



Published in final edited form as:

*J Vis Commun Med.* 2009 January ; 32(1): 8–13. doi:10.1080/17453050902821181.

## Extending a Blended Education Program to Native American High School Students in Alaska

Craig Locatis, Cynthia Gaines, Wei-Li Liu, and Michael Gill

National Library of Medicine

### Abstract

This article describes the expansion of a blended learning program sponsored by the National Library of Medicine (NLM) that combines synchronous distance learning with face to face instruction. Background information about the program is briefly discussed and challenges to expanding the program are presented. The expansion was not merely a matter of adding a school. It involved close coordination between the NLM, existing participants and those at the candidate school. The challenges included identifying a candidate school, establishing contact and determining interest, assessing and testing connectivity, developing a calendar and schedule, and identifying faculty. Since NLM is on the east coast, the current school was on the west coast, and the candidate school was in Alaska, all of challenges were compounded by enormous distances and differences in time, but all were resolved successfully.

### Background

The National Library of Medicine initiated a distance learning program for minority high school students in 2004. The program was a partnership between the library, the Charles R. Drew University of Medicine and Science in Los Angeles and the King Drew Medical Magnet High School adjacent to the university. King Drew is one of the few medical magnet high schools in the country and it specifically serves minority African-American and Hispanic students. The goals of NLM's blended learning program are to encourage these students to pursue health science careers, expose them to various subspecialties in the health science and to information that can increase their health literacy, and to promote their scientific research skills. Subject experts make presentations related to their specialties, including what it is like to work in their area of expertise. Experts may include information resources related to the topic that they discuss or librarians make follow up presentations on the resources.

The program involves using two way interactive video over the Internet to discuss health science subjects of interest to students and related information resources. A blended learning approach is utilized, since presenters who are faculty at Charles R. Drew and other universities in Los Angeles make presentations in person at the school, while others at NLM and the NIH in Bethesda, Maryland or universities in the Washington, DC area make presentations remotely. Topics include health careers, diabetes and nutrition, forensic science, infectious diseases, HIV/AIDS, disaster preparedness, environmental health and justice, the Visible Human Project, the human genome, obesity, mental health, traditional medicine, bird flu and pandemics, drug abuse and addiction, and heart transplants and surgery. The topics identified depend on the teachers and classes at the high school electing to participate and the annual theme adopted by the school. For example, one year the school focused on HIV/AIDS and another year the focus was on infectious diseases. Topics also depend on identifying and enlisting qualified experts.

During the first year, the program involved a single class at the high school, but was subsequently expanded to include other classes. Initially, the program was offered at the university. Students had to walk from the school to the university using up class time. In addition, the university auditorium having the videoconferencing equipment was heavily booked, severely limiting when the program could be scheduled. The NLM had previously sponsored a telemedicine research project where doctors at the university did remote eye exams at the school by videoconference. The line connecting the university and school was dormant after the study concluded, but was reactivated through a modest investment in new network equipment. This eliminated the need to re-locate students and greatly expanded scheduling options, since the King Drew High School technology coordinator could direct this connectivity to any room in the school. Since the university was on the Internet2, the advanced research and education network in the United States, this effectively projected Internet2 into the school, increasing bandwidth and network quality of service, while also by-passing any school district firewalls that could block videoconference transmission. The linkage made it possible to include additional classes. The fact that other teachers wanted to participate and that students rated the instruction they received so highly (and continue to do so) were indicators of success (Locatis, et al., 2006). The program was extended to include Native American High School Students in Alaska in 2007.

## Identifying a Candidate School

When the NLM's Outreach and Special Populations Branch decided to include Native American students from Alaska in the program, which school to include had to be determined. It had to be a school in which there was a need in an area that could greatly benefit. The branch has identified Native American Physicians in Alaska that it uses as consultants and they suggested a high school in Kotzebue, Alaska that was part of the Northwest Arctic School District. NLM staff assumed the location would be near major cities like Anchorage, Fairbanks, of Juneau and were astonished to find out that it was located thirty miles north of the Arctic Circle. They were given the name of the district superintendent and were later given the names of the district's curriculum and technology coordinators. These initial contacts were encouraging because the district was already using interactive videoconferencing technology and had just decided to establish a magnet school that would have three specialties: mining, teaching, and health. Mining was chosen because it was the largest industry and biggest employer in the area. Teaching and health were chosen because many teachers and providers are recruited from elsewhere and stay for only a short time. There is less turn over among local teachers and health workers.

A site visit was subsequently made to the school to more fully document interest and commitment and to assess connectivity options. Although there was interest at the district level, the program had to be explained to school faculty to determine their involvement. NLM staff also had identified two options for connecting and needed to determine which to use. One option was to possibly connect through the University of Alaska Chukchi Campus located in a building across from Kotzebue High School. Another was to use the district's existing Internet service provider. Travel to Kotzebue involved making two connecting flights with the first taking off at nine in the morning and the last landing at nine at night. Given the time differences, it was sixteen hours of travel overall. A representative of the district's Internet service provider met the team at the airport in Anchorage while they were waiting for one of the connecting flights to discuss the project and assure the team of his company's support.

The site visit was very useful. District staff appreciated the fact that the team would travel so far and indicated the trip showed NLM's sincerity and commitment. The team met with the principal and faculty and identified the advanced level science teacher and class as the

student group who would participate. They collected suggestions for topics and reviewed district videoconferencing facilities. They discovered that district had a multipoint conferencing unit allowing multiple sites to send and receive video at once and that it was used to present selected courses via satellite to schools in the eleven surrounding villages making up the district. They also visited the technical education center and the University of Alaska campus where it was determined that the university's Internet satellite connection was heavily used and would likely not accommodate the video, although it was in the process of being upgraded. Moreover, students would have to re-locate to the campus which was only just across the street, but still an inconvenience during the arctic winter. Re-location could be avoided by connecting the school to the university, but this would have involved installing a new line, not re-activating an old one, as was the case at King Drew. On the return trip, the team went to the King Drew Medical Magnet High School to determine their willingness to partner with Kotzebue, get their suggestions for topics, and reactions to those Kotzebue suggested. The faculty at King Drew welcomed having a partner and responded favorably to the Kotzebue's topics.

## Connectivity and Testing

A point to point videoconference was made between Kotzebue and NLM prior to the site visit that was encouraging. If it was unsuccessful, there would have been no need for the trip, but the test showed that the district had the requisite infrastructure. There were concerns, however, because the connection was made over the commodity Internet and not Internet2. Moreover, the connection was not multipoint and additional test would be needed linking the King Drew and Kotzebue high schools to the NLM. The first tests were done using the multipoint conferencing unit (MCU) at Kotzebue and there were problems. The bit rate for previous conferences between NLM and King Drew was 768 kilobits per second and picture quality was good. This level of bandwidth could not be sustained over the satellite connection to Kotzebue, but a rate of 384 kilobits could with an inferior, but acceptable picture. Latency in transmission, however, was more troubling. King Drew and NLM were transmitting their video to Anchorage where it was sent up to a satellite, down to the Kotzebue MCU, and then transmitted back to the satellite, back to Anchorage, and then back to Los Angeles and Bethesda. There were doubts that the students at King Drew would accept the delays these dual satellite hops engendered. People would frequently talk over each other whenever a speaker paused because the latencies made it appear the person had finished speaking. The problem was solved when the Northwest Arctic School District's Internet service provider volunteered the use of an MCU that they maintained in Anchorage. Kotzebue connected to it via satellite while King Drew and NLM connected via land lines, eliminating one satellite hop and halving latency.

## Calendar and Schedule

Scheduling was always a problem because King Drew does not finalize its schedule until just before the start of the school year. Moreover, the school day is not divided into equal time periods. There are longer time blocks on some days and shorter ones on others because the magnet school students spend time at Los Angeles hospitals and clinics. In addition, the three hour time difference between the west and east coasts reduces the time frame when the program can be offered. The school schedule also had to accommodate uses of the NLM Collab, the venue where programs originate at NLM and where all the programs were recorded. Many times NLM people would work quietly in the room off camera while a program was being conducted. All of these scheduling problems were compounded with the addition of another school. Now, two school calendars and schedules and four different time zone differences had to be accommodated. Kotzebue High School's schedule was in daily 55 minute time blocks, unlike King Drew's. Fortunately, there was a one hour time block one

day of the week at King Drew that coincided with schedule of the Kotzebue class and this day and time were selected for the program. While Kotzebue High starts and ends the school year earlier than King Drew, it was not a problem because the heavy testing schedule at the end of the King Drew school year precludes its participation at that time anyway. The earlier start for Kotzebue was not an issue either because once topics and the schedule are set, time is needed to identify and recruit presenters.

## Outcomes

The expanded program was highly successful. Students at King Drew and Kotzebue completed short evaluation forms after each session. These forms were identical to this students at King Drew completed in previous years. Students are asked to rate nine presentation attributes (e.g., encouraging participation, using audiovisuals, staying on subject, etc.) and the presentation as a whole using a five point Likert scale, with one being the lowest and five highest. Every presentation has had average ratings between four and five on each of the nine attributes and overall. This has consistently been the case for all years of the program. Some years the presentations that are face to face get statistically higher ratings, some years those at a distance do, and some years there are no differences. Even when one form of presentation is statistically higher, the mean differences in the ratings at King Drew do not exceed two tenths of a rating point. It would appear that the distant presentations by videoconference are perceived to be very similar to face to face classroom instruction. Students at Kotzebue experienced all presentations at a distance and, curiously, consistently rated them higher than students at Drew. Although the differences were statistically significant, the means of four of attributes were only two tenths to four tenths of a rating point apart, while the rest were essentially the same. One reason may be that the program was new and novel to the students in Kotzebue.

## Conclusion

The program was successful and is continuing at both schools in the 2007-2008 academic year. Experience to date indicates that interactive videoconferencing over the Internet is very similar to classroom instruction even over great distances, but there are technical, scheduling, and other issues that need to be worked out. The technical challenges, though formidable, have been the easiest to solve. Scheduling has been the most difficult because it has to be done after each school establishes its calendar and schedule every academic year. Moreover, the school schedules have to be harmonized with each other, the use of the NLM Collab, and the availability of the presenters.

## References

- Locatis C, Gaines C, Liu W, Gill M, Carney J, Foster J, McCall V, Woods M. A blended training approach using videoconferencing for distance education. *Journal of the Medical Library Association*. 2006; 9(4):464–468. [PubMed: 17082845]
- Ruiz J, Mintzer M, Leipzig R. The impact of e-learning in medical education. *Academic Medicine*. 2006; 81(3):207–212. [PubMed: 16501260]



**Figure 1.**





**Figure 2.**



**Figure 3.**



**Figure 4.**





**Figure 5.**



**Figure 6.**

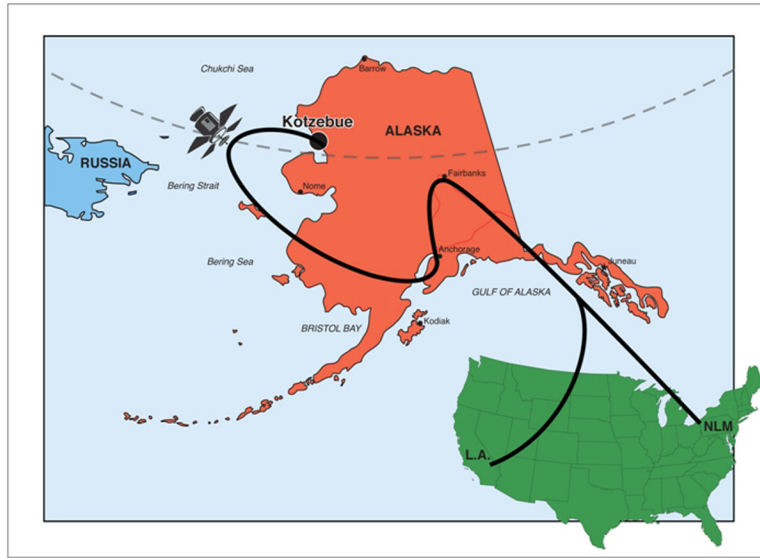


Figure 7.