

**Facilitator Perspectives from Five Public Access Sites
Serving Ethnically Diverse Communities
in the Pacific Northwest**

North Central Regional Center for Rural Development

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EXECUTIVE SUMMARY

Tribal and inner city populations are among many groups on the “wrong side” of the digital divide according to a series of reports commissioned by the federal government. Many—including the federal government—treat the issue as simply a lack of infrastructure. To address this, the Advanced Internet Satellite Extension Project (AISEP) provided physical access to disadvantaged sites free of charge for several years. We visited five of these sites in the Pacific Northwest—all of which are public access sites serving ethnically diverse populations—as part of a study to explore if or how Internet access makes a difference in disadvantaged communities and whether technology access is helping bridge the so-called digital divide. More specifically, we set out to explore the nature and character of digital inequality at disadvantaged sites and to identify the systemic challenges these sites face when using technology for community empowerment. To this end, we focused on the social and cultural context of these communities and the organizational resources they have available to support the use of technology.

All sites acknowledged positive impacts of the connectivity, most of which were related to social, cultural, and knowledge benefits. For example, almost all of the facilitators with whom we spoke noted that access had created new or improved relationships between individuals and organizations across cultures, as well as within cultures. They regarded this benefit as crucial for increasing the ability of disadvantaged communities to secure resources for themselves in the future. Facilitators cited other benefits brought by local use of the high-speed Internet, including the creation of opportunities for personal growth and development for place-bound learners. In sum, local access and support for access offers users social and cultural support they need to thrive. However, facilitators noted a dearth of emergent political, environmental, and financial capital benefits as a result of having access to high-speed Internet.

Results from interviews with facilitators at the five sites also show that the solution to the digital divide is complex, requiring attendant investments in social, cultural, human, and political resources. Such investments are needed to:

- Increase county, state, and federal sociopolitical recognition of disadvantaged communities;
- Assess if or how technology is relevant to the lives of disadvantaged users;
- Promote states’ interest in investing in telecommunications infrastructure in Indian country;
- Target the ability of local government to support long-lasting technology benefits;
- Help resolve political contention over what is culturally appropriate content to post online;
- Build trust and relationships between users of different ethnic backgrounds;
- Build trust and relationships between organizational and institutional partners;
- Increase self esteem among users;
- Overcome intimidation of technology among unfamiliar users;
- Provide qualified technical support personnel;
- Provide visionary personnel who can connect technology tools with programs to achieve broad social outcomes;
- Reduce turnover among community technology partners;

- Collaborate and coordinate technology efforts with government agencies to ensure disadvantaged individuals and communities become self-sufficient in the long-term;
- Encourage public access sites to foster productive rather than consumptive behaviors among technology users;
- Fund the creation of culturally appropriate online content;
- Support culturally appropriate learning opportunities like a virtual tribal college;
- Address concern about using technology to offer public access to cultural resources such as art, language, sacred sites, or traditional rituals and customs;
- Consider technology training as one piece of holistically addressing pervasive socioeconomic disadvantage;
- Stimulate private sector financial interest to invest in telecommunications infrastructure in excluded locations;
- Extend educational pricing discounts to community education centers;
- Help tribal members use technology to connect with the land through the practice of local culture;
- Treat Internet access as a basic human need in subsidized housing developments;
- Increase federal investments in building community knowledge and human resources at public access sites;
- Include the voice of non-citizens in local government participation;
- Build relationships between communities and government officials;
- Create a network of committed service providers to create technology enrichment opportunities for disadvantaged populations;
- Create partnerships between public service agencies and private industry to create quality employment opportunities for disadvantaged users gaining technology skills;
- Ensure that the basic needs of disadvantaged populations are met; and
- Deliver technology programs tailored to address the specific language and cultural needs of users.

If we reduce the issue of the digital divide to one that can be bridged simply by laying cable to chronically excluded areas, we are ignoring the larger political, social, and cultural arrangements in which technology use is imbedded. Successful use of technology depends on having access to technical resources and appropriate program knowledge (human capital), family and community cultural values (cultural capital), strong and functional social networks (social capital), and consistent political support (political capital).

INTRODUCTION

From March 28-April 11, 2004, North Central Regional Center for Rural Development staff Corry Bregendahl, Research Associate, and Susan Fey, Editor, traveled to Nevada, Oregon, and Washington to conduct site visits at five locations participating in the Advanced Internet Satellite Extension Project (AISEP) administered by the American Distance Education Consortium (ADEC) and funded by the National Science Foundation. Craig Campbell, ADEC Project Coordinator for Tribal Colleges and Indian Affairs, accompanied the team but did not participate in the interviews.

These site visits were conducted as part of a study to explore if and how Internet access makes a difference in disadvantaged communities and whether technology access is helping bridge the so-called digital divide in these places. The term “digital divide” was introduced in 1995, when the National Telecommunications and Information Administration (NTIA) issued the first in a series of reports¹ that presented statistical evidence for the presence of technology “haves” and “have nots” in the United States.

Numerous studies have already documented who is using the Internet and for what purpose, the most renowned examples of which are the NTIA’s *Falling Through the Net* series, the Pew Foundation’s Internet & American Life project, and the University of California Los Angeles (UCLA) Internet Project. Documenting the presence of a digital divide is therefore not the purpose of this work. Instead, our goal is to expand the definition of access beyond one of infrastructure and identify critical non-infrastructure investments that are also needed. As one contact put it, “[t]here’s a bigger picture here. It isn’t just getting access to the Internet; there are other things going on.” Hence, we have attempted to evaluate the “other things that are going on”—namely, institutional and organizational human, social, political, and cultural resources—to better identify the factors that mediate technology access and use.

Research Questions

To conduct this evaluation, we must understand the context and resources at sites serving ethnically diverse communities to answer the following questions:

- What role does Cooperative Extension, public service agencies, tribes, and tribal colleges play in providing public community technology access at ethnically diverse locations?
- Is technology access in these locations bridging digital inequality or leading to more social exclusion?
- What benefits does technology bring? Does it even bring benefits?

¹ See: 1) 2002, “A Nation Online: How Americans Are Expanding Their Use of the Internet” (<http://www.ntia.doc.gov/ntiahome/dn/anationonline2.pdf>); 2) 2000, “Falling Through the Net: Toward Digital Inclusion.” (<http://search.ntia.doc.gov/pdf/fttn00.pdf>); 3) 1999, “Falling Through the Net: Defining the Digital Divide: A Report on the Telecommunications and Information Technology Gap in America” (<http://www.ntia.doc.gov/ntiahome/fttn99/>); 4) 1998, “Falling Through the Net II: New Data on the Digital Divide” (<http://www.ntia.doc.gov/ntiahome/net2/>) and 5) 1995, “Falling Through the Net: A Survey of the “Have Nots” in Rural and Urban America” (<http://www.ntia.doc.gov/ntiahome/fallingthru.html>).

- Access alone may not overcome social and political disadvantage experienced by certain groups of users. What kinds of supplemental support are necessary to overcome disadvantage?
- What kinds of challenges does Internet access bring?
- How do institutional and organizational arrangements prevent or contribute to technological inequality?
- What issues do organizations, institutions, and their partners face when attempting to create benefits for the disadvantaged communities they serve?

We designed the research questions to understand the organizational challenges of supporting effective use of the Internet at the study sites. They centered on:

- Current and planned uses of high-speed Internet as it relates to organizational goals;
- Use of connectivity to catalyze positive community change;
- Benefits to institutions and communities from participating in the AISEP;
- The development of new relationships or strengthening of existing ones as a result of participating in the project;
- Expectations about use of high-speed connectivity;
- Plans to continue accessing and using Internet connectivity;
- Advice contacts can offer others seeking similar outcomes; and
- Other observations, challenges, or experiences contacts associated with this project.

We visited one site in Nevada, two in Oregon, and two in Washington. Four of the sites are tribal sites, three of which are learning centers supported by tribal funds and open to the public. The other tribal site is the Northwest Indian College, a tribal college located in Bellingham, Washington. We also visited a non tribal site at the Salishan Learning Center located in the urban setting of Tacoma, Washington. The Tacoma Housing Authority funds the Salishan Learning Center, a community center in Tacoma's largest public housing development. The learning center serves a diverse refugee and immigrant population primarily from Southeast Asia and the former Eastern Bloc countries. In addition to sharing regional geography, all of the sites in the Pacific Northwest cluster provide community education service components for ethnically diverse populations. These sites deserve special recognition given that the populations they serve are among the disadvantaged on the "wrong" side of the so-called digital divide. Through intensive study of the factors that put them there, we can begin to deconstruct those barriers and build on the assets these populations have to offer.

Methodology

The purpose of these visits was to learn about the nature and character of digital inequality at disadvantaged sites and to identify the systemic challenges these sites face when using technology for community empowerment. To achieve this, we conducted in-depth interviews with facilitators (i.e., administrators, managers, service providers, and educators) at sites participating in the AISEP and serving ethnically diverse populations in the Northwest. The human component or facilitators have been identified as crucial for creating social networks

necessary for using IT to transfer knowledge for empowering people (van Bavel, Punie, Burgelman, Tuomi, and Clements, 2004).

The analysis in this report is based on conversations we had with site facilitators. For the purpose of this project, facilitators manage and/or use the Internet for educational, training, administrative, community development, or other purposes. Facilitators include service providers (in a general sense) and educators who have specialized knowledge about the impact of high-speed Internet as a result of their involvement in the project. Facilitators are located or employed at the sites, are co-located at the sites, or are based off-site at partnering land grant institutions. They offer insights into the assets organizations bring to the table, as well as the unique challenges these sites face in delivering technology-based services to community users.

Throughout the course of the site visits, we conducted face-to-face interviews with 18 project contacts including on-site facilitators and off-site facilitators at partnering institutions. The duration of these interviews averaged about three hours and ranged from a minimum of one to a maximum of four hours. We also conducted follow-up telephone interviews with three individuals with whom we could not meet during our visit, as well as follow-up telephone interviews with contacts we did meet with to get elaboration on or clarification of answers to questions we asked during the site visit. Approximately one year prior to the site visits, we also conducted preliminary telephone interviews with many of the individuals with whom we met during the site visits and one of whom we were unable to meet with in person. In sum, we interviewed 23 different individuals about the impact of the Internet at the five sites in preliminary, on-site, and follow-up interviews. The following lists the affiliation of each interviewee by site. (Note that some facilitators are listed twice because they were involved at more than one site).

Pyramid Lake Paiute Tribe (PLPT) Education Center

- PLPT Higher Education Coordinator
- PLPT Technology Services Director
- Former PLPT Tribal Council Chairperson
- Associate Professor, Department of Educational Leadership, University of Nevada Reno

Warm Springs Education Center

- General Manager of Adult and Community Education at Warm Springs
- Assistant to the Director of the Education Center at Warm Springs
- Technology Coordinator
- Central Oregon Community College Director at Warm Springs
- Jefferson County/Warm Springs Reservation Extension Service and Superintendent of the Central Oregon Agricultural Research Center
- Dean of Distance Education, Oregon State University Extended Campus
- Director of Media Productions, Oregon State University
- Enrollment Coordinator for Distance Education at Oregon State University's Extended Campus
- Cooperative Extension Marketing Specialist, Oregon State University

Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Learning Center

- CTUIR Training Project Coordinator and Eastern Oregon University Distance Education Coordinator
- CTUIR Human Resources Director
- Family Literacy Program Director
- EvenStart Assistant
- Economic Planner, CTUIR Department of Community and Economic Development
- Enrollment Coordinator for Distance Education at Oregon State University's Extended Campus
- Dean of Distance Education, Oregon State University Extended Campus
- Director of Media Productions, Oregon State University
- Cooperative Extension Marketing Specialist, Oregon State University

Northwest Indian College (NWIC)

- Director of Media Technology at Northwest Indian College
- Washington State University Cooperative Extension Director of Information Department

Salishan Learning Center

- Salishan Learning Center Preceptor (teacher) of Technology
- Pierce County Cooperative Extension Director
- Family Investment Center Director at the Tacoma Housing Authority
- Washington State University Cooperative Extension Director of Information Department

SITE DESCRIPTIONS

Located on the Pyramid Lake Paiute Tribe Reservation (population 1,735) and funded and operated by the Tribe, the **Pyramid Lake Paiute Tribe Education Center** received AISEP connectivity June 25, 2002. This reservation is in a remote area of the desert 35 miles from Reno and encompasses 475,000 acres or 742.2 square miles in three counties: Washoe, Lyon and Storey. The Paiute Tribe has approximately 2,300 enrolled members across the United States, with the majority living on the Pyramid Lake reservation. Ten tribal council members, elected bi-annually, govern the Tribe. Pyramid Lake, a desert lake, is approximately 15 miles long and 11 miles wide, and is an important tribal asset. License fees from fishing and other recreational activities, as well as lease and tax revenues, make up the economic base of the reservation. Tribal Enterprises, which owns the I-80 Smokeshop and Campground/Pyramid Lake Marina, earns 60 percent of the monthly net income (PLPT, 2004).

The Education Center, housed in the Tribal Education Department and situated in the center of the reservation, occupies a group of three trailers which were once the BIA high school. One of the trailers contains the educational director's office and the site of an early childhood program. Another is the future home of the Pyramid Lake Community Library, which is in the early stages of completion. A third trailer houses the computer lab, the technological hub of the reservation, and provides the only community access on the reservation. Currently, community members use the computers for email, the GED preparation program, free basic computer classes, college information searches, completion of the FAFSA form (federal financial aid), homework, Internet

searching, and on-line distance education courses offered through Truckee Meadows Community College in Reno. The computers are also used in the state's first high school distance education program. High school and adult distance education students use the computer lab most frequently. Computers in the lab were purchased through the federal Technology Opportunities Program (TOP) and Twenty-First Century grants; others were donated from Truckee Meadows Community College and the Bureau of Land Management. The AISEP connectivity made the learning center possible as the high-speed Internet was needed to support the Center. The only other connectivity the Tribe had was a private line and a BIA T-1 line connected to the high school.

In the future, the education center envisions using TOP funding to set up videoconferencing in the lab for more accessible distance education opportunities (prior to congressional elimination of TOP funding for FY2005). Additionally, Pyramid Lake is working to help organize a Virtual Tribal College where tribal members from Pyramid Lake and other tribes can take on-line courses. They hope to have a permanent extended campus with full degree programs. The plan also includes a video production class, which will involve 16 tribal members comprised of 7-12th grade students and adult community members. In cooperation with the Reno Media Center, course participants will create video clips that capture the stories and history of the Tribe which will then be made available on the Internet. Other future plans involve the creation of a digital library through a free download named KOHA (Koha.org) developed by Australian libraries, which will allow tribal members to have access to several different library resources. This Internet library would supplement the physical community library the tribe is building at the learning center; it will also help those students who are pursuing their distance education degrees. Site respondents hope they can hire more personnel in the future to hone local computer skills and provide on-site technical assistance. When people using the lab have a technical problem, there is often no one there to help them, as the only on-site staff is a program—not technical—expert.

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Learning Center (AISEP connectivity established August 14, 2002) is located on approximately 172,000 acres in northeastern Oregon. The Confederated Tribes of Umatilla once occupied a homeland of 6.4 million acres. The Confederation includes three different tribes: the Cayuse, Umatilla, and Walla Walla. As of April, 2003, the Confederated Tribes had 2,396 enrolled members with approximately half (46 percent) living on the Umatilla Reservation. Almost 2000 other people live on the reservation, about 400 of whom belong to other American Indian groups and the rest who are non-Indian. Multiple languages are spoken on the reservation, including the Walla Walla, Nez Perce, and Umatilla languages. However, the Cayuse language has died out. Language preservation and revitalization programs are therefore an integral part of the CTUIR's goals (CTUIR, 2004a).

Natural resource-based activities such as farming, animal husbandry, logging, recreation, hunting, fishing, and commercial development, including the Wildhorse Casino and Resort and the Tamastlikt Cultural Institute, are major contributors to the tribal economy. CTUIR is the second largest employer (the State of Oregon is first) in Umatilla County with over 1,000 employees in 2003. This number includes tribal government (521) and the resort (573). Of those employed in tribal government, 43 percent are enrolled CTUIR members and 16 percent who

identify with other tribes. The rest (41 percent) are non Indians. At the resort (which includes the casino, golf course hotel, RV Park and Tamastlikt Cultural Institute), only 27 percent of employees are CTUIR members (CTUIR, 2004b).

The Learning Center, located near many of the other tribal business and government buildings on the reservation, houses multiple public access terminals freely available to community members. Currently, community members use the AISEP connection for public access, distance education courses, resume writing, pre-employment skill training, employment searches, email, GED preparation, homework and research for school related activities, youth programs, completion of the FAFSA and college searches, tax services through AARP, and curriculum development. The Learning Center focuses its activities on increasing educational opportunities, job skills, and employment opportunities, and works in conjunction with the Even Start Program where parents can attain their GED or higher education degrees to improve their quality of life. Searching for employment on the Internet has also been an important part of this program. The site also implemented a summer language program using technology that linked youth with elders. Prior to the ADEC connectivity, administrative offices for the Confederated Tribes had connectivity through the Bureau of Indian Affairs but the Learning Center did not.

CTUIR is very connected in terms of its distance education programming. A three-way partnership between Blue Mountain Community College, Eastern Oregon University, and Oregon State University has created increased educational opportunities for the Confederated Tribes. The relationship with OSU has been positive and continues to expand, even as the AISEP comes to an end. For example, OSU now offers a minor in Fish and Wildlife, which is currently the largest distance education program at Umatilla.

Future plans for using the connectivity include providing more distance education courses for tribal members, increasing Internet use among tribal elders, installing computers, providing connectivity to every home on the reservation to help residents become more comfortable with the technology, continuing and improving partnerships with other institutions, and becoming part of a virtual tribal college to ensure degrees are offered that are relevant to the tribes.

The **Warm Springs Education Center** (AISEP connectivity established June 4, 2002) is located in Warm Springs, Oregon on the Warm Springs reservation. The Warm Springs reservation, home to nearly 3000 enrolled members, occupies 640,000 acres of land in the north central part of Oregon (CRITFC, 2004). Three tribes make up the Confederated Tribes of Warm Springs, including the Wasco, Warm Springs (formerly known as the Walla Walla), and Paiute Tribes (Confederated Tribes of Warm Springs, 2004).

The economy of the Confederated Tribes is supported by many businesses, including the tribally owned Kah-Nee-Ta Spa and Resort, Warm Springs Forest Product Industries, Warm Springs Power Enterprises, and other tribally owned businesses (Confederated Tribes of Warm Springs, 2004). The area is characterized by scenic landscape, with mountains, rivers, desert terrain, wildlife, and lush trees and plants.

Ironically, the Education Center is housed in an old Indian boarding school, a haunting symbol to some of the repression of the American Indian.² Used in the late 1800s and early 1900s, these schools were used to acculturate American Indian youth into white European culture and religion. Here, Native languages and cultural practices were forbidden and attendance obligatory. Today, the Education Center offers training, technical support and on-line education services to tribal members. The Education Center houses multiple computer labs, one of which is served by the AISEP. This lab connects 10 computers to the Tachyon network. In addition to the AISEP connectivity, the Education Center is served by a TI line from OSU and one from the BIA. Warm Springs mainly uses its high speed connectivity for educational purposes, whether it is advancing computer skills, preparing for the GED, or participating in on-line courses or distance education. The Center also received a grant through OSU to develop an on-line library system, allowing tribal members to access OSU resources on-line. In addition to its partnership with OSU, the Warm Springs Education Center also partners with Central Oregon Community College (COCC) which offers courses at the Center and academic advising for students. Washington State University is also a partner in developing programs for adult education on the reservation.

Future plans for using the connectivity at the Warm Springs Education Center include a technologically “smart classroom,” and becoming a leader in helping each home on the reservation get connected to the Internet (the Confederated Tribes received a \$700,000 grant from USDA for this project). The Confederated Tribes also plan to be involved in developing a Virtual Tribal College and to continue the successful educational programming already in place.

Northwest Indian College (NWIC) (AISEP connectivity established October 21, 2002) is located on the Lummi reservation near coastal Bellingham, Washington, in the northwest corner of the state. Unlike the other tribal sites, NWIC is not wed to one particular tribe or confederation of tribes although NWIC’s main campus is located on the Lummi reservation. The Lummi reservation includes 12,500 acres of land and 8,000 acres of Puget Sound tidelands and is home to more than 4000 people. The shellfish industry, fishing, farming, and forestry, as well as recreation activities and commercial development, support the local economy. The Lummi tribe owns and operates a casino and a convenience store.

The mission of NWIC is to offer educational opportunities to Northwest Indian people (NWIC, 2003). Like other tribal colleges and universities, that mission is fulfilled by offering culturally appropriate courses in accordance with the needs and interests of various Indian communities. In addition, NWIC strives to “provide opportunities for individuals to gain self-sufficiency in a rapidly changing technological world, while recognizing and nurturing their cultural identity” (NWIC, 2003). Internet connectivity is therefore critical to the College’s mission. NWIC sought to participate in the AISEP to provide high-speed Internet connectivity at one of its branch campuses.

Currently NWIC uses the connectivity for distance education such as videoconferencing with its branch campuses, Internet searches for coursework, library usage by students and the public, and email. NWIC has a wireless video connection through a statewide network called K-20, as well

² Indian boarding schools are not always a symbol of repression, however. Tribes in North Dakota, for example, have a very different perspective on boarding schools and continue to send their children to them.

as a high-speed data connection through Washington State University (WSU). NWIC also partners with WSU for programming.

Future plans for high-speed connectivity at NWIC involve continued distance learning applications that require high bandwidth, training for students and faculty, and course development through learning labs that will be interactive and online.

The **Salishan Learning Center (SLC)** (AISEP connectivity established October 22, 2002) is located within an urban housing development in Tacoma, Washington. The SLC is operated by Washington State University Extension in cooperation with the Tacoma Housing Authority and serves a diverse population of mostly new immigrant residents. While the SLC is open to all residents of Pierce County, it is used most frequently by residents of the Salishan Housing Development. Therefore, statistics compiled for this report were taken from Census Tract 622, which covers a four-mile square area that includes the housing development, rather than the whole of Pierce County, thus providing statistics more representative of the population than the statistics for the county.

This site serves a range of users, mostly new immigrant ethnic minorities from Southeast Asia and former Eastern Bloc countries. While these populations may be disadvantaged economically, the same is not necessarily true in terms of education. As our site contacts noted, some immigrants are highly educated but have difficulty translating their work experience into a quality job and livable wage in the US. The site also serves youth and ex convicts participating in work release programs.

In 2000, the U.S. Department of Housing and Urban Development granted \$35 million of housing revitalization funds under the HOPE VI program to replace aging public housing at Salishan. Originally built after World War II to house returning soldiers and their families, the project is now undergoing much-needed redevelopment.

Currently the SLC is using high-speed connectivity to provide a way for the public to search for employment opportunities, prepare resumes, start their own businesses, take distance education courses from WSU, receive technology training, complete homework assignments, email, participate in on-line chats, and play on-line games (for youth predominantly). For users of the SLC, the connectivity is critical to staying in touch with family and friends back in their native country. The computers in the lab were provided by the Gates Foundation, which were granted to the 4-H program in the county. Youth 4-H participants were instrumental in setting up the lab and building the computers after they arrived at the SLC. WSU Extension serves as the source of technical support for the SLC.

Future uses of the connectivity are uncertain as the housing development undergoes reconstruction. However, there are plans to fund a central community technology center. Yet there are also plans to connect each new unit with high-speed connectivity. While the physical access may be provided in each unit, a community technology center will still fill a much-needed role in providing technology training, programming, and assistance for users.

TECHNOLOGY AND SITE DISADVANTAGE

Before discussing results of the study, we must first discuss the concept of disadvantage. The term is used to describe communities located in rural areas or central cities populated by low-income and/or minority residents. Note that so-called disadvantaged communities and populations are advantaged in many ways in terms of the diverse cultures and backgrounds they represent.

Types of Disadvantage

Table 1 presents information about the types of “disadvantage” experienced at each site regarding geography, racial minorities, and income and poverty. Poverty in this report is defined not only according to the U.S. Census Bureau’s definition (income thresholds based on family size), but also the World Bank’s definition as access to income, voice, and power. The table compares selected baseline level demographic information from the 2000 Census to give an overview of the sites, the contexts in which they operate, and the level of economic disadvantage.

Geography

Geographically, all of the sites we visited are located in the northwest region of the United States. Four of the five sites are rural. The exception is the Salishan Learning Center, which serves an urban clientele—specifically a refugee and immigrant population living in low-income housing subsidized by the Tacoma Housing Authority.

Racial Minorities

All of the sites we visited serve people from different racial and cultural backgrounds. Almost half (49 percent) of the people living on the Confederated Tribes of the Umatilla Reservation are American Indian, whereas 47 percent are White³. On the Warm Springs Reservation, American Indians make up 92 percent of the population, with 5 percent classified as White by the U.S. Census Bureau. Of all the sites we visited, the population served by the Salishan Learning Center is the most racially diverse in terms of the number and balance of different groups represented. While more than half (54%) of the people living in the census tract are of Asian descent, almost one-fourth are White and one in ten is African-American.

Within these broad racial categories, cultural variations exist. At Salishan, Laotians, Vietnamese, and Cambodians represent just a few of the Asian groups. The White population served comes from former Eastern Bloc countries in Europe with their own distinct cultures and heritage. While the four tribal sites we visited serve predominantly American Indians, not all of the members at each site belong to the same tribe. For example, the Learning Center on the Umatilla Reservation serves members of the Cayuse, Umatilla, and Walla Walla tribes; the Warm Springs Education Center also serves multiple tribes including the Warm Springs, Wasco and Paiute.

³ “White” is the term used by the U.S. Census Bureau.

Table 1. Selected demographic characteristics for five Pacific Northwest sites

	Pyramid Lake Paiute Tribe Learning Center	Confederated Tribes of the Umatilla Indian Reservation Learning Center	Warm Springs Education Center	Northwest Indian College	Salishan Learning Center
<i>State</i>	Nevada	Oregon	Oregon	Washington	Washington
<i>Site location</i>	Nixon	Pendleton	Warm Springs	Bellingham	Tacoma
<i>Service area</i>	Pyramid Lake Reservation	Confederated Tribes of Umatilla Reservation	Warm Springs Reservation	Lummi Reservation	Salishan Housing Development, Census Tract 622 ^a
Service area population	1,734	2,927	3,311	4,193	2,802
Race					
American Indian ^b	70.4%	48.8%	91.8%	50.4%	1.4%
White ^b	23.9%	47.0%	4.7%	43.6%	23.6%
Asian ^b	0.2%	0.3%	0.0%	0.5%	53.5%
African-American ^b	0.1%	0.1%	0.1%	0.4%	10.8%
Native Hawaiian and Other Pacific Islander ^b	0.2%	<0.1%	0.1%	<0.1%	0.9%
Other ^b	2.3%	0.6%	1.1%	1.1%	2.6%
Service area median household income (1999)*	\$30,777	\$37,827	\$31,406	\$37,014	\$13,068
Service area percent of population below poverty level**	18.0%	15.8%	28.4%	18.3%	57.4%

^aAlthough the Salishan Learning Center is technically available to all residents of Pierce County, it is used by residents of the Salishan Housing Development. To be more representative of the population actually served, Census figures presented here were taken from Census Tract 622, a four-mile area that includes the Housing Development.

^bIncludes people reporting only one race.

*Median household income in 1999 for Nevada is \$44,581; \$40,916 for Oregon; and \$45,776 for Washington.

**Percent of individuals below the poverty level (1999) is 10.5% in Nevada, 11.6% in Oregon; and 10.6% in Washington.

Source: U.S. Census Bureau, 2000

Despite the confederated status of tribes at these reservations, each tribe has its own customs, traditions, and language. At one end of the spectrum, the Pyramid Lake Paiute Tribe Learning Center is the only among the four tribal visited that serves a single tribe, whereas the Northwest Indian College serves all Northwest Indian people.

Income and Poverty

Household income and poverty⁴ are also compared in Table 1. Figures suggest the populations served by the education and learning centers we visited face serious economic disadvantages. Urban residents served by the Salishan Learning Center are the most disadvantaged, earning a paltry median household income of \$13,068 in 1999 and experiencing a 57 percent poverty rate. Poverty rates on the Warm Springs Reservation are also high with 28 percent of the population falling below the poverty level. Compared with the other sites, residents of the Umatilla Reservation appear to be the least economically disadvantaged with the lowest poverty rates and highest median household income. However, median household income is still lower than the state mean for all of the sites we visited.

The picture Census statistics paint for these sites reveals distinctly economically and geographically disadvantaged populations that are culturally and racially diverse. These factors must be considered in the context of using the Internet to build the capacity of these communities.

THE MEANING OF DISADVANTAGE WITHIN A NATIONAL CONTEXT

Each of the sites we visited has a unique set of characteristics in terms of the different socioeconomic conditions and cultures they represent. However, all of them are situated within a common broader national policy context that systematically denies them technological privilege that advantaged populations enjoy. Challenges created by the federal policy structure are examined here. Specifically, this section discusses national recognition of digital inequality and who is likely to suffer from technological exclusion. We also discuss the plight of public access sites in light of diminishing federal support and the narrow strategy of government to bridge the digital divide by channeling the majority of public funds into infrastructure projects.

Technologically Excluded

In 1999, the NTIA reported that despite increasing personal computer ownership and Internet access rates for all demographic groups in the U.S., the rate at which each group has access to the technology differs. Controlling for other factors, those living in rural areas, those with low incomes, those with less education, and those belonging to minority groups are at a disadvantage when it concerns access to electronic services. In summary, the NTIA suggested,

The chief concern with respect to household computer and Internet access is the growing digital divide. Groups that were already connected (e.g., higher-income, more educated, White and Asian/Pacific Island households) are now far more connected, while those with lower rates have increased less quickly. As a result, the gap between the information “haves” and “have nots” is growing over time. The increasing divides are particularly troublesome with regard to Internet access. (1999:8)

⁴ For a family of three (two adults and one child), the U.S. Census Bureau poverty threshold for 2003 is an annual household income of \$14,810.

The most recent NTIA report (2002) counters this claim by contending that the digital divide, in terms of physical access, has now been bridged. Yet Kotkin (2000) argues that regardless of whether or not physical access is improving for disadvantaged groups, the digital economy is serving to *increase* the gap between the rich and poor, advantaged and disadvantaged, haves and have nots. This argument is supported by DiMaggio et al. who claim that people with high socioeconomic status are better able to muster resources to “employ the Internet sooner and more productively than their less privileged peers” (2001: 310). Resources, in this sense, should not be thought of only in financial terms. As Stanley (2001) points out, non-users of technology also have trouble mustering social and psychological resources to overcome a fear and intimidation of technology. This conclusion was reached when contradictory assertions were made by low-income, ethnically diverse households who cited cost as the number one reason why they did not purchase computers or access the Internet from home while at the same time indicating they intended to purchase a computer in the next year. This led Stanley (2001:6) to conclude that “cost as a primary barrier to ownership may be obscuring a more complex relationship between economics and attitudes...” a claim that has implications for the way in which technology programs are designed and delivered. In essence, Stanley’s statement calls for a need to support programs that are sensitive to the role attitudes and culture play in the adoption of technology.

In addition to the ability of privileged individuals to use information technology to mobilize resources in their favor, organizations and corporations are also able to do the same, which in turn can affect entire communities and regions. Kotkin (2000) contends this occurs as computer technology becomes portable. E-based business means that companies can choose who they want to employ and where they want to locate (often selecting locations with natural amenities such as scenery and recreational opportunities), thereby further concentrating capital in the hands of a homogenous group of the wealthy and well-educated instead of choosing the rural poor to participate in the digital economy⁵. This has grave implications on disadvantaged individuals and communities who continue to be excluded from fully participating in society. So what can culturally and racially diverse people living in rural areas or central cities facing economic disadvantage do to change this? How can they use technology to their advantage? What programs and policies can be instituted to assist in the process?

Public Access Sites and Declining Federal Funding

Few dispute the claim that computers and access to the World Wide Web have become invaluable, if not indispensable, tools in the everyday lives of most Americans. Indeed, a survey conducted in 2002 by the UCLA Center for Communication Policy found that 71 percent of

⁵ One exception is call centers, some of which are choosing to locate in rural areas to take advantage of low rents and a skilled and underemployed workforce to reduce employee turnover. Call centers find they can also pay rural workers less than urban workers—sometimes 20 percent less—presumably because the cost of living is lower in rural areas (Christenson and Babine, 2000).

Americans used the Internet that year. Impressive, too, is the figure reported for home Internet users—59 percent. Yet what do we know about the remaining 41 percent who do not access the Internet from home?

We know that many disadvantaged users face multi-layered access challenges. For instance, many do not enjoy the luxury of personal computer ownership or high-speed home Internet access,⁶ a finding confirmed by site facilitators.

[..S]tudents may not have access [...] to a home computer. If they do have access to a home computer, they may not have access to the Internet. If they have access to the Internet, it may not be broadband, so you [have] all those tiers.

As a result, disadvantaged users often access technology at public access sites. Public access sites may be located in community technology centers, public libraries, or tribal administrative offices if these services even exist. In a report to the Bill & Melinda Gates Foundation, Moore et al. (2002) report that computers in public libraries are more likely to be used by low-income respondents who are unlikely to have computers at home or access to the Internet at any place other than the library. Furthermore, lowest income families (less than \$15,000 per year) are more likely to report their only Internet access is at a library compared to higher income families (\$25,000+ per year) who are more likely to have Internet access at home. Heuertz et al. (2002) also found that Native Americans are three times more likely to use computers at public libraries than Whites.

Something else we know about people who have Internet access at home versus those who must access it away from home is that at least among children, those with home access are more likely to be Internet content producers than children without home computers (Gordon et al, 2003). It follows that children advantaged by home access are therefore more likely to become content-producing adults because they have both the time and resources to develop that content. As such, these content-producing adults are in a position to dominate the Internet landscape. In contrast, children who do not have access at home are more likely to be consumers rather than producers given use restrictions that often accompany public use. Thus, as adults, they may not only lack skills, but may be less able to produce content on the Internet because public access sites do not allow the time necessary to get involved in the complex applications of developing Web pages and creating computer programs (Gordon et al., 2003).

In the absence of technology and Internet access at home among disadvantaged users, public access sites must therefore find ways to remove barriers that interfere with disadvantaged users' ability to create content on the Web. Public access sites should design and implement programs and structures that encourage users to go beyond mere consumption to create content that gives them voice. A facilitator at one of the tribal sites recognized this need when he remarked that tribal acceptance of the Internet depends on whether or not the tribe is able to become producers of on-line content.

⁶ At one of the sites we visited, a facilitator reported that tribal members use individual payments from casino revenues to buy computers.

If we are always downloading stuff coming in and not creating anything that's significant to this tribal community, [the tribe is] not going to want to get [involved].

For public access sites without sources of regular, non federal funding (like funding from a tribe), achieving this objective may be difficult given declining federal support for public access sites. In a report sponsored by the Ford Foundation and produced for the Leadership Conference on Civil Rights Education Fund and the Benton Foundation, the Bush administration is criticized for cutting federal funding to support technology access in underserved communities (Harris et al., 2002). Other critics (Jackson, 2002; Servon, 2002) also blame the Bush administration for painting an overly optimistic picture about information technology access in the fifth—but the administration's first—NTIA technology report (2002). A source of particular distress is a statement issued by the U.S. Department of Commerce Secretary who used the findings as a reason to cut funding for federal public access programs in response to the 2002 report: “With the expansion of the Internet and related technologies into all sectors of society, the administration believes federal subsidies are no longer justified to prove the usefulness of such technologies” (Jackson, 2002). The federal subsidies to which the Secretary referred are the Technology Opportunities Program (TOP)⁷ and the Community Technology Centers Program (CTC),⁸ two programs supporting community information technology at public access sites. According to a report by Davies et al. (2003) the Bush administration reduced federal funding for the TOP program from \$42.5 million in 2001 to \$15 million in 2002 despite urging to Congress from the National Congress of American Indians, a national organization representing Native American governments, to reject Bush's proposed cuts (Johnston, 2001).

At the same time, funding for the CTC program was also halved from \$65 million in 2001 to \$32.5 million in 2002. The proposed budget in 2003 sought to eliminate the TOP and CTC programs altogether (Johnston, 2001). The Pyramid Lake Paiute Tribe is a recipient of TOP funding. By February, 2004, TOP was appropriated \$12.9 million for matching grants (NTIA, 2004). Nevertheless, this is a 30 percent reduction from 2001 funding levels. The CTC program fared no better with \$9.9 million appropriated to the program in 2004—15 percent of 2001 funding levels (U.S. Department of Education, no date). In late November, 2004, funding for the TOP was eliminated with passage of the FY2005 Consolidated (Omnibus) Appropriations bill. Public access sites are overwhelmingly used by those in low-income brackets without access to home computers and Internet connectivity. Thus, elimination of the TOP translates into eliminating IT opportunities and programs for those who need them the most.

Federal Technology Policy

The standard public policy response to bridging complex socioeconomic differences has been to fund initiatives that address one aspect that is a known contributor of the “problem.” In the case

⁷ Funded by the NTIA, the Technology Opportunities Program funds initiatives that promote access and use of information technology in the public and non-profit sectors.

⁸ The Community Technology Centers program is administered by the U.S. Department of Education. It funds centers which provide information technology access and training to disadvantaged residents of economically distressed rural and urban communities.

of digital inequality, this has meant channeling resources into technology infrastructure—investments in built capital. Federal funds such as the Universal Service Fund support infrastructure-based programs like the E-rate program established by the Telecommunications Act of 1996, which helps schools, libraries, and health care providers gain access to affordable telecommunications services. The U.S. Department of Agriculture is also involved, funding rural telecommunications programs via the Rural Utilities Service. The RUS administers programs that promote rural access to telecommunications such as the Broadband Program, which makes loans available for the deployment of technology to rural towns. In February, 2004 the Chairman of the Federal Communications Commission (FCC) unveiled the Rural Action Plan, designed to assist with rural deployments that extend to rural areas the same access “to high quality infrastructure that is available in urban and suburban America” (Powell, 2004: 5).

Many states also have taken action to promote widespread technological access by providing regulatory exemption for telephone companies serving rural areas to encourage their proliferation. The net effect of such policies has generally been favorable as indicated by the growth of a national telephone system that provides connectivity to most rural areas, except—most notably—on Indian reservations (Strover, 1999). The telecommunications infrastructure situation is so bad, according to one tribal respondent, that locals “joke about the phone systems here. They just don’t work. I still get bumped off my computer because of the bad connection.” For tribes in particular, infrastructure is only the *first* limiting factor in accessing technology; we discovered other limiting factors in the course of this research.

While infrastructure deployment is a critical first step, equipment and infrastructure alone will not provide all of the necessary solutions. Framing the problem strictly as one of infrastructure

inspire[s] a relatively narrow set of solutions that, to date, have failed to address the multifaceted aspects of the digital divide, such as the need for relevant content, information sharing and strengthening the community-based infrastructure with technology. Moving away from treating the digital divide as solely an issue of technology access, opens up the possibilities for using IT’s power as a tool to strengthen low-income communities. (Kirschenbaum and Kunamneni, 2001)

Corroborating these remarks, Warschauer (2002) and Lentz et al. (2000) also contend differential access to knowledge resources—those that allow people to put the technology to use—is a critical issue in the digital divide.

[...M]eaningful access to ICT [information and communication technology] encompasses far more than merely providing computers and Internet connections. Rather, access to ICT is embedded in a complex array of factors encompassing physical, digital, human, and social resources and relationships. Content and language, literacy and education, and community and institutional structures must all be taken into account if meaningful access to new technologies is to be provided. (Warschauer, 2002:5)

Resolving the notion of differential access to information therefore requires investments in knowledge and human resources. For Kirschenbaum and Kunamneni (2001:6), this means bridging the “organizational divide” by making investments in community-based organizations: “These organizations and their resident constituency bases have the wisdom, knowledge and experience to use IT as a tool for building social and economic equity, and strong organized communities.”

A need exists to emphasize the human side of the technology equation to attain social and economic equity in disadvantaged communities, especially within the current climate of infrastructure-based federal technology policy. Evidence of this is presented in the 2003 UCLA Internet Report “Surveying the Digital Future.” In a longitudinal study of 2000 American households, researchers at the UCLA Center for Communication Policy found that reasons for using the Internet differed among “new” users (less than one year online) and “very experienced” users (online six years for the 2002 study). The top reason why “new” users access the Internet is because they were “given access” (27.6%) compared with 5.1 percent of “very experienced” users who claimed the same. In contrast, very experienced users reported the top reason why they use the Internet is the ease with which it grants them rapid access to information (27.6%) compared to 13.8 percent of new users. Moreover, the UCLA study also found that new users are more likely to experience technophobia (30%) when compared to their very experienced counterparts (11%). In addition, results from the study also show that those earning a combined household income of less than \$30,000 were more likely to be nonusers of the Internet (48%) than those earning \$100,000 or more (6.1%) (Suman, 2004). And, while all income categories had more very experienced users than new users, the ratio of very experienced users to new users increased exponentially from the lowest to highest income brackets. For example, for every new user earning a household income of less than \$30,000, there were three very experienced users. For every new user earning a household income of \$30,000-\$49,999, there were eight very experienced users. For every new user earning a household income of \$50,000 or more, there were roughly 35 experienced users (Suman, 2004).

Since many of the users frequenting the sites we visited are new users of the Internet, these findings are important. The implication is that new users may be using the Internet simply because it is *available*, rather than using it to achieve personal or professional goals. New users also have different needs when it comes to dealing with the intimidating nature of technology. These two findings beg the questions: What support, if any, is provided along with “given” access to help new users navigate the electronic landscape to make it a useful tool that is relevant to their lives? Furthermore, what support, if any, is offered to aid computer-fearing novices who are squarely placed amid the technology revolution? These are key questions as we consider the impact of bringing infrastructure to un- and underserved sites and the role played by institutions and organizations (many community-based) to help in the process. Research to date has shown these collective structures play a critical role in the effective use of technology among disadvantaged populations. As such, “money spent on [information technology] without investments in organizational change and training...is wasted” (Blau, 2001:20).

COMMON TECHNOLOGY-RELATED EXPERIENCES OF DISADVANTAGED SITES

Despite racial and cultural differences of the people served by the public access sites we visited, the sites shared common technology related experiences in terms of how they are using technology to overcome disadvantage. All of them share the mission of using technology to empower people. All are struggling with the need for sociopolitical recognition. In addition, each faces human capital issues such as a lack of technical support, staff turnover, and the need for education and training. Social capital is another barrier. All of the sites identified a need to build

relationships and trust across cultures to make more effective use of technology. Strengthening cross-cultural relationships and trust is necessary at multiple levels, including between institutions, between institutions and communities, and within communities.

Despite common challenges, most of the sites enjoy a multitude of benefits associated with high-speed Internet, benefits which are building the human, social, and cultural assets of communities. For instance, sites recognize public access offers youth a safe place to spend time (social capital); allows recreational Internet use, which often serves as a precursor to educational use (human capital); encourages greater use of community services (human capital); strengthens and expands cross-cultural relationships (social capital); and provides sites access to students (human capital) and cultural assets (cultural capital).

Common Vision: Using Technology for Local Empowerment

In terms of missions, in the rural places and the inner city we visited, Cooperative Extension, public service agencies, community colleges, tribal governments, tribal colleges, and 1862 land grant institutions are cooperating to provide resources that support public use of technology. Different organizational structures manage and operate each site, yet all of them are committed to empowering the communities they serve. In the case of NWIC, the overarching structure is a tribal college. At the Pyramid Lake, Umatilla, and Warm Springs sites, Internet support is provided by staff on the tribal payroll under the rubric of tribal education programs. Primary site and staff support for public access at the Salishan Learning Center is sponsored by Washington State University Cooperative Extension in cooperation with the Tacoma Housing Authority. Each of these organizations has different relationships with their communities and different approaches to technology, but all of them are allocating resources to technology for education. The educational mission is part of a broader goal of empowering the people they serve by offering distance education opportunities, building skills and self-esteem, and providing unfettered access to global knowledge.

Our mission is to develop and enhance programs that [...] promote education opportunities for the community and the tribe.

Computer and Internet technology are seen as tools for improving community-based education. Residents can use technology to access and learn the information they need to improve their job prospects to overcome disadvantage.

Students come in here [...] to learn] basic computers skills and to gain [...] employment skills.

One contact suggested the broad mission of cultural preservation could be achieved through local control and community self development, made possible by improving individual educational attainment, skills, and self employment—in other words, local human capital.

In order for you to be able to protect your cultural heritage and language in the future, you're going to have to have resources that you control. [..E]ven if you

own a casino, a casino is a short-term kind of deal. [..]If the revenue from the casino ever goes away, these things collapse. So what other kinds of enterprises, or what other kinds of assets do you have that you can use this money to control. What are the kinds of skill levels or education that people need to be able to fill these positions that are related to these other assets.

Facilitators at public access sites articulated their role as opportunity brokers in the process of individual and community empowerment. “We’re like a brokerage of information and education. We can look at possibilities. We can show them what [technology] can do for them.” Implicit in this perspective is the use of technology as a tool for broader social outcomes, such as poverty alleviation and sovereignty.

[..W]e have a community here who has been very dependent on government, and we need to work towards independence to be connected to the community [...] but not dependent on the community or the tribe [...].

Lack of Sociopolitical Recognition

Disadvantaged populations face daunting odds when it comes to achieving goals of empowerment, not because of geographic disadvantage but because of sociopolitical disadvantage. For instance, why is it that rural Caucasian use of the Internet at home (20.6%) is higher than rural Native American use (9.4%) (NTIA, 1999)? These statistics indicate there are other reasons—both social and political—beyond issues of infrastructure, that influence which groups have physical access to technology and which do not (Bregendahl and Flora, 2002).

Among disadvantaged populations, Native Americans in particular lack sociopolitical recognition at multiple levels. An example at the federal level appears in the NTIA’s most recent (2002) report on the digital divide. In *A Nation Online: How Americans Are Expanding Their Use of the Internet*, data on American Indians are not reported because results for this population were not reliable due to the design of the 2000 Census’ and Department of Labor’s Current Population Survey, from which results were drawn. Yet Native Americans are consistently one of the most technologically disadvantaged groups in the U.S. Oversampling would solve this problem and provide statistically reliable information on this chronically un- and underrepresented population. However, mainstream interests have often collected data on marginalized groups and then used that information against them rather than for them. As a result, few Native Americans may be willing to provide information. The dilemma is that without the data that justifies the spending, rigid federal policy will refuse to address the technology assets and needs of Indian people.⁹

⁹ Terminology of racial groups is often a contentious issue and is not one solved in this report. The reader will note that the terms “Indian people” and “Native Americans” are both used in the narrative. The term “Indian people” is a term respondents used and is therefore a term used by the authors. In other cases, “Native American” is used in deference to federal sources using the same term (such as the NTIA series of reports on the digital divide). Ultimately, however, the recommended term “is to refer to a person by their tribe, if that information is known. [..T]his shows respect because not only are you sensitive to the fact that the terms Indian, American Indian, and Native American are an over simplification of a diverse ethnicity, but you also show that you listened when they told what tribe they belonged to” (Berry, 2004).

At the local level, we found evidence for lack of sociopolitical recognition in terms of services (not) received. Facilitators at both tribal and the inner city sites told of experiences where their communities were targets of institutional and/or corporate discrimination. One facilitator at a tribal site said the reservation is always the last to receive county snow removal services.

We have more buses out here for our children to go to school than anywhere else in the county [...]. In fact, on my road there's seven buses a day that come down and pick up kids [...]. Ours is the last plowed road that ever happens and I've called the bus company, I've called the county, and the county says [they] do it by need. I know a man that lives up the road [who] has one child that gets on the bus and it's a county road to his house and he's plowed. We have all these kids and we're not touched [...]. So when services like [the AISEP] come[s] out here [...] we jump on it because we want everything for our community as anyone else would.

A contact from the inner city site related a similar experience of exclusion in terms of receiving corporate services. She spoke of telecommunications companies “red-tagging” targeted neighborhoods in the city so that residents cannot get a strong cell phone signal.

We're working with some of [these] issues with the cell phone companies. These [residents] pay for their cell phone service just like anyone else but they have to go three blocks down to be able to get a signal.

Facilitators agree disadvantaged populations are denied routine services that others enjoy. Meeting daily needs can therefore be a struggle. “When a group feels discriminated against or that they are viewed with either hostility or suspicion by the host society [and its government], political incorporation may seem either pointless or an unachievable goal” (Staeheli et al., 2002:1009 citing Nagel and Staeheli, 2002).

Challenges Related to Human Capital

Human capital, or skills and education residing in people, were recognized as critical resources in empowering disadvantaged people through technology. Facilitators expressed the need for hiring staff members who can make connections between technology and users through education. Thus, a single staff member has to be versed in technical support issues, as well as training techniques, or sites need to have the resources to support two different staff people who cooperate to cover both subject areas. Facilitators identified a third skill desirable for on-site staff: the ability to link technology to community goals by accepting people from diverse backgrounds.

The Need for Technical Support

A recurring theme for three of the public access sites we visited was finding a local person to provide technical support in the computer lab.

[We] can't hire one person around here who could help on the network. There's nobody.

We don't have the people [for technical support].

[Internet access] brought us opportunities and it brought us resources, but it didn't bring the extra manpower to facilitate it.

Access to state of the art technology in public access sites was identified as inadequate in building the skills necessary for preparing local people to troubleshoot technical problems at a site. One facilitator mentioned the importance of having computers at home to adequately prepare local people to provide technical support. This facilitator suggested long-term use made possible through home computer access was imperative for developing the complex set of technical skills needed to create competencies in network administration and technical support. He suggested that home computer and Internet access would help overcome the lack of technical support skills needed at the site.

Adequate technical support is needed not only to keep computer labs running, but also to keep users interested in the technology and all that it offers such as distance education opportunities. One facilitator said local technical support is needed to help users navigate the technology so they do not get intimidated by it and drop out. This facilitator made an important conceptual link between the lack of technical support which creates conditions conducive for intimidation, which in turn, leads to attrition.

The Need to Link Technology to Users through Education and Training

The presence of technical support alone is insufficient in leading to effective use of technology. Making connections between the tool (technology) and the outcome (poverty alleviation) is also critical. This is achieved through program delivery—namely, the availability of training and education.

We need a community technology center. [High-speed Internet] is a piece of that, but we [also] need a commitment from education, and we need the commitment that we can continue to provide those services [... in terms of] having the people who are there who can talk to people and not just be a technology person.

Staff people involved in the maintenance and delivery of technology education must understand the need for education and the role technology plays to meet the mission.

The drawback with [our technical support person] is that [while s/he] was very capable and understood what we were doing, [s/h]e had nothing to do with education.

This facilitator noted that education is the path to poverty alleviation and that technology has to be paired with educational programming to achieve this outcome. This often requires sites with limited resources to hire a single staff person to take on both technology and educational responsibilities, or having the technical support staff coordinate their efforts with the educational programming/training staff. One site admitted this was difficult because the single staff person who was hired to provide both technical support and training “[refuses to] teach a class to the [Native American] community.” They felt this hurdle set them back years in terms of what they were able to accomplish in the community using technology.

In order to be effective, one facilitator mentioned that it is important for staff who are helping users to be open-minded and accepting of differences. Staff must also be “committed to community, committed to technology, and [...] accept everyone that walked through the door [...]” Thus, acceptance of differences, along with a knack for linking technology with community was noted as important.

In summary, sites serving disadvantaged populations should hire staff who understand and can troubleshoot the technology, can make it relevant to the lives of users through effective training techniques, and who are accepting of diversity. This is a great challenge given the limited budgets under which public access sites operate.

Turnover

Turnover was recognized as a barrier to the flow of technology use at all of the sites we visited. The tribal college we visited had experienced turnover within the IT department, but this was not uncommon according to two facilitators.

Tribal colleges are fairly known for the revolving door with employees.

It's a constant state of confusion for a tribal college [where] the administration turns over, the faculty turn over, and the program is in shambles all the time [...].

Tribal colleges are not the only institutions to experience turnover. Changing leadership within tribal government was also noted as a barrier at sites with tribal education centers.

Within [the tribal council], if [technology] isn't a priority, then it [won't] reach its maximum potential because of a change in leadership.

Staff turnover at cooperating county cooperative extension offices was also noted as a barrier.

People came and went on the project at the Extension office there in the county. The leadership had turned over a couple of times. It was like, who's in charge today and who do we talk to?

Within the Extension office, everybody quit and we're hiring new people.

Turnover of site staff and among critical partners in government and Cooperative Extension can affect the continuity of technology programs offered by public access sites and can undermine the ability of sites to continue on a common course. We learned that a visionary education coordinator at one of the sites recently vacated the position. This has compounded the change in tribal leadership, as well as the elimination of federal TOP funding. Given this string of setbacks, it remains to be seen what effect these events will have on technology programming at this site, as well as the surrounding tribal community.

Challenges Related to Social Capital

In addition to human capital, social capital is also a necessary resource that must be invested alongside infrastructure before sites can fully experience successful technology related outcomes. Social capital is unique in that as it is invested, social capital grows. Social capital is comprised of social networks, trust, and shared identity. It therefore inheres in human relationships and is a necessary component in the transfer of knowledge necessary for education. Without relationships, knowledge cannot be shared. The value of technology in promoting education depends on how (and how fast) it connects people in a myriad of ways.

Social capital is measured in many different ways. Two dimensions of particular interest to this project are bridging social capital and bonding social capital. Bonding social capital occurs when individuals and groups with similar backgrounds and interests interact for a common purpose. Bridging social capital is created when people of diverse interests cooperate. We found that bridging social capital in particular is absolutely critical to the successful use of technology at disadvantaged sites. Contacts at four of the five sites we visited discussed how important it is to nurture relationships and develop trust at institutional, organizational, and community levels to implement effective use of technology. They identified the need to build bridging social capital between various institutions, between institutions and communities, and between community members.

Building Cross-Cultural Relationships and Trust

Facilitators emphasized and re-emphasized the need for developing strong ties and trust across cultures. In fact, the development of bridging social capital was identified by mainstream facilitators as the most important investment and outcome of the AISEP, a benefit that would persist beyond the end of the subsidy.

The real value of the [AISEP] ended up being getting people from the Distance Education group [at the 1862 land grant] onto the reservation talking.

[Involvement in the AISEP] has built some good working relationships here, some that never would have been.

The relationships that have been built and that we've put together are not tied solely to the funding for this project. So it isn't like once the federal project is over, this thing is off [the table] and we'll never see [them] again.

Mainstream contacts recognized the importance of casting the net widely to build relationships with tribes.

We networked here on campus and got a lot of people involved and [...] got people percolating with ideas... People from [the 1862 institution] and the reservations [got] together and talk[ed]. That turned out to be what it was really all about.

Tribal facilitators also recognized the far-reaching bridging social capital benefits provided by the AISEP.

[I]t's improving the relationship between the tribes, [the 1862 institutions], the community colleges, and the Department of Education that's within the state, but also connecting to other institutes in the Northwest. [It connects me] back to ADEC in the Midwest, which connects me directly to DC.

We also heard advice about how to build bridging social capital in terms of components necessary for building cross-cultural relationships, particularly in tribal settings. Contacts from one of the 1862 land grant institutions remarked on the experience of approaching tribes with a technology "gift."

Don't go in with a gift, which is in essence what we were doing. [...] if you were going to start from scratch again, you need to go in first and build some relationships and make the gift a part of those relationships instead of the other way around.

In other words, it is important to create partnerships rather than patron-client relationships where gifts can be used as tokens of power. Another said it was also important to recognize the reciprocal contributions tribal sites can make.

There's some cultural programming. There's some other types of things that are happening on the reservation which I think are precious and should be shared with the university and other educational institutions [...] if they want to share.

Another 1862 land grant university contact suggested that tribes develop asset-based relationships with outside institutions that are both beneficial to tribes and on tribal terms.

Transparency while building cross-cultural ties was identified by a contact from an 1862 institution as critical to building trust with tribes.

Ask [tribes] if you can learn about what they have, to see if there is any way that you might be able to work together with them and build a relationship [...] because [...] they] have dealt with the federal government and government agencies for decades. [..Y]ou have to go out with a genuine interest in what they're doing and the fact that you want to work together and it be for their good but you have to tell [them] that it's for your good too. Be real honest and real straightforward [...].

Indeed, a key finding from this study is that transparency is one of the most important pieces of empowering excluded people.

Building Social Capital between Institutions

The development of cross-cultural trust and ties is important at multiple levels—including institutions, communities, and individuals—in order to support the use of technology at the sites we visited. One level where relationships must be built is between mainstream institutions and tribal institutions. At three of the tribal sites we visited, the AISEP project helped link Cooperative Extension at 1862 institutions with tribes. These ties were tenuous in some cases but were considered critical to the success of the AISEP.

There wasn't resistance, but there was a real distance between the people in the tribal offices and what the [1862 land grant] was trying to do with ADEC.

The distance was bridged at one site because a Cooperative Extension staff member had worked in the tribal community for decades, allowing him to get to know tribal leaders and establish some level of trust for the institution he represented.

The first thing we did was make the [AISEP] offer. [..At one site] it was much easier because Extension has such a great presence there on the reservation so that went very smoothly. [..T]he Extension person out there [...] has been there for such a long time and has such a great relationship and the people with the tribe really respect and trust him.

At one site where the 1862 land grant institution did not have the benefit of long-term ties, receptive site staff were acknowledged as key to building strong relationships between tribal education centers and state universities.

If it hadn't been for [a contact at a tribal site] and [his/her] willingness to be a partner and collaborate [...], it would have been much, much harder for [the 1862 land grant] to make any progress because [the land grant] really hadn't done anything for [the tribe], so [the tribe] didn't view [the land grant] as a resource.

One land grant institution realized how critical it was for them to maintain university relations with the tribe that they made tribal relations a permanent part of a staff member's job duties within the department of distance education.

Building Social Capital between Institutions and Communities

At another level, it is also important for educational institutions to develop strong relationships with the community in the pursuit of technology initiatives to overcome disadvantage. At one of the tribal sites we visited, contacts expressed how complicated it is for educational organizations to build relationships with everyone in the community because of contentious race relations.

[...] I'm kind of getting into cultural kind of stuff. There are individuals who will only talk to [non-Indians] just as there are individuals who will only talk to [Indians]... It's not about my hair style or whatever... it isn't personal. It's just how it is.

The way this site addressed the issue was to have both Indian and non-Indian people on staff to communicate with people from both backgrounds.

[We] work very well together, her being the IT person and the support for the computers because she has the knowledge, but she cannot contact the individuals. She doesn't have a connection because she is from the outside [...].

At Salishan, the learning center is building trust in the community by partnering with institutions co-located in the area that already have the trust of community members.

We happen to have the Indochinese Culture Center next to us, so that provides some of a connection [with multi-ethnic computer users] because they see us working together. We can utilize their staff if there is a language barrier. A lot of our materials are translated into several of the Southeast Asian languages. With the Russians, we're still working on that piece because we do not have a Russian staff member. The Housing Authority, which has their community services in the same building is hiring a Russian person. So we do have someone within easy reach or distance that can help us with the language barriers. But yet, the trust issue can be a great one.

In this way, Salishan is connecting with the community by making use of pre-existing social capital assets that were already created between other institutions and the new immigrants. At the same time, the Salishan Learning Center is also building social capital with the other institutions.

Building Social Capital within Communities

Another barrier that can interfere in widespread use of the Internet at public access sites is a low level of bridging social capital among community members from different ethnic backgrounds.

At the Salishan Learning Center, tensions exist within relationships between community members of different nationalities and ethnic groups.

We still have some animosity based on whether you're from Vietnam, Laos, or Cambodia. [Members of these groups] don't like to be in the same room at the same time. They won't take their child to a child care center that is used by any of the other two groups. Sometimes, [one group will use the site] and then that group will leave while the other one has been outside watching [to] move in.

At this site, we discovered that distrust of different ethnic groups is acting as a barrier.

[... T]here are certain groups [...] from other countries that don't want their kids intermixing with the other ones. I think that in most cases, [parents...] don't allow [their children] to come and use the facilities where they know there is going to be a lot of other kids from other backgrounds.

Low bridging social capital is also an issue at two of the tribal sites we visited.

There are not too many bridges that can go [...] back and forth [between cultures]... and take what the Indian is saying and translate it so that [the mainstream] can hear it or take what [the mainstream is] saying and translate it so it applies to Indians.

Investments in technology must therefore be accompanied by investments in building relationships that bridge culture to make effective use of technology.

Benefits of Access: Building Social, Human, and Cultural Capital

We know from the previous discussion that a range of challenges face ethnically diverse sites attempting to join the digital revolution. Yet many within these communities feel the use of technology is worth the trouble because of benefits they have experienced and those they hope to experience. In addition to the obvious technical advantage the Internet provides in terms of access to a world of information, distance education opportunities, prospective jobs, entertainment, and shopping, facilitators also listed other benefits experienced by disadvantaged users. Many of those benefits relate to the growth of social, human, and cultural capital. Social capital includes trust and ties between individuals and groups. Improvements in human capital lead to increased skills, education, and self-esteem. Improvements in cultural capital increase indigenous language skills and shared cultural values, heritage, and symbols.

Safe Place for Youth

A facilitator at one site said that the computer lab and Internet connectivity provide a safe place for youth to go after school instead of coming home from school to an empty house.

Sometimes it's just a safe place to go at the end of the day to play on the computer. If your mom's not going to be home for a couple of hours, you can go in the computer lab.

Public access sites offer youth constructive and creative learning opportunities in an environment that is non threatening. It also offers them a source of recreation with appropriate controls that is safe. Youth safety is important to community safety, one of the measures of social capital.

Recreational Internet Use as a Precursor to Educational Use

Recreational use of the Internet was identified as the seed that grows educational use which creates greater stocks of human capital. Contacts from two sites said that people using the lab for recreational use to just “poke around” on the Internet were inspired to take a formal Web-based course while they were at the learning center.

You can put people in the [computer] lab and let them play games and not be so fearful. And then you get them to searching, and then you get them to looking, and then they don't mind taking a class at a distance.

Sometimes students are recruited by their friends through word-of-mouth to take a Web-based course together. Two contacts noted how important it was for students at a site to take courses together to assuage fear and provide support for each other in the process. Students who 1) become familiar with technology through recreational Internet use at public access sites and 2) who take courses along with their friends may be apt to go from “tirekicking” as one contact put it, all the way to graduation. It is therefore no surprise that facilitators report use of the Internet spawns a greater appreciation for education among community members perhaps as they gain confidence and familiarity with using technology. In the process, they see its potential as a tool to attain their (achievable) goals.

Greater Use of Community Services

With increased site patronage, the broader community has become more aware of the computer lab and what they can do with it. Increased visibility in the community means greater use of other co-located services.

People are coming back in there, which also heightens the usage for higher education, language, Even Start, and Head Start. The more people that go through the doors now are aware of [other services] in the building, as well as the computer lab.

Typically hard-to-reach groups such as elders and youth are also increasing their use of the Internet at four of the sites.

I've had a couple of 50- and 60-year-old elders come in to learn about computers because they say they are not going anywhere in their jobs.

The kids do get access to technology, but it's through the schools [...]. We want to be able to say you've got a greater support base within the community than the school.

In fact, sometimes youth and elders are making simultaneous use of the technology through participation in various cultural programs. In the process, they are building valuable social capital, as well as cultural capital.

I think we've bridged the gap between some of our children and our elders with the language piece [by using technology].

One facilitator noted that the indigenous language program that paired youth with elders built a lot of pride in the community and the cultural resources there. S/he cited this pride as one of the gains the community experienced as a result of participating in the AISEP.

As marginalized groups cooperate to use technology, not only do they build social capital, they also gain self-esteem, which increases levels of human capital.

[...] our elders are frightened of computers, but [...] our regular community members are more than willing to help out the elders...

We have [name] who's trying to train just the basic community grandmas and traditional natives [that] it's okay to punch that button and it's not going to break.

Stronger and Expanded Cross-Cultural Relationships

Time and time again, we heard facilitators credit the AISEP for social capital benefits that sites derived from participating in the project, despite underlying concerns about cross-cultural mistrust and discrimination.

The relationship between the various tribal councils and institutions in the state haven't always been good, so we've gained some credibility. I think it's been mutual.

In particular, facilitators valued the AISEP for providing a reason to cooperate.

[The AISEP] has been a catalyst for establishing relationships [...].

The [AISEP] really enabled [...] all of us not just to become more familiar with the reservation but to really become involved in what they're doing and have an opportunity to meet a fairly significant cross-section of their people.

A facilitator at one of the 1862 land grant institutions articulated his evaluation of the AISEP not in terms of the number of degrees conferred or jobs created as a direct result of the connectivity, but in terms of the relational impacts it had.

From a purely technical standpoint [that we] had a signal coming down and people are taking wonderful courses [over the Internet], I would say by and large it's probably mostly a failure in that regard.[..O]n the other hand, [...] it turned out in our state to have tremendous value—I mean TREMENDOUS value in terms of moving forward [with] those long-term relationships that we've developed [with the tribes].

Tribes and mainstream institutions are not the only parties to benefit from the relationships developed during the AISEP. A tribal contact noted that the public also directly benefits from project outputs.

We formed great partnerships not only for the tribe, but for anyone in the state for distance education. [The 1862 land grant] now has a minor in Fish and Wildlife.

Thus, it was noted that tribal/mainstream relationships forged during the project were beneficial for the entire state because everyone has access to the new distance degrees offered. Tribal contacts also valued the AISEP because it diversified relationships with mainstream institutions, notably beyond the cultural arena.

Prior to the [AISEP], I was close with the [community] college, but in the multi-cultural department. We worked really close with the retention of natives at the college and native classes at the college. With the [AISEP], we've gotten in contact with the distance ed program.

[Relationships] with [the state university] have been helpful to the tribe because we've worked together to bring out native business workshops to the school [...].

We have access to the elite of the elite in distance education.

Access to Students and Cultural Resources

The tribal college contact we interviewed mentioned that one of the benefits of the high-speed access was that it provided access to more students. This benefit was echoed by all of the institutional contacts we interviewed. However, the tribal college also recognized the connectivity for its ability to provide the college more access to instructors who can teach culture “back in this direction.” Connectivity was therefore highly regarded as a way to enhance tribal cultural assets.

TECHNOLOGY RELATED ISSUES FACING INDIAN PEOPLE

Why has technology and all of its benefits not proven to be an effective elixir in alleviating poverty among Indian people? Why has distance education so far not led to the creation of high-quality jobs or business opportunities? We identified a multitude of factors responsible for undermining the ability of technology to empower native peoples, all of which point to mainstream structures that prevent access to opportunity. Recent withdrawal of federal support for public access sites is a good example of what tribes face when trying to build local financial resources (as one mainstream contact pointed out, “What we face [in working with the tribes] is not only was [there] not an agenda, there wasn’t even paper and pencils to even write the agenda on”). Other challenges relate to geographic isolation, as well as sociopolitical issues such as federal mismanagement of Indian affairs; power and dominance in mainstream education; tribal government support for tribal education centers; and cultural relevance of technology.

Geographic Isolation

Tribes and people living on reservations face particular challenges when it comes to gaining access to technology. As the NTIA reports illustrate, many groups are excluded based on demographic characteristics such as income, education, age, and race/origin. In 1999, the NTIA reported that race plays a role in who is more likely to access the Internet at home: Caucasians living anywhere are more likely to use the Internet at home (26.7%) than are American Indians (17.5%). Rural, urban, and central city residence is another distinguishing factor predicting physical access. More urban households have access to the Internet (42.3%) than do rural (38.9%) or central city residents (37.7%) (NTIA, 2000). Why the geographic disparity? Principally, rural reservations cannot aggregate the demand required to make it cost effective for phone companies to invest in Internet infrastructure.

It’s not cost effective for [the telephone company] to run other lines out there, because there’s no projected growth or anything for that community. That’s a major barrier often times in tribal communities. It’s not like there’s going to be a 200 house subdivision planned and breaking ground. We put up four or five houses as a time.

Unless subsidies are offered to offset the costs, Internet subscriptions from a handful of houses cannot provide the income necessary to recoup private investments in Internet cable.

Yet geography alone is not the sole determinant in whether Native Americans gain physical access to the Internet. Some groups find themselves even more excluded when one type of disadvantage is compounded by another. When we combine factors of race and geography by comparing urban Caucasians to rural Native Americans, differences are even more pronounced: 29.4 percent of urban Caucasians use the Internet at home versus 9.4 percent of rural Native Americans (NTIA, 1999). As we mentioned earlier, social and political reasons beyond issues of infrastructure influence which groups have physical access to technology and which do not (Bregendahl and Flora, 2002). Those issues are discussed in the following sections.

Federal (Mis)management of Indian Affairs

The U.S. government has a long history of mistreating its first peoples. This history lingers on in the collective memory of tribal people, in spite of the creation of a federal agency in 1824—the Bureau of Indian Affairs (BIA)—to handle relations between the federal government and Indian tribes. Created by Congress, the BIA was originally administered under the War Department. Today, the BIA operates under the Department of Interior.

The BIA plays a key role in the deployment of technology on Indian lands. The BIA's Office of Indian Education Programs (OIEP) has been working to connect BIA elementary and secondary schools to the Internet. A handful of tribal colleges are also included in this effort. Through EdNet, high-speed Internet service is free to all "OIEP operated schools, Grant Schools, Contract Schools, Education Line Offices, OIEP Central Office East and West, and approved community learning centers" (OIEP, 2004). OIEP submits an application on behalf of BIA schools to the federal e-rate program in order to receive 20 to 90 percent discounts on monthly access fees for T-1 lines or satellite service to BIA schools. Discounts are based on the number of children enrolled who are eligible for the National Free Lunch Program. In addition to the school-based program, the BIA also offers high-speed Internet connectivity to BIA departments through DOINet, the Department of Interior's Internet backbone. The problem with these BIA administered lines, one contact noted, is the lack of freedom when using the connection.

The tribal [BIA-provided] system has nothing but a lot of filters and blocking. [...] So you can't do much with it, so we like [an independent connection] because we don't have blocking.

Recent federal cuts to IT structures and programs that benefit Indian people coincide with a dark time for the federal Department of the Interior and the BIA. The DOI and BIA have been jointly charged by federal courts with gross mismanagement of Indian trust lands. The BIA, as designated trustee for profits derived from natural resource activities on Indian lands, is tasked with keeping track of all transactions to disburse payments to individuals through Individual Indian Money accounts. In a class action lawsuit brought against the federal government by Eloise Cobell (which remains in litigation), courts found that "the sum of these trust monies was never fully tallied, recorded, or dispersed to the individuals and tribes for whom they were intended" (Brasel-Awehali and Talvi, 2002:41), an issue that resonates throughout Indian Country.

[We have] land issues that have been pending in court for 40 years. [...] probate might go three years, but a land issue going 40 years—that's just an insult to us and the system. But these are in the memories of our people [...] and they're concerned about it.

The federal proclamation of mismanagement has resulted in indictments of contempt and mismanagement brought against the Secretary of the Interior and head of the BIA. A federal judge has issued several court orders since 2001 that the DOI's Internet backbone be shut down multiple times due to security breaches in the network that permitted hackers access to vulnerable Indian trust documents (Indianz.com, 3/16/2004). With the federal court system's

identification of the BIA Internet as a security risk to Indian trustees, the ability of BIA departments connected through DOINet to effectively use the Internet in ways that both improve and are relevant to the lives of Indian people has been compromised. It is unknown what impact this case has had on shaping the attitudes of Indian people towards technology.

Power and Dominance in Mainstream Education

Another issue confounding Indian peoples' use of the Internet is the environment in which technology training is available. Much of this is mediated by culture and identity (Warschauer, 2002; 2000; 1999; 1998a; 1998b; and 1996), as well as the structure of institutions responsible for delivering education. Warschauer introduces the notion of a "literacy divide" that explains the digital divide or digital inequality. Literacy is defined as how well an individual grasps coded information defined as significant by a particular (usually dominant) culture. Such literacy is highly dependent on modes of communication used by dominant cultures, like the printing press or the computer. The Internet is dictating the need for new skills like searching, navigating, and sifting through volumes of information on Web sites rather than printed pages. Thus, people failing to grasp coded information considered significant by the dominant culture (and using the dominant language) will be labeled "illiterate" regardless of their own attitudes toward such knowledge or whether or not they have access to or mastered the dominant communication medium (the computer) and language.

Warschauer, citing Freire (1994), shows that "literacy instruction is most effective when it involves content that speaks to the needs and social conditions of the learners" (2002:10). Literacy instruction may therefore not be effective when dominant cultures decide what information is significant because what may be significant to the dominant culture may not necessarily be significant to marginalized cultures. Hence, attitudes regarding motivation, desire, and confidence held by marginalized populations are important but often overlooked elements in literacy acquisition.

Learning is fundamentally a social act, and people learn when they are surrounded by people who support them in the process. Moreover, literacy is a matter of cognition, culture, language, power and politics. "Because of the politicized nature of [computer] literacy, campaigns that focus exclusively on individual skill while ignoring broader social systems that support or restrict extended literacy are not always the most effective" (Warschauer, 2002:10).

Concrete evidence for this contention is illustrated in research Warschauer (2000; 1999; 1998a; 1998b) has conducted involving Native Hawaiian learners who have traditionally relied on gaining knowledge through cooperative informal social interaction such as chanting, hula, and hands-on activities. However, this form of learning has been largely ignored by a Western-based education system that encourages competitive, independent, and text-based education, an approach that is rooted in the learning method of choice for U.S. missionaries. Missionaries introduced literacy and printing presses to the islands to spread Christianity and the English language, while at the same time prohibiting the use of native languages (Warschauer, 1999). Individual, text-based, English-based Western education was critical for subjugating the Hawaiian people and the monarchy to American colonial rule (Warschauer, 1999). As such, the

appeal of Western educational models has been limited among Native Hawaiians because 1) content historically has been based on foreign notions of worship and spirituality (Christianity); 2) it emphasized individualized, textual learning rather than more social forms of oral history and dance characteristic of Native Hawaiian cultures; and 3) it ignored the value of native languages (education was delivered in English only). The Internet reinforces these patterns, given that 87 percent of documents on the Web are in English and because the Internet continues to lack multicultural content (Lazarus and Mora, 2000).

Cultural dominance is also exerted on Native Hawaiians today through the use of inappropriate teaching methods and technology (Warschauer, 1998a; 1998b; 1999; 2000; 2002). In an ethnographic study of Native Hawaiian students at a religious college in Hawaii, Warschauer (1998a) found that computers, in combination with a rigid teaching philosophy and institutional structure, were used to limit students culturally while grooming them for future success in a Western-based education system. Warschauer found teachers at the college were using computers to restrict student learning, which created negative attitudes toward formalized learning in general.¹⁰ Class content also became a tool for cultural dominance. Warschauer (1998a) found that teachers at the college regarded Hawaiian culture in only one sense, which they imposed on students through homework exercises.¹¹

These documented experiences show that social context shapes the learning environment. In this case, a negative learning environment was created when culturally destructive content was delivered in conjunction with inappropriate computer-based teaching strategies. The class was used as a socialization tool for helping students meet the constraints the college imposed on them to help them “succeed” in their future education. “Students who did poorly in the class [based on inaccurate teacher/technology-imposed measures] were not necessarily the worst writers but rather those who failed [the] socialization process” (Warschauer, 1998a:12). We must therefore recognize the mediating factors that influence the use of technology in the learning process, namely, institutional structures and values, teacher-imposed structures and values, program goals, and the impact of these on learning. The way in which computers are used to “deliver” education—combined with questionable content—instructs us to be wary of occasions when technology, education, and power intersect to prevent culturally appropriate learning opportunities.

The Creation of Tribal Educational Institutions

Tribal colleges such as NWIC were created to overcome these issues (although Hawaii has no tribal college). According to the American Indian Higher Education Consortium, tribal colleges were formed to explore and strengthen traditional tribal cultures using culturally appropriate

¹⁰ This took place in one class, where a computer-administered quiz was given during the first five minutes to motivate students to arrive on time. One student who invariably showed up on time but lacked computer experience continued to have difficulties logging on. He failed to finish the quiz in the allotted time, thereby creating an inaccurate measure of his commitment to the class and at the same time making the quiz a learning constraint.

¹¹ Students were asked to write about the value of their culture as a popular tourist attraction—the “visit value” it could provide to others. Through this exercise, teachers defined the worth of Hawaiian culture in terms of its use or consumptive value—how well it satisfied Western recreational desires as opposed to its intrinsic qualities as an expression of local customs, perspectives, language, dance, and more.

curricula within appropriate institutional settings often in un- and underserved geographical locations (1999).¹² Such efforts emerged out of a history of “compulsory Western methods of learning [and] recurring attempts to eradicate tribal culture” (AIHEC, 1999: A-2) that persist today (Warschauer, 1998a; 1998b; 1999; 2000; 2002).

In 1994, Congress granted land-grant status to 29 tribal colleges. Land-grant status originated with the First Morrill Act of 1862, which established a “land-grant” institution in each state to educate the common people in matters of agriculture, home economics, and mechanical arts. The first Morrill Act granted federal land to institutions to fulfill this mission, while other, subsequent acts provided federal money. Land-grant status for tribal colleges makes them eligible for federal support, which is important given that tribal colleges receive little or no funding from states due to the trust relationship between reservation lands and the federal government. The 1994 tribal college land grant legislation authorized competitive grants, equity grants, and a \$23 million endowment from which interest would be paid to 1994 institutions. It also authorized funds for developing partnerships between 1862 and 1994 land grants to share information and resources (AIHEC, 1999; NASULGC, 2004).

The federal government recognizes over 550 tribes within the United States, 220 of which are Alaska native villages or tribal governments (Casey et al., 1999). Yet as of 2004, there are only 34 federally recognized tribal colleges and universities or TCUs (U.S. Department of Education, 2004), meaning that some tribes are not locally served by TCUs. All tribal members therefore do not have equal access to formal, culturally appropriate education. In response, some tribes have created tribal education or learning centers. These education centers, funded by tribes, serve a critical role providing educational training specific to tribal needs.

Culturally Inappropriate Western Education

Some tribal colleges and tribal learning centers grapple with reconciling tribal educational expectations with Western models. Sometimes we encountered outright rejection of the assumption that earning a degree was beneficial to tribes or tribal members. Several tribal contacts with whom we spoke offered remarks about the worth of pursuing a degree.

One of the things we sometimes overlook [...] is that [...] our own goals are not necessarily the same as] the goals of the community. I thought the community college [...] was a great idea. And, AISEP was instrumental in bringing courses to us. On the other hand, what [does] the community really want? Maybe it's not an associate's or bachelor's [degree] that they really need, maybe it's job enrichment skills or additional skills that will help them find a job...

Another contact at another site questioned the assumption that formal education made possible by technology serves as a window of opportunity for tribal students.

¹² In addition to providing culturally relevant content to isolated populations, tribal colleges have also included within their mission the provision of courses transferable to four-year institutions (most tribal colleges are two-year institutions).

You look at boarding schools and what they did, [which shaped] the whole attitude about education [...]. In terms of education and distance education, you know, is it good? [The mainstream] says that I have to have it, but do I?

The digital divide literature has established that technology is produced by the dominant culture for the dominant culture. Will technology be another tool for oppression? As we learned from some of the contacts, policies to acculturate Native people through “education” have caused devastating cultural losses. Tribal contacts linked these losses to incongruent values held by mainstream and tribal educational models.

I have taken [time] to look at every value and belief that I have because for me there was turmoil. I felt like I had to choose [either the dominant or tribal culture] and I didn't want to. Through learning I gained power in it because I found that I could move back and forth between two worlds [...]. I can do what the dominant culture requires without believing in it.

[Students who leave] are not aware that they were taught for instance [that] tribal cultures [are] very family- oriented and group-oriented. There are individuals but you don't base your decisions on what is best for the individual. The dominant culture is not like that [...]. It's all about the individual.

One tribal contact described the ways in which Western education continues to acculturate tribal members. Tribal students who leave the reservation to attend a mainstream college or university often experience a transformation in their belief system to survive in the new setting. In the process, new values espoused by the dominant culture replace traditional ones.

You can't succeed in the dominant culture without adapting some of our traditional culture. It just won't happen, so when you adapt and you succeed and you get your bachelor's or your master's and then you come back and try to bring those same principles and teachings, it doesn't work.

Tribal members who leave the reservation to get an education at a Western institution come back changed because, as one respondent put it, some no longer remember who they were when they left. Not only do they now not fit in on the reservation, they also do not fit into the mainstream. They are excluded from both worlds.

It used to be, you went away, you came back, and nobody talked to you. You were shunned.

[..]It used to be [that] those of us that went away [to get] a non Indian education [...] came back [...] and weren't readily accepted back into the tribe because [the tribe was] concerned that maybe you would have some kind of distorted view of something that might not be compatible with the tribe's manner of thinking. [I had to] explain that by going out and understanding what the non Indian is thinking, we now know what to do ahead of time instead of reacting after the fact.

When you get to high school... you start to wonder if there is something wrong with [you]. [The mainstream] keeps saying that there is. [It] keeps saying that if I work hard that I can attain but the reality is that with White privilege and everything else, I never will. That is real and it isn't because of me. How do I [tell my children], "Well, I'm sorry, you can be the best you want to be, but not really? And it's not your fault. It's not who you are. It's who they are. But you still can't win." It's a tough thing to teach.

Indians are Indians, no matter [what]... I might never get to Pine Ridge but... they have the same issues that we do—the ruralness, the poor economy, high alcoholism. [... This] kind of solidified that it isn't just me in terms of who I am as an individual. You know, I don't have access to [privilege] and neither does anybody else.

These contacts recognized that Indian students are set up to fail. While the mainstream believes American society is a meritocracy in which those who try hard enough are able to succeed, this is simply not true because the hardships faced by Indian people are the same everywhere. However, Indian people are not the same everywhere. This proves that solutions to poverty therefore inhere not within individual shortcomings but within an inequitable and unequal system that creates impoverished people along racial, socioeconomic, and other lines (the central thesis of seminal works authored by William Julius Wilson¹³).

Avoiding mainstream educational institutions and values is seen as one possible solution for this untenable situation. In this regard, technology may be valuable for pursuing distance education because it allows Indian people to stay within tribal cultures. Technology was valued by some facilitators as a tool for delivering distance learning opportunities while helping tribal members “understand how the world works and yet keep [our] values and tribal ways. [..T]hat's [what] distance education will do for a lot of people that are already here.” Distance education therefore permits Indian students to avoid the culture clash that accompanies a Western education off the reservation.

Culturally appropriate distance education was also noted for its promise to build self-esteem among tribal members, which continues to be a formidable obstacle and discouraging legacy of the mainstream system of education.

[Learning] is generational and until you start doing it in a successful way that's not punitive, you're not going to get anything but frustration because they're going to go to school and fail because they haven't been set up to succeed.

This respondent insightfully noted that attitudes towards learning are part of the social inheritance of a family, community, and tribe and that learning is a social experience, passed from one generation to the next. As such, these attitudes are moderated by people and the learning structures they create.

¹³ See, for example, his books, *Power, Racism, and Privilege*, 1976; *The Declining Significance of Race*, 1979; *The Truly Disadvantaged*, 1987, and *The Bridge over the Racial Divide*, 1999.

Distance education was regarded favorably by one facilitator as allowing tribal members daily access to the support systems such as their families and co-workers who are a necessary part of helping them succeed.

I think being able to [get an education] at a distance [...], marginal students [...] could be great students, because they've got the support of their coworkers as well as their supervisors who already have these degrees [who] can help mentor them.

Yet some tribal students are not using social support systems available to them because of low self-esteem. Fear of failure was cited by one respondent as a reason why some tribal students choose not to tell their families when they are taking distance education courses.

A lot of our students will not identify as students until they've got a good term under their belt. They won't say anything to their family [...] that they're going to school. I had somebody graduate and never told their family. [...] they don't want to be seen as failures. They do it and they do a great job, and you know they're going to succeed, but they don't see that in themselves yet.

Corroborating Stanley's (2001) findings, facilitators at three of the tribal sites indicated that the disadvantaged users they serve have trouble mustering social and psychological resources to overcome fear and intimidation of technology.

What we were trying to teach people to do was to get over the fear of just turning [on the computer] and having it crash.

Once we build that foundation of feeling comfortable and ready to go on and they know that there's a lot of benefit by doing this, that's our moment right there.

Despite concerns that Western educational institutions are not a good match for tribal students, three of the four tribal sites we visited (those without a TCU) are working closely with area community colleges. These close working relationships are provided to help tribal members transfer credits earned at community colleges to cooperating state universities. At these sites, the three-way partnership between the tribes, the community colleges, and state universities is strong.

There's a lot more collaboration now between the community college system and the university system [but] there is still a turf war— although between [our community college and university partners] we've pretty much eliminated it.

I didn't realize that the community colleges and [state] university systems were separate because of our relationship with [a community college] and [a state land grant].

As the latter comment shows, one facilitator thought these collaborations were a unique feature of the tribal educational system. A contact from one of the 1862 land grant institutions admitted

these institutions have traditionally been inflexible in terms of cooperating with tribes to provide relevant content in distance education programs.

[The 1862 land grant] president really g[a]ve more lip service to distance education. He wanted everyone to come to campus and sit at the foot of the master kind of thing. [..T]he community colleges were much more aggressive in taking the lead.

To fill this gap, community colleges have proven to be a great partner in cooperating with disadvantaged populations to help deliver relevant distance education programming.

Distance Education and the Virtual Tribal College Idea

Formal adult education for remote Indian communities has undergone considerable change over time. In the beginning, the only alternative to earn a degree was to travel off the reservation to place-based Western colleges and universities. This hardship resulted in cultural losses for “place-bound learners [with] family obligations.” Add on “[...] hours of driving time [and it] becomes impossible to keep a job, go to school and have the community/family relationships that you need to have.” Another contact at a different site also cited transportation barriers which interfere with getting a formal education. “We have other barriers like transportation—broken cars, two-hour round trips, gas.”

The off-reservation exodus slowed with the appearance of place-based TCUs and local tribal learning centers. With the spread of the Internet, tribal students are now receiving distance education degrees from place-based Western institutions that used to require in-person attendance. “[Distance education] is very appealing to the tribe because we don’t have to go anywhere.” However, distance education offered through mainstream institutions does not address the concern that tribal cultures, values, and identities are subverted in the process.

To combat this, the tribal sites we visited were participating in efforts to create a virtual tribal college. A virtual tribal college promises multiple advantages: it can offer a culturally appropriate education that provides relevant content as part of a degree program. It also permits people to learn from within their tribal communities so they can retain daily ties to culture. Yet it also faces a significant challenge as one respondent remarked:

[When we all sat down and started working] on the virtual tribal college concept, the first thing that came up—and what always comes up at tribal colleges [...]—is that everybody said, “We want native language courses, cultural courses, heritage stuff...” and that becomes a lightning rod for tribal politics.

The virtual tribal college is still in the planning stage. Most of the facilitators agreed its influence could be far-reaching for remote tribal communities in terms of using technology for self gain and empowerment. Implementing distance education via technology is not without individual challenges, however. In addition to the collective challenge of overcoming the “lightning rod of tribal politics,” one respondent who had taken distance education classes, said, “You do have to

be very disciplined to [do it] and a lot of the families that we work with [...have] different chaotic schedules and a lot of [other] barriers.” In addition to addressing life pressures, there may be a need to change attitudes to gain greater acceptance of on-line degrees.

We’ve got this generation [...]— that’s how they learn is on computers—so they’re going to be pushing to be able to access education more and more this way. We’re in the generation that’s in transition. And then we’ve got faculty who [...] say] on-line [education] can’t be as good as on campus.

Several respondents at one site felt change had to start with the structure and policies of government welfare-to-work programs, which have unrealistic expectations for non traditional learners. These facilitators voiced the need for states to modify program requirements when dealing with nontraditional learners.

[..T]he TANF Self Sufficiency program [...] requires us to have knowledge of programs that operate on a nine-month maximum schedule for funding, where [people] can receive their education, their degree. That’s all they’ll allow, or [families] will not be funded anymore.

I just have a problem with the concept of how the state does this. They think that people [who] can’t work and haven’t worked are now going to be in nine months’ [time] a successful candidate [in] some college program or technical course. Well, that’s not realistic. They need nine months just to build skills. [...]

These facilitators recognized that a virtual tribal college cannot succeed in isolation of policies that constrain Indian learners. Virtual tribal college efforts must be pursued in conjunction with wholesale change at the state and federal policy level in order to support Indian people in their pursuit of culturally appropriate education.

Challenges Facing Tribal Education Centers

Tribal education centers provide culturally appropriate content to populations not locally served by tribal colleges or other formal educational institutions. Funded by tribes, they cater to both adult and youth populations and offer programs relevant to local needs and building local skill sets.

Support from Tribal Government

Unlike the tribal colleges, funding of tribal education centers is tied to direct support from tribal government; therefore, political capital (political connections that give voice, influence, and power) is an essential ingredient in effective use of technology. However, the focus of tribal education centers can change along with turnover in tribal administration. In some instances, this can occur as often as every two years. Short political terms allow little time for tribal leaders to

discuss, agree on, establish, implement, and follow long-range strategic plans for developing culturally appropriate technology-based educational programming.

[...] we wanted to get through [implementing the tribal technology program] quickly [...] and get it established before terms and the political aspects of it started to change. [... T]wo years [...] is a pretty short amount of time to really do anything and so when you have an opportunity and you're able to, you just want to run, and run as fast as you can with it.

Everything was going so fast. [We] didn't have the time to really put into [the technology projects], unfortunately.

Continuity of support from political leadership was recognized by tribal facilitators as critical to the success of their technology programs.

The first year, we had very forward looking leadership [from the tribal council] and then the second year [there was] some change.... I think there were some younger council members [...] who had a global perspective, rather than a regional or local [perspective]. Nothing negative on it, it's just [the new council] is more concerned about local issues— more so than regional or national or larger yet—global issues.

All of a sudden, when [the tribal council changed], it's not that [the technology program] didn't fall apart—it is just that they didn't have the same kind of leadership.

The structure of tribal governments and constraints they face in getting things done during short administrative terms is not a shortcoming of tribal organization, but is connected to the imposition of European-based models of governance on tribes during the Indian Reorganization Act (IRA) of 1934. One of the purposes of the IRA was purportedly to offer new rights to Indian people through the reservation system, one of which was self-governance. Yet the governing structures that emerged out of the IRA on most reservations were created by federal authorities promoting a constitutional system that did not necessarily match historical tribal governance structures. Although tribes were given an opportunity to design their own constitutions, lack of experience with the European-style legal system led to most tribes adopting a model constitution drafted by the BIA (Phillips, forthcoming). Hence, new forms of government established under the IRA were likely to conflict with a tribe's cultural norms of what was legitimate political authority and legitimacy (Cornell and Kalt, 2000).

Consider the case of the Oglala Sioux Tribe at Pine Ridge, for example. The Oglalas historically have organized themselves politically around sub-tribal “tiyospayes” based on local and often kin-based allegiances. In the late 20th Century, the Tribe operated under a federal-designed IRA constitution that creates a central tribal administration with a single directly-elected president as the fundamental arm of government. Despite the fact that this central government is the funnel through which federal monies come and with which government-to-government dealings take place, many Oglalas [do not identify with the tribe as a political group and prefer to run their own affairs at the local level]... Moreover, traditional Oglala government was parliamentary, with multiple executive officers selected to carry out the duties of administration. [Except during a civil-led uprising against reservation government in the mid-1970s], no

tribal president has been consecutively re-elected since the inception of the IRA government more than sixty years ago. (Cornell and Kalt, 2000:463)

Other tribes such as the White Mountain and Mescalero Apache who adopted a strong chief executive IRA form of government aligned with their traditional forms of government have fared better. Ultimately, the IRA, in combination with the Indian Self-Determination and Education Assistance Act of 1975 which gave tribes greater control and autonomy of Indian affairs, made it possible but not probable that tribes could overcome a “discouraging state of development” on reservations (Cornell and Kalt, 2000). Essentially, the 1934 and 1975 legislation granted tribes permission to pursue sovereignty without the appropriate institutional structural means to achieve it. Tribal governments therefore may experience significant challenges related to organizational politics, with immeasurable ripple effects on how effectively they are able to deliver programs for tribal members—technology-related or otherwise—and how adept tribes are at pursuing technology initiatives as part of broader community and economic development plans.

[We wanted] to increase [the two-year] terms [...for] economic development or economic sustainability [...]. Not only would it create a [...] more stable government, but also it would help investors become more comfortable because they knew the leadership was there for a longer period of time.

Tribal Government Support for Cultural Extended Learning

In other cases, support from the tribal council is not forthcoming *not* because of changes in administrations with different priorities, but because of concerns combining technology with cultural preservation. One tribal contact noted that “tribal government is a major barrier at times with cultural extended learning” and lamented that grade school students, because of this, did not have access to native language learning opportunities using computers.

Exclusion from Educational Pricing

In addition to short terms of tribal council leadership and lack of support for technology-based culture programs, one tribal facilitator was particularly troubled by a challenge tribal educational centers face that mainstream-accredited institutions do not—that of educational pricing.

We’re a training and educational institute. We would like to receive at cost education software so that [we can] train.

Despite having the same educational mission, tribal learning centers are not entitled to discounted prices on learning tools such as books, computers, software, and equipment that accredited institutions receive. They must therefore provide educational services to tribal members at a higher cost than accredited institutions while operating on more limited budgets. This is yet another example of the structural constraints faced by tribes in attempting to overcome disadvantage through the delivery of culturally appropriate educational services.

Cultural Relevance of Technology

The last issue to be considered here among a list of information technology related challenges identified by facilitators at the tribal sites we visited is the issue of cultural relevance. While some consider computer-related technology as a way to promote indigenous culture, others view it as a threat. Among the latter, Mander (1991) argues that technology is not only culturally irrelevant to indigenous peoples, but is a destroyer of culture. He asserts technology is yet another tool the mainstream uses to exert Western cultural imperialism on indigenous communities. Mander is not alone in thinking this way; distrust of new technologies was identified as one among many barriers to the development of technology infrastructure in Native American communities in a report titled *Assessment of Technology Infrastructure in Native Communities* commissioned by the Clinton administration (Riley et al., 1999). A contact with whom we spoke at one of the tribal site echoed similar doubts about technology.

In terms of tradition, we didn't ask for the TI [Internet] to come here. It just came here. And what [has it] done [in terms of] the influence the dominant society has had on us culturally? Nobody's ever asked whether or not that's what we want[ed]. So in terms of the computers and Internet access, I don't know if it's [...] what we want to do.

On the other hand, proponents of technology such as Casey et al. (1999) report that many Indian people are interested in technology as a way to preserve their culture (see also Bregendahl and Flora, 2002).

I wish we had thought to [...] videotape [the] obsidian tool making class. We're hoping to do a drum making class in the Fall.

One site we visited was interested in using technology to give the tribe voice by documenting the effect European culture had on the demise of the Cui-ui, a fish species that was once a food staple and center of tribal identity.

I want a permanent video production team [...] to archive [our] songs and culture. We already have our first plan. It's on the Cui-ui [...], the fish. We're called the Cui-ui eaters. The lake is called Cui-ui pond, the Cui-ui Lake. That's our tribe. [...]the spawn is coming, so we want to focus elders on how everyone used to fish [the Cui-ui], what it meant, what happens. [...]because it's an endangered species, we're not allowed to hunt it. We want to show about losing the fish, and how that has [affected] the native people themselves as that's who we're named after, that's who we are, [and] what happened to these generations who were not allowed to eat it.

Technology can be used to archive and share cultural resources on-line, if developed alongside appropriate controls that protect those resources (Davis, 2000). Sacred traditions and the location of burial sites are examples of information that a tribe might find inappropriate to post online. At least one of the sites we visited is struggling with the issue of what kind of window technology should provide to local culture.

[..T]he wisdom keepers really didn't like this thing [the computer].

We haven't archived [language] information. We have a [leader] who is stubborn—I'll put it that way—[who] doesn't really want to get it out there.

Part of the issue with posting language resources on-line is the objection of some tribal members to the cultural access it provides non tribal members in terms of learning the language. At another tribal site, this was not an issue.

Our elders have said that they would [support an on-line language program]. All we have to do is send a speaker [... to] put their voice overlay and spelling on the program.

While technology may be useful for recording cultural customs and practices—in other words, cultural preservation—it may not be as practical for *practicing* culture.

If you do want to take advantage of technology, great, but [...] what makes us unique [is] daily learning. Right now, it's root feast. [With] technology, you can take pictures, capture it, archive it, but to really exercise your sovereign right, you have to get out there and get your fingernails dirty, dig in roots, clean roots, and [do] the cooking.

As this facilitator noted, technology cannot replace relationships one has with the land and other tribal members; some teachings must be experienced using all of the senses. According to one respondent, this represents a conundrum many tribes face, which is rooted in making the social transition from a land-based or agrarian society to a technological one. In this regard, some tribes change more quickly than others and may embrace technology more openly. Others may not.

Technology clearly exhibits some limitations when it concerns relevance to Indian cultures. On the other hand, some recognize the cultural benefits it can offer (Worcman, 2002; Casey et al., 1999). The Internet can provide an opportunity for tribes and tribal governments to present themselves as they want to be depicted rather than others' perception of them. Historical, language, and other cultural resources can be self-published and shared on the Internet for more democratic and accurate representation of culture and history. Self-representation can be achieved by using digital technology to encourage members of indigenous communities to become producers and keepers of their own history (Worcman, 2002). Other culturally related advantages the Internet can provide include economic development opportunities tailored to the goals and lifestyles of Native American business owners (Bregendahl and Flora, 2002; Casey et al., 1999). We must not forget, however, that many indigenous people place little or no value on Western-created technology and its results, nor should we assume that electronic intervention is appropriate or desirable for such cultures (Holland, 2002). In these cases, we should not be surprised when we hear that "There are a lot of labs around here that are empty. [...T]hey're not being used and I don't think it's because of anything we're not making available." This facilitator went on to remark that as a whole, the tribe had not yet identified a need for Internet

technology, corroborating another remark we heard about the site: “I actually thought it would be a case of installing equipment and it would be used. That didn’t happen as far as I know.”

Somewhere in between contrasting viewpoints of technology as anathema and technology as savior are those who say the impact of technology is mediated by the social system or institutional arrangements through which it is designed and delivered (Strover, 1999; Lentz et al, 2000; Warschauer, 2002; 1999; 1998a; 1998b; DiMaggio et al., 2001; DiMaggio and Hirgittai, 2001; DiMaggio et al, 2004; Bregendahl and Flora, 2002). People, not technology, determine whether or not it is used as a beneficial tool for or a weapon against Indian people. An example of technology misuse by institutions is the use of Geographical Information Systems (GIS) to exploit indigenous people and infringe on their rights to privacy (Madsen, 1994). While GIS can be used by indigenous people to better manage their lands, Madsen describes a number of international cases where GIS was used to identify valuable natural resources within indigenous controlled lands. He then tracked the resulting policy directives that emerged to gain control of those resources. In the U.S., this occurred through the GIS-assisted identification of oil deposits in Alaska’s Arctic National Wildlife Refuge (ANWR), which has pitted interests who would drill for oil against indigenous Gwich’in people (Madsen, 1994). The Gwich’in rely on the caribou herds as a cultural and financial resource. Oil drilling in ANWR, currently a priority on the energy agenda of the current administration (CNN, 2004), is expected to disrupt the migration patterns of the caribou with resulting impacts throughout the Gwich’in community.

TECHNOLOGY-RELATED ISSUES FACING NEW IMMIGRANTS

Other groups disadvantaged by the so-called digital divide and inspiring even less national interest than Native American technology access is technology access by new immigrant groups such as those at Salishan. New immigrant groups have been understudied in part because they are notoriously difficult to track due to their characteristically short residential tenure in one location and to some extent, distrust of authorities. Little comprehensive knowledge therefore has been gathered about the role technology plays in their lives. However, these groups are worthy of study given their particular needs in adjusting to life in a new country. Those needs center on confronting issues of the labor market and economic exclusion; distrust of authority; lack of political voice; maintaining cultural identity; and gaining regular and affordable physical access to technology.

The Labor Market and Economic Exclusion

In a review of select census statistics, non-citizens experience daunting odds when it comes to achieving the same economic status of their native-born counterparts, defined as those born in the U.S. or abroad to American parents. Table 2 compares the socioeconomic status of native-born U.S. residents to non-citizens, the category that includes new immigrants without citizenship status.

A brief glance at Table 2 shows that like Native Americans, non-citizens residing in the U.S. face serious socioeconomic disadvantage. While it appears that non-citizens do not experience unemployment at a significantly higher rate than native-born U.S. residents, these figures cloak

differences in the quality of employment. Employment in and of itself does not guarantee a livable wage; the ability to generate a livable wage is often determined by the type of employment. Typically, managerial and professional positions command higher salaries than un- or low-skilled labor jobs or jobs in the service sector. Indeed, when reviewing the occupation group of employed workers, we find that non-citizens occupy about half of the managerial and professional and technical jobs that native-born residents hold. However, non-citizens command a disproportionately larger share of less-skilled service, labor, and farming jobs than native-born residents. Indeed, immigrants are “substantially over-represented among workers who are paid the least and are most in need of training to improve their skills and earnings” (Nightingale and Fix, 2004: 53).

Table 2. Select demographic statistics comparing non-citizens to native-born U.S. residents, March, 2002.

	Citizenship status ¹	
	Native-born citizens	Non-citizens
Unemployed (civilian labor force) ²	6.1%	7.9%
Occupation group of employed workers ²		
Managerial and professional	32.7%	18.0%
Technical, sales and admin. support	29.9%	17.5%
Service occupations	13.1%	23.8%
Operators, fabricators, laborers	11.9%	21.9%
Farming, forestry, fishing	2.0%	4.8%
Median household income ^{3, 4}	\$53,909	\$36,385
Percent of families below poverty level ⁴	8.3%	19.4%
Housing tenure: Owner occupied	78.6%	39.3%
Housing tenure: Renter occupied	20.1%	59.7%

¹Naturalized citizens have been excluded.

²Age 16 years and over.

³Households in which at least one member is related to the person who owns or rents the house.

⁴Based on income of previous year.

Source: U.S. Census Bureau

At Salishan, however, some evidence exists showing that lack of education is not always a problem, but lack of documentation can be.

We have issues related to [educational] degrees many of [site users have obtained] from their country of origin. For [one group], it's a problem because they had to leave all that paperwork behind. They have no documentation and yet they are very fluent in two or three different languages.

Not surprisingly, non-citizens—like Native American populations (refer to the footnotes in Table 1)—also have lower median household incomes and suffer greater poverty rates when compared

to the average for Native-born citizens. While about eight percent of native-born families live in poverty, more than twice that—19.4 percent—of non-citizen families do. Housing tenure is another area in which marked contrasts appear between the two groups. Non-citizens are three times more likely to live in rental units than native-born residents and are about half as likely to own their own home. These figures show that while some opportunity may exist for new immigrants in the U.S., those opportunities are not equivalent to those experienced by its native-born residents (where even more layers of disparity exist). As we know from the previous discussion, economic disadvantage means new immigrants also fall on the wrong side of the digital divide.

Distrust of Authority

Besides socioeconomic challenges facing newcomers to the U.S., other challenges interfere with their access to and use of technology. Refugees (involuntary immigrants) in particular often bring with them distrust of authority figures as a result of harrowing experiences in their country of origin.

Many of [the groups] do not trust anything that has to do with government.

[Some users...] have some barriers related to their traumatic experiences. They have flashbacks of all the things they went through like concentration camps.

Processing by U.S. Citizenship and Immigration Service authorities may exacerbate distrust of government. Although only one example, the story of a Cambodian-American featured in a 2003 article in *The New York Times Magazine* illustrates this point. In an unnamed, crime-ridden public housing authority (Salishan) in Tacoma, a teenage refugee who fled atrocities of the Vietnam war as a child committed a felony by firing shots at a mall in a skirmish with other teenagers. Nobody was physically harmed and after serving a year-long jail sentence, the refugee married, had children, got a job, and never had another brush with the law. At the urging of his wife—herself a refugee—he started the process of acquiring citizenship to get a passport to visit his homeland. That single act led to his arrest and permanent deportation after a law was enacted following 9/11 that called for the repatriation of Cambodian nationals who break the law in the U.S. (Sontag, 2003). Raised in the U.S. since kindergarten, the former refugee cannot return to his family in the U.S. since Congress expanded the grounds for deportation retroactive for crimes that were not deportable offenses when they were committed, and the administrative hard line means most cases are not subject to judicial review (Sontag, 2003). Given the climate of current immigration policies and the recent folding of the former Immigration and Naturalization Service (now called U.S. Citizenship and Immigration Services) into the Department of Homeland Security, stories such as these may breed further distrust of the U.S. government among refugees. Newcomers such as transnational migrants who are not refugees may also harbor distrust of government after experiencing the bureaucratic process of entering the country or gaining residency status.

Lack of Political Voice

New immigrants are subject to other forms of political exclusion, despite the promise of the Internet to create electronic democracy. “Transnational migration means that there are increasing numbers of people who are not citizens of the countries in which they reside; many of these people live in countries that exclude non-citizens from participation in local decision-making” (Staeheli et al., 2002:992). Such is the case in the U.S. where non-citizens cannot cast a vote in the presidential election and most state and local elections.

To what extent does technology and the Internet embrace immigrants as part of the voice of American politics? According to Staeheli et al. (2002), not much. In a study of Web sites focusing on immigrant political action, Staeheli et al. found that many Web sites were created not for immigrants but for American government agencies, service providers, policy makers, researchers, citizens, and business interests. Noteworthy content-related discoveries the research team found included the fact that 1) most of the immigrant-focused Web pages were sponsored by government agencies (given previously discussed distrust of government authority, do immigrants use the information on these Web sites?); 2) immigrant-related Web sites were published predominantly in English; and 3) most content was posted about immigrants—not by or for immigrants.

The potential of Internet access is its theoretical promise in offering greater opportunity for immigrants living in the U.S. to participate in the political system. In practice, however, the Internet does not offer new immigrants voice in their new home (Staeheli et al., 2002). While some Web sites exist to provide services and advocacy for low-income immigrants, they are directed at service providers rather than actual immigrants. Many immigrants therefore cannot use the Internet to access needed services. Instead, “for many immigrants, incorporation into a political community may take lower priority compared to the nitty-gritty reality of finding adequate employment, housing, education, and so forth” in the new host country (Staeheli et al., 2002:1009). These needs take precedence over the luxury of becoming involved in a political system that does not welcome their input.

Maintaining Cultural Identity

Staeheli et al. (2002) report that while access to political information does not translate into political participation, the Internet does enable some transnational migrants to maintain connections to their homelands, political or otherwise. These ties are important for maintaining a sense of cultural identity. For new immigrants at Salishan, the Internet offers such a connection.

One day, I had a man show up. He said, “I want to show you something. That’s my apartment back in Ukraine.” [..He] knew where to find a picture of his house on the Internet. [..]If you were suddenly put in a foreign country, you would want some connectivity to your old friends so that you wouldn’t feel so totally cast off and [...] isolated. [The Internet] is a way of connecting to their former friends [and places].

Fisher et al. (2004) report from an exploratory qualitative study of immigrants using the Queens Borough Public Library in New York City that immigrants feel a need to maintain language and culture connections in order to cope with adjusting to American life. Part of this involves keeping in contact with family members in their native country. Having Internet access at public sites allows such contact to occur through Web-based e-mail correspondence. In addition, while recent foreign-born immigrants say they want to hone their English skills, they also want to have access to information in their native language (Lazarus and Mora, 2000) which is another way they can reconnect with their culture and homeland.

Lack of Physical Access

Immigrant families are susceptible to poverty at a higher rate than the native-born population. Nightingale and Fix show empirical evidence that low-wage, less skilled jobs are disproportionately filled by immigrants: “Although immigrants represent roughly 11 percent of the total U.S. population, they make up a [...] larger share of the low-wage labor market (20%)” (2004: 53). Immigrant families’ lower wages therefore constrain them in the resources they can purchase for their children (Hernandez, 2004), including technology resources. In the absence of Internet access at home, many low-income families—including immigrant families—turn to public sites for Internet access (Moore et al., 2002; Suman, 2004).

Public Access Sites

Public access sites play a key role in offering culturally appropriate computer training and support to immigrants. Community Technology Center (CTC) programming is often offered in multiple languages. CTCs also design content to help immigrants navigate government bureaus and agencies to get service referrals or assistance related to immigration issues (Gundrey, 2000). In unique instances, CTC programming centers on building relationships between immigrants. One CTC in New York serving immigrants from a variety of countries and backgrounds offers a free six-week class in computer and Internet skill-building. In return, the program requires participants to volunteer to help new students during the next six-week cycle. This reciprocal commitment builds on the skills participants learn and also establishes social ties between ethnic groups (see <http://www.fhch.org/ctc.HTM>). CTCs therefore serve a linking role for newcomer groups by connecting them to the language, cultural, social, and service resources to which they deserve access. However, funding for CTCs is threatened as the federal government rolls back its support for the program, which will eventually be phased out like funding for the Technology Opportunities Program.

Public Housing and Internet Access

New immigrant families are among the most disadvantaged of all in terms of physical access to technology. Temporary and/or public housing is often a primary source of shelter for brand new immigrant families. Public housing legislation was passed in 1937 to ensure that all had access to decent, safe, and affordable rental housing. Eligibility for public housing is limited to low-

income families and individuals. In the case of Salishan, this equates to new immigrant and refugee families. Beyond the fundamental housing mission, to what extent should government deliver technology to housing project residents? Is technology a housing “luxury”? According to the Tacoma Housing Authority (2004), technology provides “a comprehensive set of education and technology training opportunities to the residents of Salishan...leading to empowerment and self-sufficiency.” Technology in this regard is central to reaching a level of self-sufficiency that can help residents transition out of publicly funded housing units into unsubsidized housing. Community learning centers in public housing projects are therefore viewed as important tools in achieving the broad social goal of eradicating poverty.

The Salishan Learning Center is one such center that serves the residents of the Salishan Public Housing Development. In 2000, the U.S. Department of Housing and Urban Development granted \$35 million of housing revitalization funds under the HOPE VI program to replace aging public housing. Part of the plan involves the construction of a new public learning and technology center with access to the high-speed Internet. Tentative plans are also underway to wire each housing unit with a high-speed connection although it remains to be seen whether individual households will have access upon completion of the project.

While Salishan faces new opportunities with the HOPE VI funding it is receiving, it may be the exception. Public housing projects are notoriously difficult for providing high-speed Internet access mostly because they consist of old, decaying structures. This is particularly true for Salishan, which was built for military families and support personnel in 1942 when wartime restrictions dictated the installation of low-wattage wiring and substandard building materials (Wilma, 2003). Aged buildings were clearly not designed with Internet access in mind, and must be retrofitted to accommodate the infrastructure—not a feasible prospect given the construction and labor hurdles that have to be crossed to make it profitable for Internet providers. Low-income residents living in public housing projects typically cannot afford Internet access offered by the private sector. Yet without it, they are caught in a vicious cycle that excludes them from learning high-tech skills that are necessary to help them earn better wages that will lift them out of poverty.

For Salishan, Internet access might not have garnered a place in the plans without the current climate of public sector support for technology training and key presence of the WSU Cooperative Extension supported-Learning Center. The Learning Center, which opened in 1996, was originally established as a partnership between WSU, Tacoma Community College, Bates Technical College, Clover Park Technical College, the University of Washington, and the Tacoma Housing Authority. Upon reconstruction slated to start in 2005, WSU, TCC, and the Metropolitan Development Council will partner to provide computer, professional development, life skills, and degree classes as part of a comprehensive approach for creating enrichment, employment, and empowerment experiences for residents. The new Education and Technology Center at Salishan will serve this mission by providing “services with an emphasis on technology that promotes distance learning, self-paced education, and access to computers. Bridging the digital divide of low-income persons is a commitment of all partners” (Tacoma Housing Authority, 2004). Salishan has been fortunate; many public housing projects with low-income residents, some of whom may be new immigrants or refugees, will not have the luxury of HOPE VI funding, the strong on-site presence of a land-grant supported community learning center, and

the leadership with a strategic vision to fold technology into the lives of residents to make them self-sufficient. These pieces appear to be essential for the provision of technology services in the public housing market if the assets new immigrants and refugees have to offer are to be adequately appropriated.

CONCLUSIONS

For this project, we had the opportunity to talk with facilitators working in geographically remote tribal sites and an inner city site to compile lessons they have learned in their role serving disadvantaged or excluded populations. We coupled their insights with a growing body of literature that is giving increasing attention to the issue of what actually constitutes the so-called digital divide. If, indeed, the digital divide is strictly an issue of access to infrastructure, then the sites we visited should have been well on their way to joining the ranks of others who are using the Internet to improve their lives and overcome disadvantage, having had high-speed Internet access through the AISEP for almost two years. While some opportunities have appeared, there is still a long way to go—not due to lack of capability or interest on the part of the sites, but because of a variety of structural and organizational impediments.

Prior to any hard evidence that Native Americans were on the wrong side of the digital divide, the former congressional Office of Technology Assessment recognized Native Americans' growing use and interest in technology. In 1995, the same year the first NTIA report was released, the OTA produced a report titled *Telecommunications, Technology, and Native Americans: Opportunities and Challenges*. In the report, the OTA projected two scenarios for Native Americans and technology by the year 2000: an “optimistic scenario” and a “pessimistic scenario.” The optimistic scenario envisioned technology would be used to overcome geographic isolation of Native American communities. In this scenario, telemedicine would help prevent diseases, not just treat them. Distance education would provide high-quality work opportunities otherwise absent in geographically remote places. Connectivity would offer access to markets and become a stimulus for local entrepreneurship. Technology would enhance and promote indigenous culture, enriching global understanding of native peoples. Democracy would be strengthened when telecommunications technology created opportunities for more local and regional participation in government.

The pessimistic scenario predicted technology would be ineffective in alleviating high unemployment rates among Native Americans or addressing a wide array of social and health ills. In this scenario, Native American homes would continue to experience telecommunications infrastructure deficiencies, far below national averages. Further, the year 2000 would reveal that “the vast majority of tribes, reservations, villages, and island communities [would] still [...] not have a telecommunication strategy...” (OTA, 1995:6). Moreover, the Federal Communication Commission (FCC) would lack a comprehensive Native American telecommunications policy nor would it incorporate rights of Indian sovereignty into its telecommunications policy framework. The grim picture would show that by the year 2000, many rural, remote, Native areas would be bypassed by the telecommunications revolution. “Without meaningful and extensive Native American involvement, telecommunications further ends up undermining

Native culture and values and disenfranchising, rather than empowering, Native Americans.” (OTA, 1995:6)

Our conversations with facilitators involved with the AISEP show that the reality in 2005 for the tribal sites we visited shows elements of both scenarios. However, results are more pessimistic than optimistic. For instance, distance education opportunities are increasing at the sites, but have so far failed to create high-quality jobs and business opportunities for all but a few individuals. High poverty and unemployment rates persist and exceed national and state averages. Connectivity can offer access to markets but in its current form, has not served as a powerful stimulus for local entrepreneurship. We heard of no users at the tribal sites we visited who had used new knowledge of access to technology to start their own business.

Technology can enhance and promote indigenous culture to enrich global understanding, but only with appropriate controls such as protection of intellectual property rights. And while the FCC has instituted the Indian Telecommunication Initiatives Program, it is far from comprehensive. Its mixture of programs focuses on improving physical access to telecommunications through infrastructure deployment and programs that provide federal discounts on telecommunications access. While these are critical first steps, they are only first steps. Regarding the pessimistic prediction that the FCC would not incorporate rights of Indian sovereignty into its policy frameworks by the year 2000, indeed, Indian tribes must comply with state and federal regulations when considering deployment of telecommunications on Indian lands (FCC, no date), underscoring the limitations of the FCC’s attempt to recognize sovereignty through its Statement of Policy on Establishing a Government-to-Government Relationship with Indian Tribes (2000).

Challenges Facing Tribal Sites

Part of the reason tribal locations with high-speed Internet access are having difficulty making effective use of technology to reduce poverty and empower Indian peoples can be attributed to the following:

Political Capital Challenges

- Federal overemphasis on infrastructure deployment and technology hardware to bridge the digital divide;
- Lack of federal investments in community-empowering knowledge and human resources for technology use at public access sites;
- Lack of county, state, and federal sociopolitical recognition and attention;
- Lack of state interest to invest in telecommunications infrastructure in Indian country;
- Misalignment of current government structures created during the Indian Reorganization Act with traditional forms of tribal government, creating political roadblocks like political terms that provide too narrow of a time frame to accomplish long-lasting technology benefits;
- Political contention over what is culturally appropriate content to post online;

Social Capital Challenges

- Lack of trust between mainstream and tribal organizations and individuals;
- Lack of relationships between mainstream and tribal organizations and individuals

Human Capital Challenges

- Lack of self esteem among tribal technology users;
- Intimidation of technology among unfamiliar users;
- Filters on BIA-administered Internet limiting access to information;
- Lack of qualified technical support personnel;
- Lack of visionary personnel who can connect technology tools with programs to achieve broad social outcomes;
- Turnover among community technology partners including tribal government and Cooperative Extension;
- Short-sighted mainstream government welfare program requirements that take an unsustainable approach to creating self-sufficient individuals and communities;
- Time constraints at public access sites, thereby limiting users to consumptive rather than productive technology behaviors;

Cultural Capital Challenges

- Lack of cross-cultural trust due to past mainstream government/tribal relationships;
- Lack of culturally appropriate online content;
- Lack of culturally appropriate learning opportunities like a virtual tribal college;
- Political concern about using technology to offer public access to tribal cultural resources such as art, language, sacred sites, or traditional rituals and customs;
- Doubts about the need for or relevance of technology to Indian people;

Built/Financial Capital Challenges

- Pervasive socioeconomic disadvantage and all that it entails including lack of seed capital and resources;
- Federal mismanagement of Indian monetary and resources
- BIA Internet security risk;
- Lack of private sector financial interest to invest in telecommunications infrastructure in Indian country;
- Lack of funding to employ technical support personnel;
- Lack of funding to employ visionary personnel to connect technology use with broad social outcomes;
- Exclusion of tribal education centers from access to technology education and other educational pricing discounts; and

Environmental Capital Challenges

- The inadequacy of technology to help tribal members connect with the land by practicing culture in a multi-sensory way such as harvesting and preparing wild foods.

Challenges Facing New Immigrant-Serving Sites

The new immigrant-serving site we visited also faces unique challenges in making successful use of technology to improve the lives of public housing residents. They include:

Political Capital Challenges

- Federal overemphasis on infrastructure deployment and technology hardware to bridge the digital divide;
- Failure of federal housing policy to regard Internet access as a basic need in subsidized housing;
- Lack of federal investments in community-empowering knowledge and human resources for technology use at public access sites;
- Institutionalized exclusion from participating in political decision-making (voting, for example);

Social Capital Challenges

- Distrust of authority;
- Lack of trust among members of different nationalities and ethnic backgrounds;
- Lack of a committed network of partnering service providers to champion access for new immigrants to computer, professional development, life skills, and formal educational opportunities;

Human Capital Challenges

- Limited access to quality employment opportunities;
- Burgeoning priority of finding adequate employment, housing, health care, and education;
- Inability to access basic services;
- Lack of assistance to help new immigrants use technology as a means for enrichment, quality employment, and empowerment;

Cultural Capital Challenges

- Lack of online multicultural content;
- Lack of Web-based content that serves the needs of new immigrants;
- Lack of on-line multilingual content;

Built/Financial Capital Challenges

- Lack of private sector financial interest to invest in telecommunications infrastructure;
- Short residential tenure in one location and therefore limited physical access to the Internet;
- High likelihood of new immigrants to reside in rental units and/or substandard housing without physical access to the Internet; and
- Pervasive socioeconomic disadvantage including lack of familiarity with American economic system and ability to afford basic needs.

Social, Human, and Cultural Capital Technology Benefits

Despite a list of formidable challenges, all sites acknowledged positive impacts of the connectivity and are managing to make some effective use of technology to build social, human, and cultural capital. With the help of technology, these sites are:

Social Capital Benefits

- Building new or improved cross-cultural, institutional partnerships with Cooperative Extension, 1862 land grant departments, community colleges, and public service agencies;
- Providing a safe place for youth to make use of creative and self-directed learning opportunities;
- Providing an environment in which users can learn together with their peers;
- Connect youth and elders around cultural activities;
- Expanding and diversifying relationships between tribes and mainstream institutions to extend beyond the cultural arena—tribes have assets that are more than cultural;
- Partnering with community colleges and 1862 land grant institutions which provide those colleges and universities access to students;
- Helping users stay in touch with family and friends across the world;

Human Capital Benefits

- Building pride in the uniqueness of local cultural assets;
- Offering recreational computer use to overcome the intimidation factor by developing familiarity with technology, which often leads to educational use;
- Increasing community awareness and use of co-located services;
- Providing greater community technology access through multiple access points;
- Developing degree programs that benefit the public;
- Offering place-bound learners educational opportunities;
- Offering users access to social and psychological resources to overcome fear and intimidation of technology;
- Allowing users to ease into formal education through community college participation;
- Offering a forum for excluded groups to become producers and keepers of their own history and present using accessible forms of media; and

Cultural Capital Benefits

- Building cross-cultural trust and relationships;
- Accessing cultural content and assets of excluded populations;
- Providing access to cultural assets and knowledge of users;
- Offering place-bound learners continued access to cultural values in their communities;
- Using technology for cultural preservation including language revitalization, demonstrations, recording oral history, and archiving tribal resources;
- Helping new immigrants maintain cultural and language connections to their homeland.

Note that few—if any benefits—fell within the categories of political, environmental, or built/financial capital benefits.

Recommendations for Using Technology for Empowerment

The next step is to translate technology access and use into improved socioeconomic status of excluded populations—in other words, making effective use of technology to reduce poverty and empower disadvantaged people. The following is a compilation of recommendations articulated both explicitly and implicitly by those in the trenches—people who are facilitating the use of technology at disadvantaged sites:

Political Capital

- Ensure continuity of support for technology programs from political leaders;
- Increase community and political support for technology by helping others understand how technology can be used to improve lives. If a community is not supportive of a high-speed connection, then it will be difficult to muster political resources to support it in the future;
- Reform government welfare-to-work programs to take a long-term approach to the lifelong learning needs of non-traditional learners in contrast to pursuing short-term, unsustainable strategies that strive simply to reduce the number of people on public assistance;
- Champion for federal financial support of programming and human resources at public access sites;

Social Capital

- Make use of existing community level bridging social capital by encouraging service providers to develop partnerships with institutions already trusted in the community;
- Pursue mutually beneficial relationships based upon shared goals rather than available technology “gifts”;
- Develop trust with partners by being completely transparent when developing and engaging in partnerships;
- Bridge relationships among different demographic groups by using technology to bring them together to work toward mutually shared goals;
- Provide an atmosphere conducive to cooperation to encourage peers to take distance education courses together to provide a strong support system for each other;

Human Capital

- Engage and invest in personnel who respect and work well with people of different backgrounds;
- Employ staff and facilitators at public access sites who can help users make meaningful use of technology for self and community benefit;
- Retain facilitators who are sensitive to the role played by culture at multi-ethnic serving public access sites and who also recognize and understand the role of technology in achieving a community vision of reducing poverty;
- Employ technical expertise to maintain trouble-free technology systems;
- Minimize turnover among critical community technology partners;
- Consider and provide for the life needs of excluded users in conjunction with providing access to distance educational opportunities;

- Encourage recreational computer use among disadvantaged users. Facilitators reported this was often a solution to overcoming intimidation with technology by developing familiarity, thereby leading to subsequent educational use of technology;
- Engage in technology activities that improve the confidence level and self esteem of users;
- Ask and expect technology users to share appropriate knowledge resources with the community and partnering institutions;
- Avoid getting swept up in the “buzz” of technology unless it can provide the community with clear benefits. Technology must be able to perform in ways that are beneficial to the community;

Cultural Capital

- Address the pivotal role culture plays in the learning process;
- Create culturally appropriate on-line content;
- Develop culturally appropriate on-line degree programs;
- Address and resolve issues in the community about what is appropriate cultural content to post online;
- Use technology for cultural preservation efforts;

Financial/Built Capital

- Locate funding to support staffing and facilitation needs;
- Demand educational pricing discounts for disadvantaged users as they use technology to pursue distance education opportunities;
- Make an inventory of existing community resources to support technology use;
- Enable users to access the Internet at home; and

Environmental Capital

- Find ways technology can be used to protect the environment; and
- Use technology to strengthen human ties to the land.

IMPLICATIONS

If we reduce the issue of the digital divide to one that can be bridged simply by laying cable to chronically excluded areas, we are ignoring the larger political, social, and cultural arrangements in which technology use is imbedded. Successful use of technology depends on having access to technical resources and appropriate program knowledge (human capital), family and community cultural values (cultural capital), strong and functional social networks (social capital), and consistent political support (political capital).

The Morino Institute (2001) recommends that when funding technology initiatives, only one-third of funding should be committed to technology equipment, whereas the remaining two-thirds should be dedicated to staff education and program development. Given evidence we found that the delivery of technology systems occurs within very specific social systems, we agree that other investments are absolutely critical.

“...The measure of our nation’s progress in narrowing its fundamental disparities will have little to do with how many computers and Internet connections we install. It will have everything to do with how well we can enable those who are less fortunate to elevate their own lives and the lives of their children.” (Morino Institute, 2001:6)

Resources therefore should be expended on helping fortify the social systems that make technology relevant and useful to the lives of users. Unfortunately, federal technology initiatives that do this—such as the TOP and CTC program—are on the congressional chopping block. If the goal of federal technology initiatives has been to develop a stronger telecommunications infrastructure network, then perhaps cutting funding for those programs is justified. But if the goal was to increase the participation of excluded people in American society and provide them with equal opportunity, federal technology initiatives have failed excluded people.

We hope others will take on the growing hue and cry to learn more about what inheres in the nature of sociopolitical arrangements that limit effective use of technology use in disadvantaged communities. To overcome the challenges and increase the assets of disadvantaged populations, funders, researchers, practitioners, and policy makers will have to come together with them to listen to their concerns and then orchestrate efforts to act upon them. Perhaps then, there will be progress.

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