

**Matthew Yazzie**  
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### **Technological Challenges of the Navajo Nation**

Michael wakes up early in the morning to his usual breakfast. Today he has a five page research paper titled *The Life Cycle of Tree Toads* for which his junior high school instructor assigned research on the Internet. After eating, he slowly gets ready and prepares for the forty-five minute drive to his friend's house where he can complete his research. Unfortunately, upon arriving Michael finds that his friend is not home. One may ask several simple questions such as; "Why didn't he do his research at home?" or "Why did he not call first?" The answer is quite simple. He does not have access to these technologies at this time. Internet access is a more recent development even in the urbanized parts of his community. Running water has just been installed within the past year and telephone access, even cellular, is estimated to be completed within the next year and a half.

Michael is a member of and lives on the Navajo Nation, the largest federally recognized Indian tribe in the United States which has approximately 225,000 members (The Offices of the Navajo Nation). Technological advancement has progressed at a frustratingly sluggish rate. Why are the technological changes on the Navajo Reservation occurring so slowly? And when these technologies are introduced, how do they affect the Navajo Nation? The focus has recently been shifted towards this lag in technological advancement. One key term is the "Digital Divide" referring to the divide that exists between those who have access to technology and those who do not. However, the

“Digital Divide” exists across several demographics, not just Native American communities, such as; the young and old, the poor and wealthy, and the disabled and non-disabled individuals.

Why are the technological changes on the Navajo Reservation occurring so slowly? Four main points will be discussed; weak economic base, geographical remoteness, distrust by Native Americans regarding change on the Navajo Nation, a lack of planning, and telecommunication obstacles.

First of all, many of these communities suffer from a weak economic base, which in turn prevents investment in the basic technological infrastructure of the Navajo Nation. Before divulging into the economic base, the term “technological infrastructure” must be observed. An infrastructure consists of roads, telephone lines and certain other capital investments that are needed to keep towns, cities and other communities functioning. Usually such investments and the benefits of such necessitate significant public involvement. In more recent years, the definition has expanded to include systems such as human and institutional capital investments rather than investments in only physical capital. The confusion is also propagated when the term *technological* is added. Technological infrastructure for the purposes of this research paper refers to those investments in physical, human and institutional capital needed to support continued technological progress. The Navajo Nation also has three areas where this infrastructure definition differs. First of all, the poor condition of the current infrastructure means that there is less to build upon than most other communities. The Navajo Nation has inadequate telephone service and low rates of penetration. Progress towards

advancement cannot be made until current conditions are improved. Secondly, because the Navajo Nation tends to be primarily rural, the technological demands are inclined to be diverse as well. And finally, cultural influences also need to be taken into account and new technologies should respect Native language, culture, traditions, government and attitudes towards these technological changes.

One of the greatest obstacles that the Navajo Nation faces to developing technological infrastructure is that Navajo Nation members tend to have a very severely disadvantaged economic situation. Unemployment rates among Native Americans remains the highest in the nation. Unemployment rates averaged 42% with an average income of \$10,296 (US Dept. of Commerce 1998). According to more recent government data, the United States national unemployment rate was only 4.5% in 1998 with average income at approximately \$24,000 in 1996 (US Dept. of Labor 1999). The poverty rate for Native Americans was at 31% compared to 13% for all United States citizens (US Dept. of Commerce 1995). Because the investment in capital improvement is only as good as the economic base, Navajo Nation members often find themselves falling behind in technological progress. The weak economic base does not allow for improvements in even the poor equipment that exists.

The Navajo Nation has been plagued with problems of access to technology and the poverty of tribal members. When looking closer at the relationship between the two, the link between poverty and the lack of technological access soon becomes obvious. Many reservations lack basic telephone lines and services already. According to the Central Office Engineer for Navajo Communications Company, "Nonpayment of fees is

a major issue that Navajo Communication Company faces. This is particular the case for long distance charges. Approximately fifty percent unemployment exists on the Navajo Reservation. Therefore the question of having a phone or not is an issue of luxury versus necessity” (National Center). Just 22% of Navajo households have access to phone lines, but Navajo utility experts assure that many more households have access to phone lines than is suggested by this statistic. The issue is more about affordability when you consider the high connection charges to receive first service. On the Navajo reservation, individuals earn an average income of just \$6,352 per year and 35% of new telephone connections are eventually disconnected. The weak economic base for tribal members is a hindrance in the improvements in the general technological infrastructure not just because Navajo Nation residents oftentimes do not have access to such technology, but also because they simply cannot afford what is available.

Secondly, natural geographical remoteness lends itself to a high cost in providing any basic technological infrastructure. According to the Acting Manager for the Engineering and Technical Services Navajo Tribal Utilities Authority, “There are few roads on the Navajo Reservation. There is really no source of funding for the roads since the tribe does not have the funding mechanisms for roads. And because of the non-tax status of the Indian reservation, there are also no funds available for public works” (National Center). Many families who live on the reservation do not have adequate access to their homes. It is not uncommon to drive for several miles on a stretch of dirt “washboard” road to reach a family member’s home. This makes it very difficult to get

basic phone lines let alone T1 connections or Internet access into these isolated homes and communities.

A survey by the Economic Development Administration through the US Department of Commerce has found that tribal colleges lack development in several key areas. First of all only 39% of rural households in Native communities have telephones compared to 94% for non-Native rural communities. Approximately 26% of Native American tribes report that they do not have 911 services mostly due to the fact that a naming convention for roads purely does not exist making it very difficult to map out exact physical locations. One such example is the United Parcel Service mailing address problem; BHP Billiton New Mexico has several mining operations on the Navajo Reservation with many shipments reaching several remote locations. The physical address to one mine site is:

Area III  
16 Miles South of Farmington  
Farmington, New Mexico 87401

Another address for an area resident is:

Five Miles South of Shiprock  
Two Miles West from Highway 666  
One Mile South, Red House on Right  
Shiprock, New Mexico 87420

Clearly, the geographical remoteness lends itself to many problems. Without a simple naming convention, telephone 911 services remain useless if they were even implemented in the first place. These geographical boundaries create problems for implementing newer technological infrastructures as well as improving those that exist already.

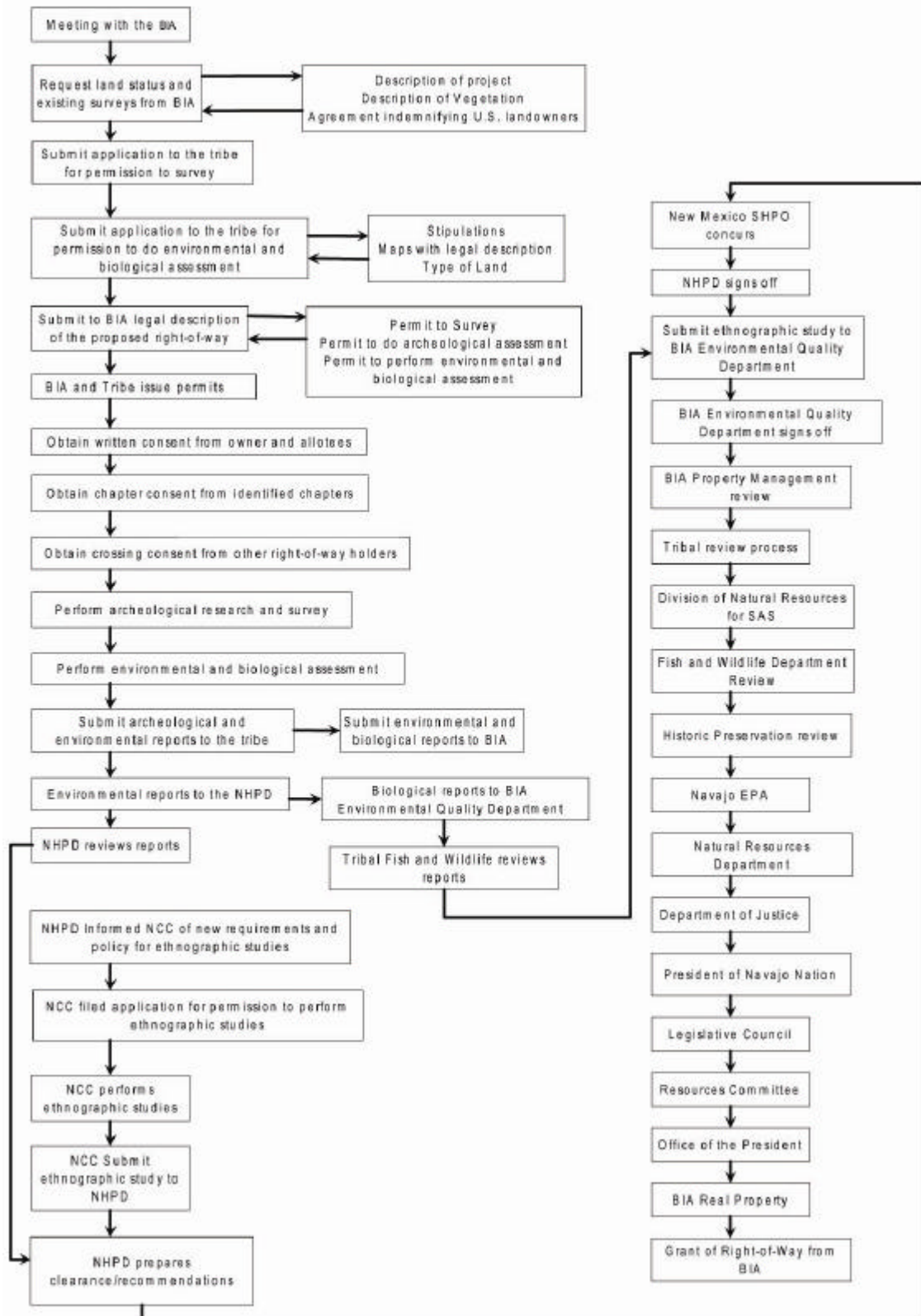
The weak Federal policies and funding towards Native American tribes create even greater problem. However, the Federal assistance programs depend primarily on the applicant to ensure the success of the program. For example, funding may be available for the implementation of telephone lines, but if the engineers are not available to properly implement the technology and the project cannot be completed within budget, the money will have gone to waste. Not on the lack of funding, but on the lack of knowledge by those individuals faced with implementing these new technologies. According to a Tribal Planner for New Mexico reservations, “The People of the tribe need training on developing local area networks, building Web Pages and other technologies. Currently the tribe pays for outside computer consultants to provide such services. In addition, there’s a very strong need to be able to use GIS [Geographic Information System] software for planning purposes. The BIA [Bureau of Indian Affairs] provides GIS databases but there is no local expertise to use this service.”

Another barrier that needs to be faced is the one of distrust by Native Americans on new technologies and even more so on federal assistance. After many years of oppression and degradation, many older Native Americans find themselves very hesitant regarding changes in the tribal infrastructure. Because many of these elders are still making decisions regarding policies and changes in within the individual tribes, rarely any change occurs or it occurs over a large increment in time. This leads to the lack of an integrated Native American investment strategy to battle technological delay. According to a Tribal Councilman of the Navajo Nation, “The land value for right-of-way is a major issue. For example, the railroad pays the tribe only \$1 a year for crossing through tribal

land. The court case in 1910 provided a onetime \$10,000 payment for the railroad easement. As a result of these past experiences, the tribe is very reluctant to provide private right of way access” (National Center). In another more recent example, the Navajo Nation sold water rights of the Navajo Aquifer under Black Mesa Arizona for \$1.67 per acre foot to Peabody Mining Company. 1.3 billion gallons of water are used annually to slurry coal from Arizona to Nevada. The mining company continues to pay the same price negotiated in 1966 to the Navajo Nation, estimated to be \$6,680 per year for use of this water. The water is neither returned nor reclaimed, but sold permanently to Peabody Mining Company. According to a 1999 report by the United States Department of Justice, one of the major reasons why technological advancement is not occurring is because of the distrust between tribal lawmakers and the US government’s involvement in implementing such technologies (US Dept. of Justice 1999). Thus creating one major hurdle for which there is no simple solution.

Telecommunications companies face significant barriers when trying to serve the Navajo Nation. The Navajo community is virtually a small market with his entry and service costs. Not only are fees and taxes paid to the reservation, but they are paid to the county and state as well. Even after obtaining permission to conduct business on the reservation, the company still needs to acquire rights of way access to build on tribal land. Permission must come from the Bureau of Indian Affairs and the tribal government for approval. A complex and time-consuming process that requires a large number of certifications and assessments is needed before granting rights of way access on the Navajo Nation. This process can take anywhere between three to five years to complete

for a telecommunications line. The following is an example flowchart associated with Navajo Communications Company process for gaining right of way access.



Other utility operations often face the same challenges as the telecommunications industry. The increased difficulty in obtaining rights of way to build on tribal lands often deters private investment.

When technological change does occur on the Navajo Nation, how does it affect the tribe? Technological challenges can affect the Navajo Nation in three ways economically, socially and culturally.

Economically, Native American tribes lack facilities to create any economically sustaining effect. Only 61% of tribes report that they do not have a single manufacturing facility in their community. Just 44% have an economic development plan and 35% have a strategic plan in place to combat this lack of economic sustenance (Duffy). According to the Domestic Policy Council report on *Economic Development in Indian Country*, Native American communities find themselves in problematic cycles (Daley). The lack of businesses on these reservations means that many of the resources are leaving the Native American communities. Henceforth, technological advancement cannot be made due to the lack of a self-sustaining economy. This lack of economy in turn causes resources to leave the reservation and so the cycle continues. Many “border towns” are typically the ones that benefit from the economically weaker reservations. Capital enters the reservation through large companies such as mining facilities or large industrial corporations and does not stay within the economy of the reservation.

Socially, the lack of technology is creating an even greater strain on the educational foundation for the Navajo Nation youth especially with regard to the tribal college system. This Indian tribe like many other tribal communities faces economic,

social and political barriers that are oftentimes a detrimental hindrance to Native Americans. With a median age of members on the Navajo Reservation between 18 to 24 years and an increasing population, the tribal college system is becoming of greater importance to the native youth. It is estimated that 85% of the college students that attend tribal colleges and universities live at or below poverty levels (American Indian College Fund). According to the American Indian Higher Education Association (1999), tribal college students face higher rates of having children and being the head of their household, living at home, having jobs outside of school, and being the first in their families to go to college. Tribal colleges are essential for native students and community members to break through socioeconomic barriers in their advancement in higher education (Carnegie Foundation). Without basic technological resources available to tribal college students, they face significantly greater challenges in today's workforce. According to the American Indian College Fund (2000), considerable problems are apparent when examining connectivity, hardware, software and funding needs at Navajo tribal colleges and universities.

However, technology is now being used in a very positive way that allows for the advancement of the Navajo culture. Several students from San Juan College in Farmington, New Mexico have developed Navajo Word Processor 2.0. This program was completed as a final Computer Science project for Dr. Timothy Reeves. According to the Journal of Computing in Small Colleges, the problem was very straightforward, "providing word processing capability in a language containing characters not generally available in commercially available word processors" (Hall). Navajo fonts have existed

in the past for years, but word processors with included Navajo fonts were not available for Windows based computers. The Navajo language now is available in several key markets. First, those that are contained within the Navajo Nation, especially the Navajo Nation tribal offices where the Navajo language is used exclusively to conduct business and to speak at tribal council meetings. Second, those businesses dealing with a predominantly Navajo community surrounding the reservation are affected, namely, these “border towns” such as Farmington and Gallup, New Mexico. The Central Consolidated School District began a campaign to increase the Navajo language classes as a part of their curricula. The Navajo Word Processor has made its way into local classrooms and is being used as a tool in improving speaking and reading skills in students.

The Navajo Nation is still growing and evolving in a very unique way. Although the trends in technological advancement on the reservation seem to be nonexistent when compared to the rest of the country, you cannot deny the fact that this change albeit slow is inevitable. Several key areas can be viewed as hindrances to this change; weak economic base, geographical remoteness, distrust by Native Americans regarding change on the Navajo Nation, lack of planning, and telecommunication obstacles. We also see how these changes can be positive or negative by viewing several key areas of Navajo life; social, economic and cultural.

According to Michael, who was mentioned at the introduction, “I am very thankful that I have running water now and that I don’t have to haul water anymore everyday. So, I don’t mind not having Internet [access] or a phone... Just because I don’t have it now doesn’t mean I’ll never have it. It just takes time. That’s all.”

## References

- American Indian College Fund. 2002. "Fact Sheet about Tribal Colleges"  
Retrieved, April 1, 2001  
(<http://www.collegefund.org>)
- American Indian College Fund. 2000. "Tribal Colleges' Technological Needs"
- American Indian Higher Education Association (AIHEC) and the Institute for Higher Education Policy. 1999. *Tribal Colleges: An Introduction*  
Washington, DC: Authors.
- Carnegie Foundation. 1997. "Native American Colleges: Progress and Prospects"
- Daley, William M., Aida Alvarez, and Bruce Babbitt. 1995. "Economic Development in Indian Country"  
Washington, DC: US Department of Commerce: US Department of the Interior, US Small Business Administration
- Duffy, Diane and Jerry Stubben. 1998. "An Assessment of Native American Economic Development: Putting Culture and Sovereignty Back in the Models" *Studies in Comparative International Development* 32, No. 4
- Hall, Scott, Stephen James, et al. 2000. "Developing MFV Application Navajo Word Processor Version 2.0" *The Journal of Computing in Small Colleges* Volume 16, Number 1
- Interview with Informant (Michael). 2002. Student, Central Consolodated School District. Used with permission by student and legal parent/guardian.
- The National Center for American Indian Enterprise Development. 1999. "Assessment of Infrastructure Needs in Arizona Indian Reservations"  
Arizona Department of Commerce
- The Offices of the Navajo Nation. 2000. "Profile of the Navajo Nation"  
Retrieved, April 1, 2001  
(<http://opvp.navajo.org/documents/021502-NNprofile.html>)
- United States Dept. of Commerce. April 1995. *Statistical Abstract of the United States*  
Washington, DC: U.S. Department of Commerce: U.S. Census Bureau.
- United States Dept. of Commerce. April 1998. 1997. *State per Capita Personal Income and State Personal Income: BEA 98-10*  
Washington, DC: U.S. Department of Commerce: Bureau of Economic Analysis.

United States Dept. of Justice. November 1999. *Report of the Indian Country Information Technology Meeting*  
Washington, DC: U.S. Department of Justice: Office of Justice Programs in Cooperation with the National Criminal Justice Association.

United States Dept. of Labor. May 1999. *Regional and State Employment and Unemployment (Monthly)*  
Washington, DC: U.S. Department of Labor: Bureau of Labor Statistics.