Live Interactive Virtual Explorations at a Southern California Native American Learning Center:
Case Studies and Lessons Learned

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EXECUTIVE SUMMARY

For the past decade, researchers affiliated with the National Science Foundation-funded High Performance Wireless Research and Education Network (HPWREN) have been working with Native American education communities on an array of Internet-enabled activities, including the Live Interactive Virtual Explorations (LIVE) pilot project. One of the communities involved with the pilot LIVE project is the Pala Native American Learning Center, which is located in rural San Diego County, California. This paper discusses five case studies encompassing LIVE activities between Pala tribal community members and field scientists/educators throughout southern California. Using laptops equipped with off-the-shelf accessories and freeware, the five pilot case studies demonstrate the advantages and disadvantages of utilizing the LIVE concept for real-time distance education programs at rural Native American communities.

Keywords: *Distance Education Programs, Distance Learning, Interactive Technologies, Virtual Exploration, Virtual Networks, Wireless Education Networks*

BACKGROUND

Funded by the National Science Foundation, the High Performance Wireless Research and Education Network (HPWREN) HPWREN Live Interactive Virtual Explorations (LIVE) project is a pilot program that focuses on two primary objectives: 1) exploration and understanding of hard-to-reach science sites and 2) preparation for students going on fieldtrips to such sites. Since the origination of the concept in 2001, many activities have been conducted involving

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rural Native American reservations. This paper discusses case studies concerning the Pala Native American reservation in southern California, four hard-to-reach science sites, and one remote living history site.

Surrounded by beautiful rock-covered mountains, the rural Pala Native American Learning Center is tucked away in the valleys of northeastern San Diego County. The Learning Center provides an array of resources for the Pala Native American reservation community – including access to the Tribal Digital Village Network (TDVNet), which allows for high-speed bandwidth to efficiently access high quality video and audio in the Center's computer laboratory. Established in conjunction with the HPWREN project by several San Diego Native American communities, the TDVNet not only provides Pala with high-performance Internet connectivity, but also allows for Internet access to other rural reservations throughout the County of San Diego. The case studies described in this paper are focused at the Pala Native American Learning Center; however, future experiments are planned for additional TDVNet users at neighboring reservations.

CASE STUDIES

A. Astronomy: Palomar Observatory

Though the Palomar Observatory is famous for its powerful telescopes, access to the site can be difficult because of the remote location. Equipped with high-speed (155 Megabits per second) Internet access via HPWREN, however, allows for the transmission of large telescope images from the observatory to remote universities while modern video and audio software lets astronomers share information between the observatory and education communities that would otherwise not be privy to such activities. Similarly, TDVNet connectivity (several Megabits per second), allows the Pala Native American community members to utilize LIVE technology and virtually visit the observatory without the need to leave their reservation. In 2007, a LIVE activity took place during a Family Night at the reservation's administration building and was attended by Pala tribal members as well as interested people from the community. There were nearly 60 participants – ranging from three-year-olds to sixty-year-olds – situated at the Pala site. Prior to participating in the real-time, virtual tour between the reservation's administration building and the observatory, a dinner was served while several hands-on worksheets and information sheets were distributed to familiarize the community with the observatory and general astronomy concepts. The on-site curriculum was prepared by a team consisting of the reservation's learning center staff, HPWREN researchers, and Palomar staff.

Following introductory hands-on activities, the Pala participants focused their attention to a large projection screen with two computer screenshots – one showcasing a real-time image of a Palomar telescope and another with real-time video and audio of the observatory's public information officer, who was situated just outside the telescope's dome (Figure 1).

The HPWREN researcher at the Pala site introduced participants to the Palomar public information officer on the screen who then began interacting with the LIVE audience – first explaining the dome and then discussing the other screenshot with the large telescope. An additional projection screen displayed a Powerpoint presentation that allowed the Pala participants to view images taken by the telescope – while the public information officer discussed these images and how they are taken by the observatory instruments and utilized by astronomers around the world. The participants were able to ask questions (and have them answered) in real-time (Figure 2).

Informal written evaluation surveys were administered at the conclusion of the activities and revealed that all of the respondents would recommend HPWREN LIVE to others and thought