

# Evaluating the Effectiveness of Live Interactive Virtual Explorations Involving a Hard-to-Reach Native American Earth Lodge and a Pacific Island Volcanoes Site

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## **Abstract**

For several years, National Park Service scientists, historians, and educators have been working with National Science Foundation-funded High Performance Wireless Research and Education Network (HPWREN) researchers on developing, implementing, and evaluating Live Interactive Virtual Explorations (LIVE) at several sites. The LIVE activities utilize computers with headsets and microphones to link National Park Service sites with an array of audiences. The two case studies in this paper examine the effectiveness of LIVE activities that allow Washington, DC, inner-city youth to explore two hard-to-reach National Park Service sites: Knife River Indian Villages National Historic Site in North Dakota and the Hawaii Volcanoes National Park.

## **Literature Review**

Distance learning research studies range from examinations of how users learn during online collaborative education experiences to the role of online discussions in virtual classrooms. The work of Dewiyanti, Brand-Gruwel, Jochems, and Broers (2007) shows that many students are more likely to ask questions by email when enrolled in an online



Figure 1: The Department of Interior Main Interior Building Sidney Yates Auditorium allowed a Diversity Days event audience to explore hard-to-reach National Park Service sites via Live Interactive Virtual Explorations (LIVE).

collaborative course versus a traditional classroom course. Research findings of Kester, van Rosmalen, Sloep, Brouns, Kone, and Kpoer (2007) also shows an increase in class participation—specifically online discussion forums. Offir, Lev, and Bezael (2007), however, posit that a traditional classroom allows for the presence of a teacher that is needed for most types of learners. Tan, Liu, and Chang (2007) conclude that hybrid instruction (combining traditional classroom experiences with remote outdoor learning) allows for an integrated approach not possible to achieve in traditional classroom environments. Bruch, Braun, and Teel (2010) agree that combined learning experiences are ideal and specifically study the value of having an educator at both the student and presenter sites of remote learning activities.

## Background

Visits to National Park Service (NPS) sites provide both adults and youth with opportunities to explore an array of unique, historic, and scientific areas throughout the country. The interpretation provided by on-site NPS staff allows the LIVE visitors to understand the virtual site and realize the importance of these protected areas. This paper examines technology that provides access for citizens to experience far-away NPS sites without leaving their area. Specifically, the researchers are developing, implementing, and evaluating distance education technology and interpretation techniques between NPS sites and distant visitors.



Figure 2: The Knife River activity took place inside a Native American Earth Lodge and was opened with an introduction to the site by an NPS interpretive ranger. Following the presentation, another NPS ranger sang a traditional chant accompanied by a Native American instrument.

For two days in October 2010, federal employees and members of the general public participated in virtual visits to eight NPS sites via Live Interactive Virtual Explorations (LIVE) activities at the Department of Interior (DOI) Main Interior Building in Washington, DC. The LIVE activities were held in conjunction with the DOI Diversity Days event, and allowed the audience to experience hard-to-reach, culturally diverse sites throughout the country and interact with NPS rangers without leaving the city of Washington, DC. Diversity Days participants at the DOI Building included a group of inner-city youth, while participating NPS sites included the Knife River Indian Villages National Historic Site in North Dakota and the Hawaii Volcanoes National Park. The DOI site utilized a laptop computer connected to the auditorium's audio speakers and video system, which included four plasma screens dispersed throughout the room and one large projection screen located on the front stage (Figure 1). The Knife River and Hawaii Volcanoes sites park rangers were able to connect their laptops to the DOI laptop through Internet-enabled freeware that allows for real-time bi-directional video and audio.

### **Case Study: Knife River Indian Villages National Historic Site**

Located in rural North Dakota, the Knife River Indian Villages National Historic Site pays tribute to the Mandan and Hidatsa peoples, who had permanent villages of earth lodge dwellings in the area during the 1800s. The technology used for the LIVE activity between the Washington, DC, participants and the Knife River park rangers included



Figure 3: The Hawaii Volcanoes National Park LIVE welcome chant took place as the sun rose over smoking volcanoes.

a laptop computer equipped with a built-in microphone, web camera, and freeware (Google video chat). Both video and audio quality were evaluated and the majority of participants agreed that both were good. During the hour-long presentation, the park rangers remained in the earth lodge and one of them demonstrated a Native American chant accompanied by a Native American instrument. The LIVE activities between the NPS interpretive rangers and the audience sparked a lively question and answer session. Inquiries included, “What type of trading took place between the Native Americans and the settlers in the 1800s?” and, “What are the artifacts in the earth lodge used for?”

### **CASE STUDY: Hawaii Volcanoes National Park**

Following the Knife River earth lodge LIVE activity, the audience was taken on a similar trip to the Hawaii Volcanoes National Park, where presenters were situated overlooking a smoking volcano and welcomed the audience in DC to the island with a Native chant. Following this opening, rangers introduced the park and engaged the audience, focusing on explanations regarding volcanoes in the area. Questions posed by the DC participants included “Can you feel earthquakes?” and “Have you ever stepped in hot lava?”

The technology used for the LIVE activity between the Washington, DC, participants and the Hawaii Volcanoes National Park rangers consisted of a laptop computer with external audio headset/microphone and video camera. Skype, a freeware program, was used for the point-to-point, real-time video and audio. Both video and audio quality were evaluated and the majority of participants agreed that both were good.

## Methods and Results

Permission to collect participant data was granted to researchers, including the authors, by the Human Subjects Research Program, at the University of California–San Diego. Data was collected through Likert-scale surveys in October 2010 directly following the Diversity Days event. The population consisted of 61 middle-school students (43 females and 18 males); ages ranged from 12-years-old to 15-years-old.

Eighty percent (49 of 61) of the participants agreed that “the information was presented effectively by the presenters” while 79 percent (48 of 61) said, “I learned a lot.” Sixty-two percent (38 of 61) said, “I would recommend LIVE activities to others,” and 64 percent (39 of 61) said, “I want to go visit the site in person now.”

## Discussion and Further Research Needs

During both LIVE activities, participants engaged with the remote presenter and asked an array of questions as described in the Case Study sections of this paper. The audio was very clear and while video was sufficient, it was not broadcast quality and sometimes appeared blurry (as shown in the figures). To enhance future events, researchers are examining additional software options to improve the video quality and also considering the implementation of hands-on manipulatives for LIVE participants to utilize before, during, and/or after the remote tour and discussion. For instance, a duplicate of the Native American instrument would serve as a hands-on tool for participants to experiment with, after the chant via LIVE technology. The remote park ranger might even be able to informally instruct the participants on how to conduct their own music and chant via the LIVE technology—if enough instruments were available at the education site. Additional possibilities include archiving the LIVE activities so that the participating parks can incorporate them into their web portals for viewing by website users.

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