



Distance Learning in the Northern Pacific

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The remoteness of the northern Pacific region presents significant challenges to providing quality interactive distance education. These geographic, economic, cultural, linguistic, professional, and technological challenges require creativity and flexibility in the design of courses and in the selection of instructional methods. This paper will explore the experience of a group of educators in providing distance learning opportunities throughout this region for 9 years, from 1997–2006.

Pacific Resources for Education and Learning (PREL) received a Star Schools grant from the U.S. Department of Education in 1997 to provide distance learning programming for students, teachers, and adults in American Samoa, the Commonwealth of the Northern Mariana Islands (CNMI), the Federated States of Micronesia (FSM), Guam, Hawai'i, the Republic of the Marshall Islands (RMI), and the Republic of Palau. PRELSTAR: A Pacific Islands Distance Learning Program was created to provide distance learning courses for K–12 students, teacher professional development, and basic adult education. In addition, the program was tasked with improving the telecommunications infrastructure in the region and building local capacity in the use of educational technology.

In the region served by PRELSTAR, teachers and students are spread across 4.9 million square miles of ocean, islands, and atolls encompassing six time zones and the International Date Line. Because the population is scattered across such a large area, telecommunications costs are high and broadband Internet access is generally affordable only in American Samoa, the CNMI, Guam, and Hawai'i. However, the remote locations of the Pacific entities create a need among educators and students for effective communication infrastructures.

This remoteness, along with the local economic conditions of many of the developing nations in the region, creates an environment where the cost of supporting a technology infrastructure and ongoing connectivity is overwhelming. Sustained development of technology is nearly impossible without supplemental funding sources. As U.S. territories and states, American Samoa, the CNMI, Guam, and Hawai'i are eligible for discounts under the E-Rate program of 50%–90% for telecommunications services to schools, libraries, and rural health care organizations. Unfortunately, the developing

nations in the Pacific region, the FSM, Palau, and the RMI, do not qualify for E-Rate discounts and lack the financial resources to provide this level of discounted services for their education and health sectors.

Many teachers lack adequate professional training, yet opportunities for higher education and advanced courses are very limited in the region. Teachers, students, administrators, and technologists need dependable access to quality educational resources in order to provide basic learning experiences, as well as to support continuing professional development for the improvement of their education systems.

English is a second language in all entities in the region, except for the CNMI, Guam, and Hawai'i. The limited English language skills of many teachers and students present challenges to users' contact with distance learning providers. Resources and services must be easily adaptable to various language proficiencies among teachers and students at different grade levels.

In addition to language differences, current instructional practice in many of the schools reflects a traditional, teacher-centered approach to teaching and learning. The self-directed, interactive, constructivist approach used by many distance learning providers is a completely new concept for many teachers and students in the region. The effective implementation of this approach requires training and modeling in instructional methods, technology, and other teaching resources.

Telecommunications Infrastructure

Since 1997, the telecommunications infrastructure has been dramatically strengthened to support distance learning through a mix of both new and existing technologies, such as cable television, radio, video, and the Internet. In 2005, PREL alone served over 247,000 students, 1,858 teachers, and 400 administrators in the major population centers of the region. However, the cost of bandwidth has remained high and limits the use of video streaming and other technologies.

The high cost of bandwidth has resulted in the development of courses that can be delivered on multiple platforms. While courses with synchronous components have been the goal, asynchronous versions have also been developed to meet the varying requirements of students across many time zones and with limited access to telecommunications. As Okamura

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and Higa (2000) note, the use of various technologies is required for effective distance learning in the Pacific (p. 211).

In partnership with the Pan-Pacific Education and Communication Experiments by Satellite (PEACESAT) and local telecommunications and cable companies, PREL installed a video teleconferencing (VTC) network to connect islands in the northern Pacific. This VTC network is made available for government, health, and education use. Local satellite station operators were trained by PREL and PEACESAT staff to operate and maintain the satellite terminals.

This VTC network uses old Geostationary Operations Environmental Satellite (GOES) weather satellites to provide low-cost telecommunications services throughout this region of the Pacific.

Partnerships have been established with governments, private businesses, and international nongovernment organizations (NGOs) to improve the telecommunications infrastructure and deliver more than 6 hours of educational programming per day to local cable companies in 10 Pacific island entities. Since 1997, over \$15,000,000 in services from these partners have been provided to support distance education. These goods and services include hardware, software, facilities, cost sharing, event sponsorship, broadcast and airtime for programming, and Web hosting.

Creating Effective Distance Learning Courses

A thorough needs assessment must be completed before creating any distance learning course. This assessment must include the needs of the students, the state of the educational system, the political and cultural environment, the telecommunications infrastructure available (and any planned improvements), funding availability, challenges to providing distance learning, the desires of all of the stakeholders involved, and a review of previous distance learning attempts.

Once the needs assessment has been conducted, instructional designers can begin to work with local educators or health care workers on creating the courses. The goal of PRELSTAR's distance learning program was to provide distance learning courses of high quality and learning opportunities that were equal to good face-to-face (FTF) courses. The use of distance learning in the Pacific region offers the ability to improve teacher training and instruction and expand course opportunities for students. In the health sector, distance learning offers health care professionals the opportunity to stay current with the latest developments in prevention and treatment while remaining in their local communities.

However, the lack of FTF or synchronous components in a distance learning course creates significant challenges in providing courses involving teacher training. In the past 5 years, teachers in the region have recommended increasing the amount of FTF or synchronous interaction through VTC in all of the courses. Teachers report both the FTF and VTC components are essential in the application of their learning in their classrooms. The recent use of live Web conferencing and synchronous collaboration tools, such as *Elluminate Live!*, that are inexpensive, accessible across a variety of bandwidths, and easy to use, has provided another possible tool to increase the amount of synchronous interaction in distance learning courses.

Research by Peterson and Bond (2004) seems to support this experience. In their experience with two pairs of asynchronous online and FTF courses in instructional planning for pre-service teachers, they found no significant difference in the group means for the asynchronous online course and the FTF course "in the demonstration of inquiry, critical analysis, and synthesis for secondary teacher preparation" (p. 354).

However, the students in both the online and FTF courses reported that FTF courses better prepared them for teaching. Peterson and Bond speculate the difference may be due to the modeling of the teacher in the FTF classes.

PREL conducted a thorough needs assessment prior to the beginning of the PRELSTAR project. Based on the information from this assessment, over a dozen student, teacher professional development, and adult education programs were developed and delivered, beginning in October 1997. Initially, the method used to deliver the courses included both asynchronous and synchronous video via satellite or cable, with interactivity provided by telephone or email.

An evaluation of the effectiveness of these programs at the end of the 1997–1998 school year revealed that many of the synchronous student and adult video courses were videotaped for use at a later time. This trend continued and, by 2002, a random sample of teachers using one of PRELSTAR's most popular student series, *KidScience*, indicated that 82% of them videotaped some or all of the programs for later use. Only 6.3% of the teachers consistently viewed the programs live with their students and participated in the interactive portions.

The evaluation also indicated the need for additional teacher training in integrating these distance learning courses into the curriculum in areas outside of Hawai'i. Although PRELSTAR provided unit and lesson plans both on the Web and in print, many teachers were unfamiliar with integrating teacher facilitated distance learning in their classrooms and had little experience with the technology required. To meet this need, the program identified one or more schools in each entity as "intensive sites" and provided ongoing research-based professional development to teachers in integrating distance learning resources in the classroom. Much of this professional development began in a FTF environment until teachers acquired the technology literacy to participate in a virtual one.

With improvements in the telecommunications infrastructure in American Samoa, the CNMI, and Guam, PRELSTAR began to deliver courses that included online components using the BlackBoard course management system. PRELSTAR moved to Moodle, an open source course management system, in 2005 and also began using a live Web conferencing and synchronous collaboration tool called *Elluminate Live!* Examples of recent online programs and courses include the following:

- Master's degree program in instructional technology and telecommunications
- Graduate courses in designing virtual advanced placement (AP) classes for teachers
- Public health courses for health care workers
- Undergraduate courses in elementary education and the integration of technology into the curriculum
- Student courses in AP mathematics

Another example of the movement to Internet delivery of resources includes the Network for English Acquisition and Reading Star Schools (NEARStar, www.nearstar.org) and the Pacific Worlds project (www.pacificworlds.com). NEARStar provided a multimedia resource for K–2 English language learners and their teachers. Pacific Worlds provides geographic and cultural resources focusing on the cultures of the Pacific region.

To improve reading instruction in the Pacific, PREL embarked on a major initiative to develop courses to provide teachers with essential research-based instructional strategies for teaching reading to early readers. The Reading Framework for the Pacific, K–3, consisting of three online courses—Collaboration and Assessment, Instructional Practice and Guided Reading, and Comprehension and Community Involvement—was developed to provide educators with a comprehensive literacy framework for teaching reading. The courses include approaches, techniques, and strategies for effective literacy practices. The development team included reading specialists, online instructional design specialists, and faculty from six colleges and universities.

Professional development seminars and workshops were offered to teachers on the use of specific software applications to assist them in integrating technology into the curriculum. Staff provided training in the use of international, national, and local content and technology standards, as well as in the development of lesson plans that meet these standards. In addition, PREL provided the online course management system and training for local entities to assist in the development of local distance learning efforts. All of these activities were offered with course credit through local colleges and universities.

PREL's most successful distance learning courses have been hybrid or blended courses involving both FTF and online components. In a master's degree program in Instructional Technology and Telecommunications delivered from January 2001 through December 2003, two FTF sessions were conducted for students. The first 2-week session was held at the beginning of the program, and the second session was held at the beginning of the second year. During the first session, students were provided with a laptop preloaded with all the software needed for the program and received training in the use of the technology. They also met with instructors and developed relationships with each other. While this method was successful, the high cost of these FTF meetings resulted in the search for a less expensive way to provide a synchronous collaborative learning environment.

To provide for interactivity while reducing costs, PREL tried a number of different strategies, including using monthly VTC sessions along with interaction using an online course management system and email. High-bandwidth materials were distributed on CD as well as posted online. Instructors used live Web conferencing and synchronous collaboration tools such as *Elluminate Live!* and email to provide students the opportunity for interactivity regardless of the bandwidth available to them. In addition, some courses used onsite local facilitators with groups of students similar to the model developed by the Open University in the United Kingdom.

One example of a mixed media course was Preventing Diabetes and Hypertension in the Pacific, a course for health

care workers delivered online to students in 10 Pacific island nations. The materials and resources for the course were developed on three platforms. It is available on the Web (www.prel.org/healthonline), on CD, and in print to meet the varying levels of telecommunications access available to medical personnel in the islands.

Future Trends

The current telecommunications infrastructure in developing nations must be improved in order to prevent a widening of the digital divide. While the growth of this infrastructure will be slow, the demand will persist and the availability of increasing bandwidth will provide additional opportunities for students.

As Howell, Williams, and Lindsay (2003) note, lifelong learning is becoming a requirement. With information growing at an exponential pace, it becomes increasingly important to stay abreast of new knowledge. Much of that information is already accessible at home or at work through online and other distance learning options, and the availability of courses will continue to grow.

Education is becoming more integrated, especially between high school and college. The current dividing line between K–12 and higher education will continue to become less distinct as distance education provides the opportunity for high school students to set their own pace and take college-level courses while still in high school.

Chris Dede (2002) of the Harvard Graduate School of Education predicts that three complementary interfaces—the “world to the desktop,” “ubiquitous computing,” and multiuser virtual environments—will have a major impact on education by the year 2020. In his view, technology will enable teachers to construct learning environments tailored to meet the individual learning styles of each student. Students will interact with technology, creating easy access almost anywhere to these environments.

PREL's work in the Pacific islands supports Dede's view, especially in those places with broadband Internet access. Students are becoming used to operating and learning in virtual environments as the result of frequent experience with video and computer games. The Pew Study (2002) found that students' expectations about Internet use in school are changing as a result of their out-of-school use. And as the number of Internet-savvy students grows, educators need to accommodate these expectations.

In the Pacific region, school systems are developing online courses to meet the teacher quality requirements of the *No Child Left Behind Act of 2001* (NCLB). Many islands have only one teacher qualified to teach specific content areas. By delivering instruction online, school systems can offer the courses to students at a number of locations. A local server on a wide area network (WAN) provides the infrastructure for delivery of the course and avoids the high cost of off-island Internet access.

Conclusion

Unlike remote and rural schools in the continental U.S., distance learning and technology is a relatively new experience for most people in the region PREL serves, with the exception of Hawai'i. Only in the past few years have students and

teachers become aware of how access to technology has impacted classrooms in other entities. The remoteness of islands in the Pacific presents challenges in building the technology infrastructure necessary to support distance learning and requires dependable and sustainable innovations in developing courses to meet the needs of students and teachers.

Since 1997, PRELSTAR experienced the most success with a hybrid distance learning model incorporating FTF, online, VTC, and Web conferencing platforms. However, the high cost of the FTF component often precludes its use, and the program has turned to combinations of online, VTC, and Web conferencing components to provide the interactivity and modeling required for the effective application of learning in the classroom. The recent use of Elluminate *Live!* with weekly class meetings supported by an onsite local facilitator with the instructor at a distance, followed up by email for submitting assignments, has proved to be an effective delivery method.

Several strategies have been effective in improving the access and use of distance learning resources in the region. These strategies include:

- Appropriate implementation—identifying individual entity needs and strengths and responding with an appropriate level of support.
- Use of multiple distance learning modalities—developing and delivering distance learning resources based on the telecommunications infrastructure available. These modalities included videotapes and DVDs for schools without cable access, programming on cable access channels, materials on CDs for schools with computer laboratories but either narrow band or no Internet access, online courses and videoconferences for schools with broadband access, and even site visits to provide FTF professional development and technical assistance.
- Resource leveraging—developing partnerships and brokering relationships among service providers and entity participants.
- Consistent cross-entity interventions—developing and supporting formally organized programs, such as the Pacific Algebra Network and the Reading Framework for the Pacific courses.
- Capacity building—identifying and working with “champion” educators, such as local service center coordinators, college and K–12 distance learning teachers, state education technology staff, school administrators, technology coordinators and computer lab managers.
- Technological and pedagogical needs of educators and students—effective use of distance learning depends on educators’ and students’ abilities to access technology, use it comfortably, integrate it into lessons, and change instructional practices accordingly.

Much of the success of PRELSTAR was due to its flexibility in dealing with the many challenges faced since 1997. These challenges included the loss of the only major satellite designed to provide affordable Internet access to the region, a lack of entity staff familiar with technology and telecommunications infrastructure issues, and a significant decline in educa-

tion funding to departments and ministries of education in the Pacific region.

By allocating significant resources to providing information and communication technology (ICT) consulting services to departments and ministries of education in the Pacific region, and by designing distance learning services to meet both the collective and individual needs of entities in the region and their educators and students, PRELSTAR has served as a catalyst for increasing the use of technology and distance learning in Pacific island schools.

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PREL programs provide resources and products developed to promote educational excellence for children, youth, and adults, particularly in multicultural and multilingual environments.

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