cable.

The basic services offered on the Learn Alaska Network were designed to meet the needs of three user groups, summarized as follows:

## K–12 Education

1. Preproduced ITV series and programs were available from national and international distributors. Individual series varied in length from a few to dozens of programs, and instructional coverage from a few concepts to a full year's study in a particular course area. The great majority of programs were intended to supplement the ongoing program of instruction in schools. Even the longer series did not constitute courses of study in and of themselves, but supplemented the instructional program. Ultimately, more than 3,000 programs were selected for network delivery and broadcast to schools in two ways. A school-day schedule was devised to make programming available on a regular basis for off-air classroom use. In addition, given the widespread availability of video cassette machines in the schools, series were fed in blocks to allow the taping of programs for later use in classrooms at the appropriate point in the instructional process.

2. ITV programming was produced in priority subject areas specific to Alaska—for example, Alaska History, Alaska Geography, Ecosystems of Alaska, Alaska Native Cultures, Alaska Fisheries, Cold-Water Near Drowning, and Alaska Native Claims Settlement Act (ANCSA). Special care was taken to ensure educational soundness of the videos and associated instructional materials. This programming was distributed on the network for both off-air use and copying on videotape cassettes. Because of considerable public interest in some of the programming, it was also broadcast during evening and weekend hours. Since the programming was developed to meet critical instructional needs, it has been especially well received.

3. Interactive programming combining the video broadcast with the audio conferencing network also was provided. Because of budget constraints, this service was produced on a limited basis in subject areas of special interest to K–12 students. These programs provided opportunities for students to interact with personalities not otherwise available to them because of their geographic isolation. Senator Stevens, Governor Sheffield, and members of the Alaska Legislature, for example, appeared regularly on programs in the spring of each year to discuss issues of regional or national significance with students in civics and social studies classes. In a program uplinked from Houston, Texas, students were afforded a preview of the science experiments for the ill-fated "Teacher in Space" shuttle mission. They had the opportunity to question Christa McAuliffe and Barbara Morgan about the mission and the training provided them by NASA. Other programs addressed a variety of topics including homesteading in the Matanuska Valley, Pacific Rim studies, and techniques for student video production.

4. One-way video programming and video programming with audio interaction were produced for teachers also. This programming addressed the needs of teachers for in-service training. For example, one interactive program featured the internationally known "Art Maker," Dan Mihuta, describing techniques for art instruction in elementary schools. Another discussed the use or drama in counseling teenage students.

5. During the 1986–87 school year, we planned to pilot-test the distance delivery to high school students in hard-to-reach areas of credit courses such as foreign languages, higher-level mathematics, and sciences. Such courses appear to offer particular promise to the rural schools faced with the difficult task of providing a comprehensive high school curriculum with only a few teachers. This project would combine technologies including video, audio, computers, and specially designed print materials, each used to its special advantage. The initial pilot test would have uplinked German language and physics courses from Oklahoma State University. The OSU approach to distance education courses is similar to that envisioned by program designers in Alaska. However, budget problems have put this project on indefinite hold.

## Postsecondary Education

Each semester the Learn Alaska instructional television network featured 10–12 pretaped university level courses obtained from the PBS Adult Learning Service. The courses covered a variety of areas including art, science, writing, social studies, and others. Credit was individually arranged through the nearest university or community college campus. The participating university instructors varied their approach to using the materials. Some followed the lessons in the videotapes and materials closely. Others made adaptations or added their own emphasis and materials.

A few courses were specially produced by university faculty at the University of Alaska, Anchorage. Courses produced for the nursing and criminal justice programs serve as examples. Yearly enrollments in telecourses ranged from 1,000 to 1,500.

## General Public Education and Information

Programs of general informational or educational value were obtained from distributors in the United States and Canada. Areas covered included everything from avocational activities to science, from homemaking to insulating homes in the Arctic.

Programs of specific interest or relevance to Alaska were produced and broadcast where possible. Alaskans had the opportunity to view such events as the Eskimo-Indian Olympics, Inuit Circumpolar Conference Meetings, proceedings of the Alaska State Legislature, governor's impeachment hearings, Alaska Federation of Natives Annual Convention, Burger Commission Hearings on issues related to the Alaska Native Claims Settlement Act, Aviation and Marine Weather Forecasts, and other programs.

# Audio Conferencing

The Learn Alaska Network Audio Conferencing Service is often used by itself, without the video network. Educational uses are from the following three areas: (1) direct instruction; (2) support of the instructional process; and (3) administration.

In the university sector the predominant use of this network is direct instruction of students. For the last several years more than 100 courses per semester have been offered through an audio and print mode of distance delivery. In a few courses instructors visit classroom sites on a round-robin basis, and the audio instruction originates from the site where the instructor is present. The instructors are university faculty members. Courses are offered in a large number of subject areas, depending on the availability and interest of faculty and the needs of students at remote sites.

In the K–12 area the use of audio conferencing has been more popular in the areas of support of instruction and administration. Teacher training, professional meetings, seminars, and administrative meetings are common uses. Specific course offerings for K–12 students have been very few and have involved gifted or highly motivated upper-level high school students. Instructional activities outside the traditional curriculum offerings are more common. These include the "Battle of the Books" reading competition, regional Academic Decathlon competitions, and audio conferences with significant personalities (such as a subject-matter expert, astronaut, or author).

The pattern of use that has emerged has led to some additional thinking about the limitations of the medium and how they might be overcome through graphics support. Experience with audio conferencing also suggests appropriate uses for the medium with various subject matter and age groups. The medium tends to be more appropriate for mature and highly motivated students. Subject matter that does not involve a great deal of visual learning is more naturally adapted to this medium.

# The Learn Alaska Network Today

Unfortunately, some of the factors that led to the creation of the Learn Alaska Television Network also contributed to its undoing. From 1980 to 1985, the state of Alaska enjoyed a period of unprecedented wealth. By 1985 approximately 85 percent of the annual revenues available to the state were derived from royalties, fees, and taxes levied on petroleum extracted from Prudhoe Bay. With the precipitous decline in world prices for petroleum in late 1985 and early 1986, the state of Alaska found itself in the untenable position of trying to support an expanded number of state programs with a suddenly limited and rapidly declining budget. As part of the overall budget reduction process, the Legislature opted in May 1986 to combine the statewide television networks into a single system. Given the popularity of the entertainment programming, the availability of the network for educational purposes is extremely limited at present.

On the other hand, the Learn Alaska Audio Conferencing Network survives today, partly because of its lower overall cost and the widespread belief that the network offers cost savings in comparison to staff travel. Changes in instructional uses resulting from the closing of the instructional television network have yet to be assessed.

# Some Observations about Distance Education

Through this series of projects we gained a great deal of experience in distance education. Much of what we undertook was new, and for many of the activities there were few colleagues or experts to whom we could turn for sound advice. Some things we did well, some not so well. Some problems were anticipated and overcome. Some problems were not anticipated or were never resolved despite our best efforts. But in the process we learned some things that deserve consideration in future efforts of this nature. Much of what we learned had to do with the particular technologies, developmental processes, and operating procedures necessary to carry out the projects. These items are discussed in various written reports. The remainder of this paper identifies broader issues that deserve consideration in the future.

1. The hardware and engineering aspects of communications and computer technologies are better understood and easier to modify than the associated educational theory and design components. Additional sophistication in educational design and development is needed if distance education is to reach its potential. (I should add that we were blessed with an excellent engineering and technical staff, and most of the systems we developed involved off-the-shelf hardware. In a program that involved developing hardware to fit the needs of learners. the hardware issues would be far more complex.)

2. Because hardware and systems are both the most expensive and the most glamorous components of projects, funding agencies and decision makers are sometimes tempted to purchase large systems without a full understanding of or commitment to the ultimate costs of development, operation, and maintenance of the technological and educational components of distance education. We found repeatedly that the cost of technical components and educational product development was but a fraction of the cost of proper implementation and ongoing support. Equipment and communications system services cannot reach their potential without the proper user support. However, we had consistent difficulty obtaining long-range commitments to funding the support elements once the glamor of the new equipment purchase had faded. This is a key challenge for future developers.

3. Distance education programs should be user-driven and not technology-driven. We were repeatedly approached by vendors or technology enthusiasts wanting to force-fit user needs into a single technology or approach. The problem is that, while one equipment configuration or strategy might address some user needs well, it rarely addresses all needs. We found that the integrated use of several technologies (for example, computer, video, audio, and print) provided a flexible base from which to address user needs. In the design process a key challenge is that of determining the best combination of technologies for a particular educational application.

4. Educational institutions are resistant to change. This is probably true of most institutions and businesses. However, public education institutions, being virtual monopolies, are not motivated to a great extent by market forces. We repeatedly found interest and satisfaction in our activities on the part of students and instructors. The institutional and political responses were not always so positive. For example, while the delivery of distance education courses for college credit has enormous potential for residents of rural Alaska, some of the fledgling community colleges in our rural communities perceived such courses as a threat to their future existence. As a result the University of Alaska had great difficulty expanding the telecourse offerings. Also, when we planned the pilot testing of full-year high school courses in rural schools, the teacher's union expressed concern about potential impact on teacher employment. Public broadcasters in Alaska felt threatened by the department's direct involvement in instructional television broadcasting, even though they placed a very low priority on the activity themselves.

Given this resistance to change and protection of turf, we had our greatest successes in applying technology and distance education techniques that were nonthreatening, that complemented the existing institutions and programs, that fit into existing structures, that made people's jobs easier or helped them to do a better job of what they were already doing. With applications that also involved substantial institutional changes, we were less successful. Some may argue that with appropriate care institutional change is always possible. However, our experience illustrates a dilemma for program developers, who may have to choose between serving organizational goals to ensure short-term success or overall public goals that may lead to greater long-term success. The long-run advantages of distance education will often require basic institutional shifts in both mission and organization.

There is a good deal of public interest in technology and the potential it holds for educating our children. Throughout our projects we enjoyed a good deal of public support. We found public enthusiasm for changes that could help children realize their educational goals. There is evidence as well that technology is changing the very fabric of our lives and the society we live in. It has certainly changed the nature of knowledge and what it means to be knowledgeable. As a result it may ultimately change the nature of education and the educational process. This changing process will provide a fertile area for educational research and development in future years.

5. Rural schools often face major problems in providing quality education because of their small size, isolation, and makeup. Further, it appears that no amount of funding (given reasonable bounds) will overcome the problems related to educational equity if one considers only the traditional labor-intensive approach to education. Our experience indicates that distance education programs such as those described in this paper, while not a panacea, do provide a substantial measure of additional quality in rural schools.

6. Finally, we had some considerable experience in determining cost of distance education components and looking at their reasonableness. A common perception is that sophisticated distance education systems are outlandishly expensive. However, one needs to ask, "Expensive compared to what?" As long as the cost of development and delivery is consistent with the numbers of potential students in the marketplace (that is, doesn't involve a multimillion-dollar system for a handful of students), course delivery can be provided at a very attractive per-student cost in comparison to instructional delivery through traditional means. In evaluating costs it is necessary to look at the cost of distance delivery as an alternative, rather than an add-on, to the existing method of delivery.

## Conclusion

I believe the stage is set for distance education to play a major role in American education, especially in rural areas. However, the need for institutional change presents a major hurdle. Insightful political and organizational leadership is needed if students are to benefit from this approach. I look forward to seeing what develops in the future.

## William J. Bramble

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