

I. Making the Connection

In the span of less than a decade, the Internet has become ubiquitous; many Americans now take it for granted. Not only are we using regular telephone lines in record numbers for email and web surfing, but high-speed connections are becoming increasingly commonplace in workplaces, schools, libraries and even in a growing number of homes. As a result, it is easy to forget that in some places, basic connectivity — the ability to get online at tolerable cost — still represents a substantial barrier to joining the information society.

Two projects supported by TOP demonstrate how isolated communities are surmounting numerous barriers and getting online. In the sprawling Navajo Nation, where many families lack even basic telephone service, local tribal governments are using satellite connections to connect with the outside world. Though the system is still new, people already are beginning to explore new opportunities for improved lifestyles, increased efficiency, economic advancement, and stronger self-government. Meanwhile, in the rural town of Mayville, North Dakota, a state university is working with local leaders to establish a homegrown technology industry — and thereby hoping to halt a long economic decline produced by the continuing exodus of people from farms. Their experience illustrates how a complex mix of infrastructure, education, and community support help determine the success of modern technology ventures.

The Navajo Nation Goes Online

The next time you feel bad about your commute to work, consider Isabelle Walker. Like many people who live in rural areas, she has more than one job. And until recently, that meant she had to spend a lot of time on the road. As a district leader for three local chapters of the Navajo Nation, she typically had to drive 150 miles round-trip every other day from her home near Flagstaff, Arizona, to the Western Navajo Agency, a regional government headquarters, in Tuba City. On other days, usually about twice a week, her jobs as vice president of the Bird Spring chapter of the nation and as a health board representative to Indian Health Services required her to travel all the way to Window Rock, the Navajo Nation's capital. That's about a 400-mile round trip. All in all, Walker was covering an exhausting 1,200 miles each week.

By last year, the seemingly endless road time was starting to wear thin. Too often, she had trouble getting home to her family in time for dinner. People on her 60-person staff at a regional office of the nation's social services agency were complaining about her long absences (at one point, she went a month without making it to a staff meeting). And the residents of the Bird Spring chapter, who had voted her in as their vice president, were growing impatient too. "People were starting to ask, 'If you're never here, why should we elect you?'" she recalls.

Fortunately, Walker's life as a commuter improved considerably last fall, when the Navajo Nation's 110 local chapters came online. Now, she could email documents she once had to spend hours hand-delivering to government offices in Tuba City and Window Rock. Her weekly commute dropped to 500 miles — still high by the standards of city-dwellers, but not unusual for somebody living in the wide-open spaces of Navajo country. Liberated from many hours in her car, she could spend more time with her family, and concentrate more on her main job—managing a group home for youth. “With today's technology, it makes no sense to drive those distances,” she says.

This may not sound particularly exotic to the growing number of Americans who have come to take the Internet, email and even telecommuting for granted. But Walker's story represents a breakthrough for the Navajo Nation, where many families lack even basic telephone service, and Internet connections are extremely rare. Where there is a will, the Navajo experience suggests, there is a technological way to bring even areas with minimal infrastructure into the Internet era.

Surprising Progress

It is hard to imagine a place where the task of providing Internet connections seems more daunting than the Navajo Nation. The nation's 200,000 residents are spread across 25,000 square miles of high plateau in Arizona, New Mexico, Colorado, and Utah. More than half earn incomes below the poverty level, and three out of four households lack telephones. In 1999, the Seba Dalkai Boarding School described the challenges in stark terms when it applied for a grant from the Technology Opportunities Program to connect five local chapters in the 5,000-square mile southwestern corner of the nation. “There are no cable television services, no local radio stations, no local television stations and extremely limited cellular phone services. The ratio of people to residential phone numbers is 49 to one,” wrote officials from the school, which is based near Winslow, Arizona. “Internet access . . . is prohibitively expen-

sive. Some tribal institutions on the western side of the Navajo Nation's second largest city paid \$17,400 per year for a single, 56-kbps data line to an Internet access point. Institutions have waited two years for the installation of additional services. The telecommunications infrastructure, especially as it pertains to small and isolated institutions, is nonexistent.”

Despite such obstacles, change has come faster than the school, or anybody else expected. Soon after the school received a \$475,000 TOP grant, StarBand Communications, Inc., which is based in McLean, Virginia, said it could connect all 110 local chapters, not just the five that had been targeted. Project managers jumped at the offer, and last fall StarBand, which says it offers the first “two-way, always-on satellite-delivered Internet access for the consumer market,” installed personal computers connected to 24-inch by 36-inch satellite receivers in each chapter headquarters.

Almost overnight, the Navajo Nation was online. The change came so quickly that officials have hardly had a chance to consider what to do with the new technology. But as in other places, many individuals find plenty to do with their new connections. A recent tour of the southern rim of the Navajo Nation gives some clues about what impact Internet connections are having.

A Tour of Isolated Chapters

In Leupp, a chapter near the southwestern corner of the nation, an old dam is failing, and government officials are worried that surrounding lands will be undermined. Rosita Kelly used the Internet to learn about sinkholes in Florida in hopes of demonstrating to chapter residents they should not build in the threatened areas. Kelly also has started to collect price quotes from construction companies to build a new sewage lagoon.

To the east of Leupp, a low, dome-shaped structure painted a dull red to match its surroundings hugs the earth under the big Arizona sky. This is the Bird Springs chapter, which was the first chapter to

get an Internet connection. Inside, receptionist Terri Joe surfs the Internet during quiet times. Her favorite website is collegeclub.com, where she has found scholarship funds that paid for two years of study in health and medical sciences at Northern Pioneer College in Winslow, Arizona. On the day TOP visited her, she had just learned about two more scholarships that could help her achieve her goal of continuing her education at Northern Arizona University in Flagstaff.

While chapters have Internet connections primarily to conduct their own business, they welcome a steady stream of residents who want to check their personal email or surf the web. Hank Willie, who keeps the system operating, has observed many of these personal explorations — people looking for truck parts, for medical information about their cattle and sheep herds, for insurance, for job searches and more. When hoof and mouth disease set off alarms in Europe, Terri Joe helped the Bird Springs grazing official study up on the issue to advise local shepherds. Willie has seen a number of young men use the Internet to register with the Selective Service.

Still farther to the east, Cheryl Chee is working on a web page designed to recount the history of the Greasewood Springs chapter. Tonaya Anderson,

who works for the Office of Dine Youth, uses Encarta to look up information for kids on subjects such as ancient African civilizations. According to Anderson, children from the chapter periodically use the chapter's computers to look up the meaning of Navajo words they can't understand. Anderson hopes in her spare time to contact people in the Kiowa Tribe in Oklahoma, from which she is descended.

When TOP visited Greasewood Springs, Barbara Cummings, the chapter's community services coordinator, was helping chapter president Franklin Gishey look for an inexpensive tractor. After five minutes online, she found a used one for sale in Aberdeen, South Dakota, that appeared to meet the chapter's requirements and had an appealing \$15,000 asking price. Cummings ventures onto the Internet frequently. She uses email to keep in touch with two nephews who serve in the U.S. armed forces; one is stationed on a U.S. warship and the other is in Kosovo. But Cummings believes the chapter, which has just 1,260 residents, has a much bigger need for networking. Under a 1998 law known as the "Local Governance Act," the Navajo Nation is transferring substantial powers to chapter governments, but the local entities first must demonstrate that they have certain management capabilities. To assume these responsibilities, chapter leaders and staff will need training in everything from account-



ing to how to levy taxes and tap outside sources of funds, Cummings says. Noting how small and isolated the community is, she adds that much of the help will have to come from outside. The chapter is making progress in finding such help: Northern Pioneer College is interested in using the new Internet connection to offer electronic courses to people in the community.

The View From Window Rock

Farther east, in Window Rock, Larry Noble is one of the nation's most avid Internet users. A delegate to the Navajo Nation Council from Steamboat, he maintains email relationships with numerous Navajos who have moved away from the Nation, providing them a link to their native culture and often helping them with their research. He says he learns a great deal from these students in return. Noble, a former sheep herder, says he has spent a great deal of time on the Internet trying to understand why Australian-grown wool sells at much higher prices than wool from sheep raised in Navajo country. The reason, he has learned, is that Australian sheep are better nourished, and hence produce higher quality wool. His studies have convinced Noble that the Navajos have to clamp down on overgrazing.

As more and more Navajos go online, Noble believes, he will use email more. Indeed, he says, in a nation where there are relatively few telephones, and people with telephones often are away from them, email may soon be the most important communications medium, he says. "If I put email through to a person I'm trying to contact, I know I'll get a better response," he says. "With the telephone message, I don't know if the message will get through."

Together, these anecdotes suggest that the Internet is starting to take hold in Navajo country. But the Nation has a long way to go before it is fully wired. Many of those who have tasted the online world want connections to their homes, and the few who have experienced high-bandwidth connections — Larry Noble uses the Nation's T-1 connection from Window Rock — are eager to get high-speed

service. Unfortunately, the lack of a strong telephone network slows the spread of the technology, and the unavailability of local, dial-up access in many areas also is a big barrier to expansion of Internet connections (Greasewood Springs Chapter President Franklin Gishey tells a story about how his son hooked onto a Dreamcast video system to gain Internet access — and rolled up a \$600 telephone bill for one month).

Next Steps

Still, the Nation's involvement with the Internet is growing every day. The Gates Foundation has installed four new computers with their own satellite-based Internet connection in chapter houses. And Kyril Calsoyas, director of the original TOP grant, is exploring a number of other relatively low-cost options that might increase connectivity in the immediate future. The Greenstar Foundation, which is based in Los Angeles, produces easy-to-install, solar-powered community centers that deliver electricity, pure water, health and education information and a wireless connection to villages in the developing world, for instance. To support such centers, Greenstar helps native peoples record traditional art, music, photography, legends and storytelling for sale over the Internet. The MIT Media Laboratory, meanwhile, has produced "Lincos," or "Little Intelligent Communities," similar packages that combine computer science laboratories, telemedicine units, videoconference centers, and information centers with electronic trade features.

More robust Internet connections cannot come fast enough for Norbert Nez, systems analyst in the Division of Community Development. Nez says local chapters have a growing need for Internet access. "Right now, information is what the chapters need the most," he says. Chapters already need a lot of information about national laws and policies, he says, and they will need much more as they become self-governing. In particular, they will need up-to-date information about land use for issuing permits, planning, protecting archeological sites, laying out roads and other infrastructure, and protecting flood plains, forest areas and grazing lands. One

chapter, Shiprock, already is building its own database of geographic information systems (GIS) data, according to Nez, who says he hopes many more will follow. Nez says he hopes Navajo people ultimately “will be comfortable enough that technology is transparent to them. Anywhere they go, if they need information, they should be able to pull it off a computer.”

Despite successes such as the wiring of the chapter houses, Nez admits to feeling overwhelmed at how far the Navajo Nation still has to go to join the information age. Much infrastructure remains to be built, and lack of training remains a huge obstacle. Indeed, he says, many Navajos still don’t have a strong idea of all the things they might be able to do with information technology. “Many people are still at the point they think it’s more of a toy than something they can put to business use,” he says. “And a lot of time people are so overcome they don’t even know what to ask.”

Still, for the first time ever, a likely candidate for president of the Navajo Nation has established his own website. And changes in the lives of people like Isabelle Walker, Barbara Cummings and Larry Noble suggest the nation has come a long way in a short time. “We’re getting there,” says Noble. “It’s just going to take some time.”

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