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## ABSTRACT

Governor Baxter School for the Deaf is one of six Maine pilot sites chosen by NYNEX to showcase asynchronous transfer mode (ATM) technology. ATM is a network connection that allows high bandwidth transmission of data, voice, and video. Its high speed capability allows for high quality two-way full-motion video, which is especially beneficial to a hearing impaired population whose language is primarily visual. Using ATM, the Maine Department of Education is developing a distance education system that offers full-motion multimedia conferencing between schools, a high speed electronic whiteboard, local and remote control of video cameras, and an integrated scheduling system. The six pilot sites are testing the technological reliability of the network and equipment while they are also programming for its use. Programming plans include the delivery of American Sign Language classes by Governor Baxter School to other high schools; development of curriculum units in Maine studies, to be delivered over the network; and collaborative work between deaf students and other public school students. Major concerns for network implementation include a high flat-rate monthly service charge and the necessary product adjustments for the educational environment.  
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ATM: RESTRUCTURING LEARNING FOR DEAF STUDENTS  
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**Abstract**

The Governor Baxter School for the Deaf in collaboration with the Department of Education and the University of Maine system has embarked on an exciting new technology initiative. The school is one of six pilot sites chosen by NYNEX to showcase asynchronous transfer mode ( ATM ) technology. The other five sites are Presque Isle, Halldale and Gorham High Schools, the college of education at the University of Maine at Orono and the state local area network. This technology, which has the potential to carry two way full motion video is especially beneficial to a deaf and hard of hearing population whose language is primarily visual. Critical issues concerning the establishment of this state of art technology will be examined from a perspective of a pilot site.

**Introduction**

Distance learning and telecommunications technologies offer much promise to schools for the deaf to alter the way teaching and learning occurs. There is evidence that successful teaching at a distance is linked to creative use of human resources and the right technology mix. (Keefe 1995) Insuring both these possibilities is imperative if ATM technology is to succeed in an education environment.

**Background**

Maine is pioneering the use of second generation ATM technology. North Carolina's ATM technology has been in place since 1994. But technologies change at an accelerated rate and ATM technology has matured significantly. Maine will benefit from this maturation. The Department of Education(DOE) has a strong commitment to provide a comprehensive educational broadband fiber-optic ATM network to every high school that will deliver voice, data, and dynamic two way interactive full motion video. (MaineOnline 1996). With support from a 15 million dollar bond issue ATM equipment will be purchased for high schools. The equipment will include routers, switches, cameras, TV monitors and VCRs. The ATM

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switch network will be installed by NYNEX at no cost to the rate payer. An Augusta ATM switch will serve the needs of the six pilot sites.

### **Description of the Technology**

What is asynchronous transfer mode? Basically, ATM is a network connection that allows high bandwidth transmission of data, voice and video. The benefits of the technology are: high speed, flexibility, compatibility and world wide standards. (Dynan 1996) The high speed capability at 45MB and 155MB allows for high quality interactive video. To support the ATM network Maine DOE has contracted services from STARVISION, an affiliate of the Newbridge Company, provider of the ATM black box, to provide a sophisticated and simple calendaring component to program for the distance education component. This distance education system offers full motion multi media conferencing between schools, a high speed electronic whiteboard, which allows you to share information with students at distant schools, local and remote control of video cameras, and an integrated scheduling system. This technology is very new and Maine's six pilot sites are testing the technological reliability of the network and equipment at the same time they are programming for its use.

### **Maximizing Opportunities for Accessible Programming**

How can Maine's ATM pilot impact and benefit deaf and hard of hearing students? Deaf and hard of hearing people have been cautious of new technology (Baker 1995). This caution has some justification historically. Alexander Graham Bell dramatically altered the pattern of life for deaf individuals with the invention of the telephone. Isolation and separation of the deaf from the broader culture was the consequence of Bell's heralded new technology. The new communication link for the hearing world was profound and negative on the deaf community and its impact continued for decades until the advent of the TTY. The advantage of the Governor Baxter School for the Deaf's inclusion as a pilot site for programming ATM technology is the opportunity to sit at the table as part of the development team. This "value currency" is real. During a recent training session for StarED, the calendaring component of the distant education system, GBSD representatives raised the issue of captioning and how important it was to a deaf and hard of hearing population. That particular functionality had not been added to the MPEG 2 card that provides video. Two days following the training session the account manager for the Newbridge company responded to the staff that closed captioning would be added to the functionality of the video card. The dynamic dialogue related to user support for

everyone advances the need for inclusive features being built into the product's functional design.

### **Programming**

The Governor Baxter School for the Deaf delivers an American Sign Language class statewide to five high schools over the Education Network of Maine as a foreign language. Currently the deaf instructor travels to a university campus to teach the class. In September the class will broadcast from the Governor Baxter School for the Deaf. Maine recognizes ASL as a foreign language. The opportunity to deliver the ASL class to more than one high school in a two way video interactive environment is very exciting and will dramatically enhance the quality of student learning. Plans to teach American Sign Language to three pilot sites focusing on cultural diversity is underway. During the initial phase of the project only a point to point connection is possible. Phase two which is targeted for September 1997 a multi point connection will permit a maximum of four schools to interact.

Additional academic programming will revolve around delivering content in the area of Maine Studies. Mackworth Island was the summer residence of Percival Baxter, a former Governor of Maine and a generous benefactor to the state. The state school for the deaf is located on this beautiful island. Mini curriculum units related to Governor Baxter's legacy to the people of Maine will be developed by students at the school. Science is another content area where ideas can be exchanged among students at the pilot sites and GBSD students will have something unique to contribute about island living. Programming collaborative work with public school students in foreign language, history and science deaf students can assume leadership roles and develop pride in sharing their language and extraordinary campus island.

### **Challenges**

The monthly service charge of \$2000 to access ATM technology by NYNEX could be a major concern for many school boards. NYNEX's flat rate service charge could be a serious challenge to expanding the network if cost benefits to school districts are not proven in a reasonable amount of time. The ATM technology and the accompanying tools to carry programming are new. There will be necessary product adjustments for the education environment. Those adjustments need to happen with alacrity. Teachers expect technology to be reliable and dependable for instruction. Patience among teachers will be limited. ATM technology has no track record in Maine; time will test the assumption that this

technology is revolutionary. The "Yankee" mentality is brutal and quick to judge exaggeration. For deaf and hard of hearing students the program applications of ATM technology can be profound. For the first time in history deaf students have access to a critical mass of peers via a network that permits communication using American Sign Language. This is revolutionary. The need to insure ways of manipulating information to acquire and test new ideas is essential to creating a new structure of learning for deaf students.

The robustness of the network will provide new opportunities for the use of high quality multi media applications (Scott 1996). The greatest challenge before us is to capitalize upon the opportunity to use this very visual medium and not settle for less than revolutionary outcomes or forfeit the potential of utilizing the technology to dramatically improve student learning for deaf students, not only in Maine but throughout the country.



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