

Taking Ownership: Strengthening Indigenous Cultures and Languages Through the Use of ICTs

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Indigenous peoples make up 5% of the world's population, occupy over 20% of the earth's landmass, and pursue self-determination and sovereignty in all 73 countries in which they dwell.³

Technology is a tool, not just a reward, for growth and development.⁴

When ICTs are introduced in an indigenous population, they bring along with them mass media, popular culture, and global languages such as English, which causes inevitable clashes with local traditions and erodes stability. Paradoxically, these technologies also provide the same populations with new tools that can be used to preserve, promote, and strengthen their language and culture.

Well-designed interventions are helping pro-indigenous organizations to take ownership of these powerful technologies and use them creatively. Since the late 1960s, indigenous education and language and culture revitalization have been gaining momentum.⁵ Important agreements are now in place that many local groups and international development activities are using to turn these ideals into reality. Current development practices center on building human capacity and giving the beneficiaries the tools they need to improve their lives. To this end, providing these groups and their target populations access to ICTs is a first step. Access does not guarantee empowerment, however; there must be an intentional process of adoption and adaptation.

Potential benefits are easy to imagine, as are challenges and risks. A number of successful endeavors hint at the possibilities: web pages laden with cultural information, chat rooms in indigenous languages, multimedia CD-ROMs for learning indigenous languages, and e-businesses that preserve traditional crafts while strengthening local economies. Yet, for the poor, rural, and illiterate who remain unable to cross the digital divide, these technologies are yet another means to marginalize indigenous groups that have suffered disproportionately for centuries. Once connected, cyber porn and online gambling are just two of the negative temptations awaiting indigenous groups.⁶ Perhaps the biggest concern is that once a local user has access to the modern world of international sports, music, news, culture, and shopping, his or her own village, language, and traditions may lose their importance. They may even be seen as a barrier to participating in the global village.

This paper discusses this theme on local and global levels as well as from technological, educational, cultural, and developmental viewpoints. It provides background information on ICTs, globalization, and indigenous populations. It also discusses the types of interventions that have been and can be designed in this realm, so that new activities can build on the work of early adopters, including Native Americans. The undeniable risks of marginalization, inappropriate use, and sustainability are also discussed, but evidence is presented that these risks can be minimized. The underlying theme is always that it is preferable to take a pro-active and culturally sensitive approach to technology introduction. In the end, it is up to local indigenous groups to take ownership of the technologies and use them to make their languages and cultures flourish in cyberspace.

* The author wishes to thank Mary Fontaine for her guidance and support in writing this paper.

³ McIntosh, 2002.

⁴ United Nations Development Programme, 2001, p. 2.

⁵ Hernandez and Thornton, 1998, p. 23.

⁶ Odasz, 2000.

ICTs Meet Indigenous Cultures

Globalization and ICTs touch the lives of all people. Many concerns have been raised about negative consequences of ICTs in indigenous communities. However, harmonious integration of ICTs into indigenous communities has been achieved and is a noble goal.

Globalization's Effects on Indigenous Languages and Cultures

Instead of widening our choices, globalization seem to be forcing us all into the same shallow cosmetic culture giving us all the same appetites but leaving us more unequal than ever before in our ability to satisfy them... We have to manage the process of global integration in such a way that everyone can benefit and no one gets crushed...⁷

Social observers generally agree that what is significant about today's world is not so much the changes we are experiencing, but rather the pace of change. Technological transformations and economic globalization are mutually reinforcing processes, and the new tools of ICT accelerate the process even more.⁸ This has had both positive and negative consequences for indigenous populations.

Native American observers recognize that "when the Spaniards brought the first iron knives and horses, life was improved for many tribes, and their cultures changed significantly." Now, they see the Internet as "an electronic wind of new possibilities for self-empowerment [that] has unexpectedly changed what Native Americans can do to support themselves and their tribes."⁹

Depending on availability, perceived benefit, and economic capacity, indigenous groups have taken advantage of the new products and technologies just as all people have throughout history. Sami reindeer herders in the Scandinavian Peninsula have readily embraced cell phones, along with other tools such as snowmobiles and all-terrain vehicles, to improve productivity in their work.¹⁰ Chain saws and pickups make logging a profitable operation. Packaged, imported foods supplement traditional foods with convenience and variety. Low-cost used clothing from developed countries is an attractive alternative to elaborate traditional dress for cash-strapped families. Improved roads, transportation networks, and communication systems foster increased migration for work and pleasure.

These actions are taken as a move toward something better, but the result is leaving behind much of what has preserved indigenous cultures for centuries. One observer of the Australian indigenous sums up the situation succinctly: "The young people only care about the outside now."¹¹ The most visible changes are those of replacing traditional clothing with Western dress and favoring international food over traditional fare. The most important change is that mass media culture is replacing traditional culture.

These effects are well documented, both in terms of origin and transmission medium of information. Nicolas Ostler points out, "Modern media have produced a strange phenomenon, giving children a source of knowledge about the world which is independent of the knowledge that comes from their elders in their own community. [Since] it conveys a sense of wealth that is not available in most places...it is not surprising that

⁷ United Nations Secretary General, Kofi Annan, quoted in Addo, 2001.

⁸ United Nations Development Programme, 2001, pp. 30—31.

⁹ Odasz, 2000, p. 3.

¹⁰ Forsgren.

¹¹ Wuagneux.

children are seduced by it.”¹² Not only do new sources lure youth away from traditional information sources, the way information is presented is also seductive, as Menou describes: “A visual tradition is replacing the oral or written ones in many cultures, or heavily supplementing them. And an entire generation, having been raised with television, videos and computer games, derives its information from still and moving images rather than the printed word.”¹³

Perhaps the most important barometer of cultural strength is the use of traditional language. Adults who have seen their lives limited by speaking only a tribal language often encourage their children to learn such dominant languages as Arabic, Bengali, English, French, Hindi, Malay, Mandarin, Portuguese, Russian, and Spanish. They know these languages will offer more economic opportunities for their children. Many parents, educators, and policy makers view development of multiple-language proficiency as desirable.¹⁴ Unfortunately, others put little emphasis on passing down traditional language. Still others have described bilingual education as a poor use of limited resources and as a means to continue to hold back the indigenous. Therefore, the move toward a handful of dominant languages poses a serious threat to many of the 6,000 estimated surviving languages.

ICTs in Indigenous Populations

Technology is neither positive nor negative, nor is it neutral. —Melvin Kranzberg.¹⁵

*Not all countries need to be on the cutting edge of global technological advance. But in the network age every country needs the capacity to understand and adapt global technologies for local needs... . In this environment the key to a country's success will be unleashing the creativity of its people.*¹⁶

As we begin to understand the interconnected nature of our planet and all of its inhabitants, it is clear that no one should be excluded from the nascent Information Age and the potential it holds to solve collaboratively the many environmental and social problems we face. Some indigenous groups feel that ICTs are not a priority, such as the Indian participant in the 1997 Global Knowledge conference who asked, “Our village does not have running water. Why should we have running data?”¹⁷ Others have expressed concern that community telecenters would be used as a means to take information from the community.¹⁸ While these concerns are valid and must be addressed, many indigenous groups also sense that the ICT revolution holds something for them and are seeking inclusion. Whether an individual or community can move into the Information Age depends on policy, costs, and local empowerment.

At differing speeds, governments around the world are adopting policies that permit the private sector to expand communications networks and services. Privatization of telephone companies and free-market competition have spurred tremendous investment in infrastructure and a rapid increase in coverage. It is undeniable that privatization has many negative consequences, because deals made often favor the interests of private companies over the interests of the population. However, Chile and Sri Lanka have provided positive models.¹⁹ Further, while monopolies continue to prevail in a high percentage of countries for traditional

¹² Ostler, 1999.

¹³ Addo, 2001.

¹⁴ Tucker, 1999.

¹⁵ Weinstein, 1997, p. 190.

¹⁶ United Nations Development Programme, 2001, p. 5.

¹⁷ Cisler, 1998.

¹⁸ Rodriguez Sotres, 2001.

¹⁹ United Nations Development Programme, 2001, p. 5.

services such as telephony, the newer services such as Internet and digital cellular are dominated by competitive arrangements.²⁰

Infrastructure problems are also being solved by the private sector and public interests. New wireless technologies are lowering costs and reducing geographic barriers to connectivity. Large initiatives such as Africa One are helping to create a backbone that will be able to handle increased network traffic.

Policy reforms, privatization, and infrastructure all help to make ICTs universally available; however, equipment costs and recurring costs such as telephone charges are potential barriers to universal access. Exponential growth in computing power and a logarithmic drop in cost continues to be the norm in computer-related industries. “Moore’s law predicts the doubling of computing power every 18–24 months due to the rapid evolution of microprocessor technology. Gilder’s law predicts the doubling of communications power every six months—a bandwidth explosion—due to advances in fibre-optic network technologies.”²¹ Meanwhile, “the cost of one megabit of storage fell from \$5,257 in 1970 to \$0.17 in 1999”²² and continues to fall as new mediums such as re-recordable CD-ROMs become prevalent.

Meanwhile, “the Internet has grown exponentially, from 16 million users in 1995 to more than 400 million users in 2000—and to an expected 1 billion users in 2005... . In Latin America Internet use is growing by more than 30% a year—though that still means that only 12% of individuals will be connected by 2005. Broader expansion is limited by low household incomes.”²³ While costs are going down, they are still disproportionately high for third world populations. “Monthly Internet access charges amount to 1.2% of average monthly income for a typical U.S. user, compared with 278% in Nepal and 191% in Bangladesh.”²⁴ Although costs are high, alternative forms of information exchange are often more costly. For example, “E-mailing a 40-page document from Chile to Kenya costs less than 10 cents, faxing it about \$10, sending it by courier \$50.”²⁵

As individuals, organizations, and communities are able to cross the digital divide, they find themselves in a connected world in which the opportunities for global communication, accessing information, and publishing are nearly equal for all. The challenge to any development project involving ICTs is to help the beneficiaries move through four growth steps as defined by Odasz:²⁶

- Mastery of individual self-directed learning skills
- Mentoring and teaching others to develop their skills and confidence to become self-directed learners
- Citizenship, local and global: Taking action for what you believe in
- Learning-to-Earn for individual, familial, community, and cultural sustainability

Only an indigenous community that has reached step four of this process is truly empowered to apply ICTs in a beneficial way to its community.

Negative Consequences

*The weak must speak to the strong in the language of the strong... . The Darwinian way of the world bears some responsibility, globalization does the rest: movies, television, Reeboks, and the Internet.*²⁷

²⁰ Ibid., p. 82.

²¹ Ibid., p. 30.

²² Ibid., p. 2.

²³ Ibid., p. 35.

²⁴ Ibid., p. 80.

²⁵ Ibid., p. 30.

²⁶ Odasz, 2000, p. 13.

²⁷ Shorris, 2000, p. 38.

*Commitment to technology means acceptance of certain social structures and orientations, and implies the adoption of certain values of the technology as well as the values of its originating source.*²⁸

Well before the advent of the Internet, television and radio had already put an end to pristine indigenous cultures uncontaminated by Western culture. Reaching far beyond the limits of electric grids, battery-powered televisions and radios have long brought information, entertainment, and a new set of values to indigenous communities. To this end, “Technologies are no longer regarded as neutral instruments...because they shape the social choice mechanisms available to the communities that use them.”²⁹

Perhaps the most troubling issue affecting traditional societies integrating into the global village is the lowering of elders’ self-worth:

In most cases, indigenous communities facing development projects see a new information source as a combination of threat and salvation, but always as an authority—one that takes the place of a source of information within the community. The result is a corrosion of communal capacity. Internal information sources (often the elders) are considered less important; they lose value within the group, and the group loses value as a whole. When external information is considered “right,” community members think that they have been “wrong”; that those once thought of as wise are, in fact, ignorant. Respect breaks down, and community members stop seeing themselves as a problem-solving group. Cooperative, interdependent behaviors begin to disintegrate. Even more damaging, this new source of knowledge has no provision for exchange. Group members ask: “If I am now being told without being asked in return, where is my self-worth? What do I have to offer?”³⁰

A related concern is that, despite the democracy the Internet offers, the information flow continues to be predominately north-to-south.³¹ South-to-south flow, say among indigenous groups in neighboring countries, has not yet flourished, nor has south-to-north flow. This subrealization of indigenous groups’ full potential means that, although connected, they remain marginalized.

A Harmonious Integration

Imagination is more important than knowledge —Albert Einstein³²

It is indisputable that bringing ICTs to indigenous communities also brings risks and challenges. However, denial of their potential poses an even greater threat. “No traditional culture will be well-served by denying the reality of our fast changing world, or the value of more accessible knowledge and education.”³³ To get ahead in the modern world without losing their heritage, indigenous communities need to develop a biculturism that enables them to move between two cultures and to combine certain elements of each harmoniously. This goes beyond speaking Maya-K’iche’ and eating tortillas at home, but speaking Spanish and eating pizza with friends. In a digital world, it means Internet chats in indigenous languages, indigenous web pages, multimedia CD-ROMs for learning indigenous languages, and cultural information published by

²⁸ de Horowitz quoted in Addo, 2001.

²⁹ Hall quoted in Addo, 2001.

³⁰ Wuagneux, <insert date>.

³¹ Afele, 2002, p. 38.

³² Odasz, 2000, p. 5.

³³ Ibid., p. 82.

indigenous groups for a global audience. These are proven examples of how traditional knowledge and modern technology can be blended.

Student projects in many countries have shown the benefits of careful integration of technology and cultural content. The online environment lets students explore and invest in their cultural identity by discussing with students near and far and by publishing their own work. Students have come out of these projects with a stronger sense of belonging to their indigenous group and a deeper commitment to their language and culture. It is important to remember that, “Knowledge sharing does much more than pass on information; it adds to the self-esteem and self-worth of those sharing, and allows group members to see each other as capable.”³⁴

The following section discusses how these ideals can be put into practice. Easy access to an infinite amount of information offers new possibilities for peoples who have never had access to world-class libraries. Virtual communities of interest allow for collaborative linguistic and cultural research. Further, the Internet permits mutual support and knowledge sharing among indigenous groups around the globe, who face similar issues despite geographic differences. Multimedia learning is also discussed as an ideal medium for transmitting knowledge that traditionally has been passed down by oral tradition, song, and dance. The examples presented are simply meant to pique the reader’s imagination with what is possible.

Pro-Indigenous Technology Interventions

Let us put our heads together and see what life we will make for our children.
—Sitting Bull³⁵

Even the most developed countries are still experimenting with how best to take advantage of the new technologies that have become commonplace in the last two decades. Fortunately, many indigenous groups in developed countries were early adopters, such as the Oneida tribe in New York, which had a tribal web page before the White House had one.³⁶ These pioneers have generated significant experience, showing what is possible and how to go about technology projects.

Of course, conditions in developing countries are much different from those in the developed world. Yet, increasingly simpler and less expensive technologies and improved infrastructure mean that developing countries can also leapfrog over some of the challenges posed to early adopters.

Implementation risks are an ever-present concern. The most threatening, especially in technology projects, is sustainability. There must be a financial commitment and strategy to maintain and renew the equipment as well as a human commitment to retain knowledgeable people who can keep the equipment running. Further, the initiatives must be designed so that ICTs actually do strengthen the indigenous community rather than serving as a means of weakening them.

The following pages present 10 kinds of interventions. Details of specific technologies and target populations have been purposely limited to keep the focus on what one can do rather than what others have done.

National Policies and Access Initiatives

Before indigenous groups can take ownership of ICTs, they must cross the digital divide. Numerous projects worldwide have created clusters of telecenters that are serving as pilots to discover and demonstrate possible uses of ICTs. However, broad use and sustainable local ownership will not be possible until indigenous communities have affordable, easy, and reliable access to these technologies. All developing countries are

³⁴ Wuagneux, <insert date>.

³⁵ Odasz, 2000.

³⁶ Polly, 1998.

facing the acute challenge of how to make these technologies available to the poor and those in rural areas, indigenous or not. Efforts must be made simultaneously at the national policy level and the local level.

At the national level, the key issue is competitiveness and regulation of the telecom industry. It has been observed that,

In many countries, access to IT remains hampered by government control of the telecommunications sector. Many observers have noted that, to become full participants in the information age, such countries will have to reform their systems, ceding a greater role to a competitive private sector. Moving beyond pilot implementation of ICT projects toward a strong national system will require an enormous infusion of capital, the type of investment that has traditionally come from private corporations that operate within a stable regulatory environment.³⁷

However, privatization must be carefully controlled, and government regulation of the telecommunications industry must include mechanisms to reduce rather than widen the digital divide. Developing countries are especially susceptible to poor policies, inadequate regulation, and lack of transparency.³⁸ Free-market competition or government control can foster competitive pricing of services by establishing special pricing for schools.³⁹ Progressive telecom privatization deals should include explicit conditions that encourage investment in infrastructure in rural areas.

Innovative policies designed with the interests of indigenous populations in mind are necessary as well.

The World Development Report [1999], for example, suggests that governments should create policies that foster the acquisition and creation of knowledge by tapping global knowledge, creating local knowledge, defining, enforcing and rewarding intellectual property rights. Governments should also increase people's capabilities to absorb knowledge by decentralizing education, give more power to those with most information, focus public resources on those who need them most—the poor and girls—and encourage the use of new technologies to improve the quality of education and broaden access.⁴⁰

These activities will permit whole nations, rather than isolated groups, to participate in the Information Age.

While national policies are being reformed, local access initiatives can work at the grassroots level to connect target groups so they can reap the benefits of ICTs immediately. Development work must help indigenous groups to connect to technologies and take ownership of them.

Incredible advances in bandwidth and wireless connectivity indicate that geographic limits are becoming less of a barrier. Satellite-based Internet connections offer the same bandwidth and the same price whether they are located in an urban hub or in the most remote village. Inexpensive wireless units permit sharing of an Internet signal around a village. Costs continue to drop. Development projects must study the region to be connected carefully and choose the most practical connectivity options.

Since individual ownership of computers and Internet connections ranges from difficult to impossible for most third world indigenous groups, community access centers are the most common means to provide access to specific target populations. These centers work much like Internet cafes and can be used as an integral part of all the interventions discussed in this paper. They build on the successful model of community telephones, generally offering services such as the Internet, desktop publishing, photocopies,

³⁷ LearnLink, 2001a, p. 32.

³⁸ United Nations Development Programme, 2001, p. 4.

³⁹ Often referred to as "e-rates"

⁴⁰ Addo, 2001.

telephone, fax, research assistance, and courses. Successful centers feature “public access; an informal, welcoming environment; adequate security; friendly, knowledgeable staff, and/or volunteers; well-maintained, reliable computer equipment, peripherals and connectivity; a variety of training programs and services; and a business plan, including strategies for self-sustainability.”⁴¹

These centers currently provide access for many indigenous populations. Brazilian indigenous groups are among the beneficiaries of The Committee for Democracy in Information Technology, CDI, which had created 208 “information technology and citizenship schools”⁴² by 2001. Guatemalan Mayans benefit from centers being installed in bilingual teacher-training schools⁴³ and by centers created through chambers of commerce for local economic development.⁴⁴ The Songhai centers in Benin give access to local farmers and other community members.⁴⁵

These centers, by definition, are public places and serve all community members who have the capacity to pay. Development projects that wish to favor certain groups have used a number of strategies, including vouchers, promotional events, and culturally sensitive orientations, to introduce their target beneficiaries to all these centers offer.

Making access available to populations is not the end, but rather a means to help them take ownership of the technology. Programs and policies must “move beyond connectivity, to promote the social use and appropriation of the Internet, and to improve the conditions and enabling environments, while simultaneously minimizing risks and threats so that the Internet can effectively contribute to development... . It is far more advantageous to use ICTs as a means to enhance existing practices than to merely promote ICT use.”⁴⁶ For indigenous communities, this means that projects must be familiar with local culture and local organizations and work with them.

A World of Information

*Knowledge is like light. Weightless and intangible, it can easily travel the world, enlightening the lives of people everywhere. Yet billions of people still live in the darkness of poverty.*⁴⁷

As indigenous groups increase their level of interaction with dominant cultures and global society, their need for information grows as well. Mainstream media often provide inadequate coverage of subjects of interest to a certain community. Further, media such as newspaper and television may not reach distant populations and seldom are available in the local language. However, ICTs bring an endless supply of information to any community. Creative access and local dissemination of this information within a community will provide residents with timely, useful, and relevant information. This can include people directly accessing information from a community access center, the Internet combined with local radio to extend the former’s reach, and virtual education and training opportunities.

Information is power. This tenet has traditionally limited the power of geographically isolated and information-deprived indigenous groups. A crop buyer from a major city knows what fair prices are but will not be able to take advantage of a local farmer who has just checked selling prices on the Internet. Indigenous groups striving for inclusion in national politics must stay up-to-date on current affairs and monitor specific issues closely. The Internet permits them to do that. Information about agricultural

⁴¹ LearnLink, 2001a, p. 4.

⁴² United Nations Development Programme, p. 86-7

⁴³ Proyecto Enlace Quiché, 2002a.

⁴⁴ AGEXPRONT, n.d.

⁴⁵ Academy for Educational Development, n.d.

⁴⁶ Gómez and Martínez, 2001.

⁴⁷ World Bank Development Report quoted in Addo, 2001.

practices and new products is available as well. Opportunities for project funding, scholarships, and participation in events may reach indigenous communities too late to be taken advantage of, yet are instantly available on the Internet.

Clearly, we may be far from the day when the average indigenous farmer uses the Internet. However, many local information intermediaries, are using ICTs to obtain relevant information and transmit it locally. Telecenter staff of the InforCauca program in Colombia search for information on the Internet that is relevant to the interests of the indigenous population, including national events, women's issues, human rights, and reports from news agencies, non-governmental organizations (NGOs), and government agencies. This information is transported (in print form or on diskette) by bus two hours to the Nasa Radio station, where it is broadcast in the Nasa Yuwe language.⁴⁸

Another example is Kothmale Community Radio in Sri Lanka⁴⁹, which uses radio as a gateway to the Internet for its listeners in remote rural communities. Children or their teachers send requests for information about school topics for which no local resources exist; other listeners may also submit requests. The broadcasters search for the information on the Internet, download it and make it available by constructing a broadcast around the information, mailing it to the school or placing it in the radio station's open-access resource centre. The resource centre provides free Internet access and a library with computer databases, CD-ROMs, downloaded literature and print materials. This mediated access brings the Internet's resources to rural and underserved communities. And community rebroadcasting can relay the information in local languages, rather than English, the dominant language of the Internet.⁵⁰

These same technologies can bring opportunities for formal study and training to people who otherwise would be forced to travel hours to reach a university or other training center. Universities are still just beginning to decentralize and offer virtual courses and degrees. Connected communities will be able to take advantage of these opportunities as they become available. Meanwhile, institutions are having success with computer-mediated professional development. The time and expense involved in providing training for professionals in the field often limits the number of training sessions and other types of support provided to them. Online training in their communities eliminates travel costs and time.

Institutional Capacity Building

Sustainable development is best achieved by strengthening existing institutions. Introduction of ICTs can be a catalyst for organizational change as well as a cost-effective means to allow indigenous groups to work more efficiently and more effectively. However, "technology alone cannot achieve these desired outcomes... . To enable new electronic technologies to provide durable and fundamental benefit, they must be coupled with changes in values, attitudes, behaviors, skills, and knowledge, all of which comprises organizational culture."⁵¹

Three general strategies for using ICTs in institutional capacity building have been defined:

- Office computer networks to improve administrative efficiency, management capacity, internal communication, and professional development.
- Information management systems to enhance educational and outreach programs by obtaining, creating, repurposing, using, and distributing more and better development information with greater efficiency and at lower cost.

⁴⁸ Rodriguez Sotres, 2001, p. 11.

⁴⁹ See www.kothmale.net.

⁵⁰ United Nations Development Programme, 2001, p. 87.

⁵¹ LearnLink, 2001c, p. 6.

- Electronic networks and virtual communities to enhance organizational learning and advocacy, increase knowledge of national and global policy issues, create new communities, enable collaborative programs, gain access to critical resources, and improve professional development.⁵²

After initial installation and training, one of the immediate and most obvious gains is improved efficiency. Geographically isolated offices will be able to exchange information by email or telephone without the delay of mail services or travel expenses. As an example of tremendous potential savings, Canada is wiring its Northwest Territories in hope of improving services while reducing government travel costs, which were \$17 million during 1993–94.⁵³ Within local offices, access to and organization of information will also be improved.

Advocacy for change is a key part of the mission of many public institutions and NGOs serving indigenous populations. “A critical part of successful advocacy is communicating news and the institution’s perspective on important issues to as many people, especially primary clients and decision-makers, as possible. And successfully communicating news and perspectives demands that institutions create and distribute accurate and compelling messages quickly, in a variety of ways, and as cheaply as possible.”⁵⁴ Common examples of how this is being done are:

- E-mail alerts for fast communication
- Electronic newsletters lower production and distribution costs
- Announcements on distribution lists to inform a larger community
- Organization web site
- Electronic conferences

Panama’s Kuna Nation one of many groups benefiting from the Internet. Since getting connected, its members have “become strong international advocates of environmental issues. Some of their members have been able to establish strong collaborative relationships with environmental organizations. Environmentalists have invited their leaders to serve as consultants for international agencies, to develop plans that defend the environment, and to work for human rights for indigenous peoples.”⁵⁵

Just as important as getting information out about issues of concern is the ability to bring in important information in a timely manner. Indigenous journalists in the Northwest Territories have observed that the Internet “equalizes governments and the people they govern. Suddenly, we have far more power to access, communicate, and distribute information among ourselves than we had before. It corrects the traditional power imbalance between governments and those they govern.”⁵⁶

It should be remembered that “concepts about information...are deeply imbedded in culture, and are extremely difficult to change.”⁵⁷ These concepts include how people perceive, get, value, share, and use information. “To reap the benefits from investments in improving [information management] systems, project planners and institutional leaders must assess and understand the cultural and perceptual underpinnings of local information management systems.”⁵⁸

Virtual Communities

⁵²Ibid., p. 5.

⁵³ Zellen, 1998.

⁵⁴ LearnLink, 2001c, p. 24.

⁵⁵ Delgado-P, 1998.

⁵⁶ Zellen, 1998.

⁵⁷ LearnLink, 2001c, p. 19.

⁵⁸ Ibid.

We must unite all the indigenous peoples struggles <this doesn't make sense grammatically>regardless of where we live... . Our main goal should be to maintain a constant flow of information among indigenous peoples—not doing so represents a threat for us.⁵⁹

Due to their geographic isolation and the discrimination they face, many indigenous people may feel their plight is unique. However, indigenous groups and their supporters who actively participate in forums such as the Development Gateway⁶⁰ or Cultural Survival⁶¹ know that the challenges their communities face are similar to those being faced by indigenous populations around the globe. Connectivity allowed Brazilian scientists to co-write articles with scientists from 114 countries from 1995 to 1997.⁶² As indigenous Brazilians gain this same level of connectivity, they will be able to work together as well to solve environmental, social, and political problems of common concern.

The previous section discussed using ICTs for to exchange information at the organizational level. However, many issues facing indigenous groups are more personal. The world is changing rapidly, forcing many indigenous groups to struggle with their identity. Initial experiences are showing that virtual communities are well suited to helping indigenous communities express themselves and strengthen their identity. It has been pointed out that virtual communities are compatible with tribal units and identity, that they are parallel in both size and nature. Like tribes, they maintain group identities and resist assimilation. Further, “because the Internet can support an admixture of audio, video, and text, transcending the print medium, it is ideally suited to the oral story-telling traditions of the Aboriginal community.”⁶³

Many of the first Native Americans to gain access to Internet used it “to raise questions concerning their personal and collective identities and to share their histories. Before the Internet, these histories were only accessible through restricted classified systems at university or public libraries. In other words, the information came home and in exchange, people started to share their own oral histories regarding their indigenous experiences.”⁶⁴

In addition to strengthening identity, virtual communities can be used to revitalize indigenous languages. The most established example is the Leokī (Powerful Voice) Bulletin Board System: “All menus, dialogs, alerts, and all other items viewed by the user are now in Hawaiian... . All communication is in Hawaiian; English is forbidden except for private e-mail sent to or from Leokī via the Internet by non-Hawaiian speakers.”⁶⁵

Language Revitalization

The following has been excerpted from Ostler, 1999:

Many linguists predict that at least half of the world's 6,000 or so languages will be dead or dying by the year 2050. Languages are becoming extinct at twice the rate of endangered mammals and four times the rate of endangered birds. If this trend continues, the world of the future could be dominated by a dozen or fewer languages... . The definition of a healthy language is one that acquires new speakers. No matter how many adults use the language, if it isn't passed to the next generation, its fate is already sealed. Although a language may continue to exist for a long time as a second or ceremonial language, it is moribund as soon as children stop learning it. For example, out of 20 native Alaskan languages, only two are still being learned by children... . Linguists scramble to document as many dying languages

⁵⁹ Ibe Wilson, n.d.

⁶⁰ See www.developmentgateway.org/indigenous.

⁶¹ See www.culturalsurvival.org.

⁶² United Nations Development Programme, 2001, pp. 4—5.

⁶³ James Hrynyshyn <spelling OK?>cited in Zellen, 1998.

⁶⁴ Delgado-P, 1998.

⁶⁵ Donaghy, 1998.

as possible, ... Inevitably, some languages will disappear before they can be written down. And once an unwritten language is gone, it's gone for good...

Replacing a minor language with a more widespread one may even seem like a good thing, allowing people to communicate with each other more easily. But language diversity is as important in its way as biological diversity. Andrew Woodfield is quoted as writing "We have inductive evidence based on past studies of well-known languages that there will be riches, even though we do not know what they will be. It seems paradoxical but it's true. By allowing languages to die out, the human race is destroying things it doesn't understand." Nicolas Ostler of the Foundation for Endangered Languages reminds that "the success of humanity in colonizing the planet has been due to our ability to develop cultures suited for survival in a variety of environments. When language transmission itself breaks down, there is always a large loss of inherited knowledge."

The deck is stacked heavily against the world's minority languages, but the case isn't hopeless. We've seen that, with effort, endangered plants and animals can be brought back from the edge of extinction. Languages, too, can be turned around. The United Nations has declared language maintenance a human right, and UNESCO is compiling a "Red Book" of endangered languages. Hinton is cited as saying "We should remember, ... that most people in the world are bilingual or multilingual. Speaking one language all the time is not the norm."

We face two alternative scenarios for the future. In one, the world becomes increasingly homogenized as minority cultures and their languages are swept away in the oncoming tide of standardization. The accumulated knowledge of millennia disappears, leaving the world a poorer place. In the other scenario, minorities keep their cultural integrity, and minor languages continue to exist alongside larger ones. Which scenario comes to pass depends to a large extent on our actions now.

* * * * *

Of all the arts and sciences made by man, none equals a language, for only a language in its living entirety can describe a unique and irreplaceable world.⁶⁶

Language revitalization efforts must fight homogenization at the political level, in education, and by producing resource materials. In the previous discussion of institution building and creation of virtual communities, we saw how ICTs can help indigenous communities and their supporters in political advocacy and related actions. The following section is dedicated to bilingual education. It is worthwhile to understand the potential uses of these new technologies in support of linguistic efforts to standardize languages, the creation of more resources in indigenous languages, and the computer-based systems that help language learning.

In contrast to dominant languages with long written traditions, most indigenous languages either lost their written systems during colonization or never had one. The current struggle involves standardizing a written system, and the challenges are linguistic, political, and cultural. In the linguistic aspect, online resources about a particular language are cost efficient, flexible, easy to maintain, and widely available. They provide an ideal medium for collaborative projects among native speakers and foreign linguists.

Perhaps the most interesting linguistic database is the "Internet Living Swahili Dictionary." While Swahili has nearly 50 million speakers, they are spread out over many countries. This web page provides instant translation of 56,000 words and a discussion forum to add new translations.⁶⁷ Without Internet-based collaboration, the Swahili community probably would not be able to develop, much less maintain, an up-to-

⁶⁶ Shorris, 2000, p. 43.

⁶⁷ Kamusi Project, n.d.

date dictionary. This model of worldwide collaboration and instant dissemination of new contributions can serve other linguistic groups as well.

A smaller, tighter community is served by the Kualono web page,⁶⁸ which includes both a searchable bilingual dictionary of new vocabulary and a database containing detailed listings and ordering information for Hawaiian language curriculum and books.

Ambitious researchers are creating tools that are even more sophisticated. Carnegie Mellon University's Avenue Project is developing machine translation software to permit automatic translation from Mapudungún⁶⁹ to Spanish and vice versa. The translation engines are being developed in such a way as to facilitate development of engines for other indigenous languages by local speakers with minimal help from linguists or computer scientists.⁷⁰

While linguists work to develop and disseminate dictionaries and other resources, a vicious circle exists that limits production of materials in indigenous languages. In nearly all indigenous languages, few written materials exist, few people are able to read those that are in print, so even fewer are compelled to write in them. Desktop publishing technology is ideal for helping to break out of this cycle since production is local, costs are low, and the chance to publish is available to anyone with access to a computer. It allows community groups to publish newsletters, magazines and literary journals. Individuals with knowledge of a particular subject such as herbal medicine are empowered to document and disseminate their knowledge themselves in their own indigenous language. Educators can create their own instructional materials.

The value of writing and publishing in education cannot be overstated. The Language Proficiency Method, currently used in the instruction of Hupa and other Native American languages, is "based upon the belief that writing is useful within a program of language instruction. Writing offers a sequence for presenting new language material, moving from easier to harder forms, and can also be the basis for communication."⁷¹ A recent example of indigenous language desktop publishing is the Mayan oral tradition series of preschool stories, *The Blossoming of our Grandparents' Words*. The students and teachers involved in creating these books collected oral tradition and then recreated it as preschool stories. They found the task of writing literature in their native language a challenging, but rewarding experience.⁷² The specific example of educators creating their own instructional material is discussed in more detail later.

While writing on a computer can be done with any word processing program and a custom-designed font, other software is being custom designed for computer-assisted language learning. As computers become more available in indigenous communities and multimedia software creation becomes easier, sophisticated learning systems will be an increasingly viable component of language study programs. Some existing systems cater to new learners of, for example, Cree⁷³ or Hawaiian⁷⁴ by emphasizing a basic vocabulary. A preliminary system designed for Maya-K'iche' and Maya-Ixil is tailored to the needs of native speakers of these languages who are learning their written form. Rather than vocabulary building, the emphasis is on auditory discrimination and distinguishing minimum pairs.⁷⁵

Dedicated members of the community, who face an uphill battle, must do the work of revitalizing an indigenous language. Yet, with the increasing power of ICTs, even the smallest linguistic groups can create resource materials and literature.

⁶⁸ See www.olelo.hawaii.edu.

⁶⁹ Indigenous language spoken in Chile.

⁷⁰ Avenue Project, n.d.

⁷¹ Bennett et al., 1999.

⁷² Instituto Privado Mixto Joyabaj, 2002, p. 6.

⁷³ OBI Systems, Inc., n.d.

⁷⁴ Aha Punana Leo, n.d.

⁷⁵ Proyecto "Enlace Quiché," 2002a.

Bilingual Indigenous Education

We want [our children] to become intelligent but not to lose the knowledge and customs of our ancestors, our way of thinking, our way of talking... They must learn the way of life of the mestizos and that of their own people as well.

—Tzotzil mother in Chiapas, Mexico⁷⁶

Bilingual education is an important expression of indigenous rights and identity. Despite on-going debates by individual families and national movements, bilingual education has been gaining ground worldwide in recent decades. Many programs are still limited to a transition-assimilation model for the early school years that uses the indigenous language as a bridge to the dominant language that will be used for the rest of the child's education. However, if education in indigenous language only goes through fourth grade, then the culture will also be reduced to the level of children.⁷⁷ To this end, there is a move toward maintenance models, which enable children to receive a complete education in both languages and both cultures. This section mentions some necessary elements of a successful bilingual program and explores how ICTs can become an integral part of a bilingual education program.

Modern bilingual education programs provide much more than an education in two languages. They are based on models that permit self-determination, development, and fostering of indigenous cultures and ideals.⁷⁸ It is also recognized that being well educated in the modern world is often synonymous with being well disciplined. Holistic indigenous education, on the other hand, values the “organic, subconscious, subjective, intuitive, artistic, mythological, and spiritual dimensions of our lives.”⁷⁹ Successful teachers in these programs are “well trained, have cultural competence and subject-matter knowledge, and continually upgrade their training.”⁸⁰

Introduction of technology has proven to be a catalyst for moving from teacher-centered learning models to constructive models that are much more compatible with the holistic vision of indigenous education. To be successful, the focus must be on technology as a tool to be used in meeting a larger goal. Whatever skills are learned, such as how to digitize photos, are only a means to attaining the learning goal (making a web page about local traditions.)

This vision of “Teaching with computers, not about computers”⁸¹ has been represented graphically by a project in Guatemala that is using technology to train pre-service Mayan bilingual teachers. The diagram below illustrates that the technology is simply the shell surrounding the center. It is the most visible part, but it serves as the entry point to reach the central goal of the participating schools: development of the whole person by learning to be and learning to make.⁸²

⁷⁶ Freedson González, 1998, p. 41.

⁷⁷ Shorris, 2000, p. 40.

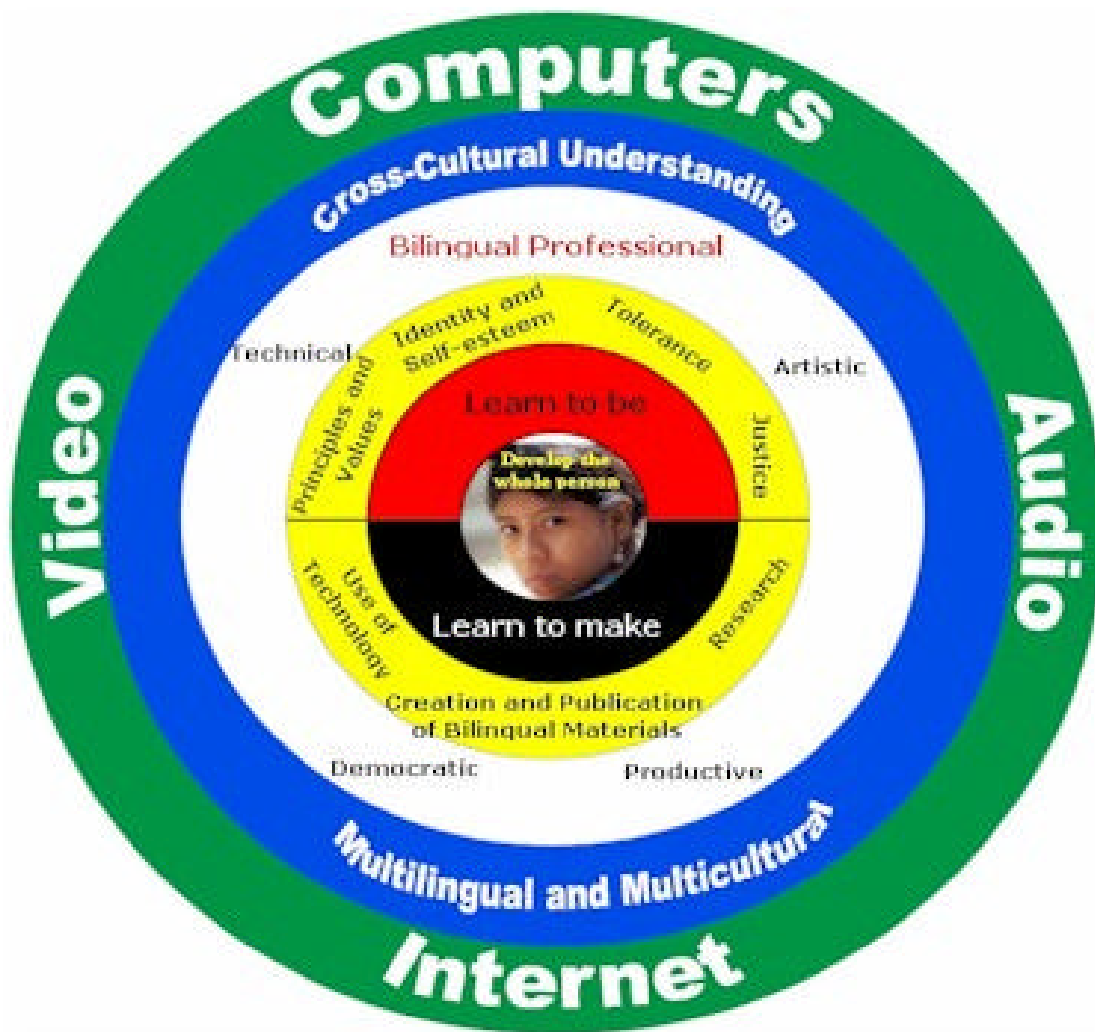
⁷⁸ Hernandez and Thornton, 1998, p. 22.

⁷⁹ Pewewardy, 1998, p. 33.

⁸⁰ World Bank report cited in Tucker, 1999.

⁸¹ Proyecto “Enlace Quiché (a),” n.d.

⁸² Ibid.



Instructional Material Development

Even in many indigenous communities, children are growing up on a diet increasingly laden with sound bites and multimedia stimuli. Their appetites need to be offered a rich diet of culturally, linguistically, and educationally appropriate materials as well. Around the world, in both developed and developing countries, indigenous educators are struggling to overcome the limitations in their own education (which was almost certainly not in an indigenous language) and the shortage of indigenous language instructional materials. Rapid changes will happen only when local indigenous educators are empowered to create their own materials. ICTs have brought professional production abilities within the reach of all educators, and the products can be video, audio, and CD-ROM as well as in print. In this way, materials will not be superficial translations of texts in dominant languages, but will truly reflect the culture, perspective, and reality of the target learners.⁸³

Desktop publishing has been mentioned as a basic means of creating materials. As well as texts, children need recreational reading materials in a variety of subjects to stimulate their minds and imaginations. A lack of materials will lower the perceived status and significance of the indigenous language and emphasize the

⁸³ Warschauer, n.d.

greater significance of the dominant one.⁸⁴ To help educators take quantum leaps in the production of materials requires thinking of creative ways to ease their creation of new materials. One example of a tool that Mayan educators are finding useful is the CD-ROM, *Illustrating My Words*, which contains 3,000 clip art images based on a Mayan vocabulary. This need was detected when Mayan textbook writers were observed having to draw new art for each text they developed. Since Mayan linguists and teachers developed the word lists for the CD-ROM, and a Mayan graphic design firm did the drawing, the product is highly relevant to educators, students, and anyone else developing Mayan materials.

Innovative educators are not limiting themselves to print instructional materials. Radio-based education programs have been used successfully in many regions for decades. As television and video extend their reach, they provide new means to reach target learners as well. Until recently, producing for radio and video were costly, time-consuming efforts requiring specialized technicians and a professional studio. New technologies have brought near-professional quality production to the desktop PC. A good microphone, a quiet room, and a PC equipped with audio mixing software are all that is necessary to produce radio programs, cassettes, and audio CDs. One such effort, mentioned earlier and produced in Mayan teacher-training schools, is the series of radio programs based on oral tradition, *The Blossoming of Our Grandparents' Words*. Video production requires a good camera and a high-end computer. Simpler software, more power, and falling prices make it clear that educators will soon be able to create their own videos as well.

Educational, interactive CD-ROMs are another important instructional material. While indigenous elementary school students seldom have widespread access to computers, secondary students and professionals in training are increasingly likely to have access to computers through school laboratories or community access centers. A multimedia CD-ROM that carefully combines a specific educational goal and the local context can provide an integral learning experience. As an example:

Science: *Through Native American Eyes* is the first interactive multimedia CD Rom that meets American National Content Standards for middle school science while addressing scientific concepts from within Native American culture... . The first of Cradleboard's planned fifteen core curriculum CDs, it addresses the scientific principles underlying sound, friction, and lodge construction which are presented as interactive media via video, audio, text, and animation... . [One unit,] *Principles of Friction*, uses video, slide show, narration, and text to teach how friction is at work when we make fire; when we grind things; and when we use sleds and toboggans. Students can play a simple interactive animated game based on the traditional Native American sport of Snow Snake, to reinforce what they have just studied about friction and speed.⁸⁵

Collection and Dissemination of Cultural Information

*Today we have new tools for preserving our cultural knowledge, particularly that of our elders, while they are still with us. The sum of this cultural knowledge is humankind's joint heritage, which literally tells our shared story and is of immeasurable value. We must use the tools available for such honorable purposes, or suffer the unnecessary loss of our shared cultural knowledge.*⁸⁶

⁸⁴ Smith, 1998, p. 28, cites this problem for New Zealand's Maori, despite New Zealand being a developed country with only one indigenous language and 20 years of work in language revitalization.

⁸⁵ Nihewan Foundation, n.d.

⁸⁶ Odasz, 2000, p. 83.

It's like a double advantage for us, we're learning how to use new tools, ...at the same time we're doing it in Hawaiian language, ...which I think is really, really good. It looks almost as if it's a thing of the future for Hawaiian, because if you think about it, maybe there's [only] a few Hawaiian language papers. But instead of maybe having a Hawaiian language newspaper, you have something that might be just a little bit better, like the World Wide Web.

—Kamahele, a Hawaiian language immersion student⁸⁷

Indigenous cultures are valuing more and more the unique knowledge they possess and are seeking to conserve and disseminate this information before it is lost to globalization. Putting cultural information into a digital format provides a flexible medium for conserving and disseminating the content. Perhaps more important, it ascribes a certain status to that knowledge that it might otherwise lose. Students and other organized groups are carrying out successful projects around the globe, mostly at the local level. Those participating have found ICTs to be an ideal medium for their project. They have taken ownership of both the content and the new technologies. These projects are made up of a multidisciplinary process of preparation, field work, digitalization, production, and dissemination. This section explores the types of projects that can be carried out and how the collected information can be disseminated.

Indigenous cultures have relied on oral tradition to pass information down for generations. As the spoken word loses status next to mass media, indigenous groups are looking for ways to keep the tradition and the information alive. Storytelling “is a blend of self-expression and a desire to assert cultural identity in another realm besides dance, art, religion, and traditional knowledge... . Many books do not tell their stories from their point of view, and they view the web as their own medium of expression to correct history, to strengthen their own identity.”⁸⁸ Projects such as *The Blossoming of Our Grandparents' Words* (described earlier) have allowed students to rediscover and validate these stories in their communities and present them in forms that will let them be passed on in their communities and form part of the national and global body of collective knowledge accessible through the Internet.⁸⁹

Lack of Internet connectivity does not preclude creation of multimedia presentations about local cultures. In fact, for presenting video and audio, presentation software is much more appropriate than web-based. *Our Grandparents' Thoughts*, For example, was produced using Microsoft PowerPoint.

How the compiled information will be published should be decided at the start of a project. There will be important differences in how information is gathered and processed depending on whether the goal is to publish in print, audio, video, or multimedia CD-ROM.

Another increasingly viable medium for publication is the World Wide Web. Low-cost and free Internet hosting options are readily available, providing instant worldwide distribution of content at almost no cost. The Oneida Nation's web page is meant to provide authoritative information about the Oneida that is not readily available in school texts or other written works. In addition to political activities, the site includes the legend of Oneida creation, traditional wisdom and memories of elders, a virtual cultural center, and even recipes.⁹⁰

As indigenous students, educators, writers, researchers, and cultural leaders take advantage of these technologies, they are sure to find even more creative ways of using them to document and promote local information, reaching community members and interested people around the world.

⁸⁷ Warschauer, n.d.

⁸⁸ Cisler, 1999.

⁸⁹ The four books in the series are available for download from www.enlacequiche.org.gt.

⁹⁰ Oneida Indian Nation, n.d.

e-commerce

In our modernizing world, income generation is an important area of development work. Cash-strapped indigenous communities may not be able to afford the luxury of sending their children to bilingual schools or otherwise participate in the revitalization of their language and culture. To this end, an important development objective for such communities must be helping them to improve their economy without jeopardizing their identity and without being forced to migrate in search of work. e-commerce is creating interesting possibilities for those with business savvy and an Internet connection.

Cooperatives and other groups are using the Internet to communicate with buyers and even to market products directly. On seeing the final market for their products and their final selling price, producers can tailor their products and prices to the market. This system has multiple advantages. “Cultural authenticity adds value to cultural products. Marketing cultural crafts and products, growing one’s reputation for quality, can produce an income while enhancing one’s cultural identity. Cultural marketing offers opportunities to villages and reservations to retain their youth rather than lose them to the competing dominant culture.”⁹¹ PEOPLink is a nonprofit organization that helps to make these connections all over the world. By working directly with producers and forming alliances with companies such as eBay, PEOPLink is building a large global network of trading partners.⁹²

Business options are as limitless as the imaginations of local entrepreneurs. A non-indigenous venture worth highlighting is Tortas Peru, which takes orders for Peruvian cakes from around the world via the Internet for delivery in Peru. The cakes are baked to order by a network of women all over the country.

The project shows how, with ingenuity, new technology can be used not just to create new successful businesses but, above all, businesses that tackle socio-economic exclusion—in this case the widespread exclusion of women from work and family income in most developing countries. The success of Tortas Peru underscores that in the new economy the secret of commercial success is not much different from that in the old economy, namely, technology is about supporting business ideas that delight the customer and make them want to come back for more! In the case of Tortas Peru the technology helps to bring together people who are living outside Peru with their families and friends for the most special occasions, all through traditional tortas and digital means.⁹³

Environmental Protection

Indigenous populations dwell on or near many of Earth’s most important biospheres. Environmentalists see indigenous knowledge and conservation practices as key elements in the struggle to heal our planet, and ICTs are playing an increasingly important role in this process. Foremost is their use in advocacy work, supporting virtual communities and general institutional capacity building, all of which was discussed earlier. This section provides more specific examples of related experiences.

Perhaps the greatest potential of ICTs is that they allow horizontal transfer of information rather than relying on traditional agriculture extension models of diffusion. Sophisticated software systems are now readily available that combine anthropologic practices and basic artificial intelligence to create Indigenous Knowledge Systems. One example is a soil classification system based on local farmers’ knowledge developed in the Colca Valley, Peru.⁹⁴ In Benin, students and graduates of the Songhai agricultural center used their CyberSonghai

⁹¹ Odasz, 2000, p. 82.

⁹² PEOPLink, n.d.

⁹³ Tortas Perú, n.d.

⁹⁴ Bardini, 1992.

technology center to produce CD-ROMs on subjects such as “Sustainable Development and Crop Production,” “Sustainable Development and Animal Production,” “Sustainable Development and Aquaculture,” and “Sustainable Development and Entrepreneurship.”⁹⁵

Internet connectivity opens up additional possibilities for collaborative projects. Students around the world are working together to understand and help solve complex environmental problems. GLOBE, a NASA-sponsored program, has formed partnerships with more than 10,000 schools in the United States and 95 other countries. Participating students “contribute data for worldwide research and learn by taking scientifically valid measurements in the fields of atmosphere, hydrology, soils, and land cover...; reporting their data through the Internet to the student data archive; creating maps and graphs on the free interactive Web site to analyze data sets; and collaborating with scientists and other GLOBE students around the world.”⁹⁶

Implementation Risks

Peace comes within the souls of men [and women] when they realize their relationship, their oneness, with the universe and all its powers, and realize that the center is really everywhere. It is within each of us. —Black Elk⁹⁷

The previous section discussed how ICTs can be used by the indigenous groups to revitalize their language and culture. To be successful, a development project along these lines must introduce new technologies, face politically and culturally sensitive issues, and create change in attitudes and behaviors toward information and communication. Failure in one area can undermine advances in other aspects and put the whole project at risk. Risks can be greatly minimized, however, by learning from the first implementers, indigenous and otherwise. A successful project will move the beneficiaries from the early stage of awareness and uncertainty through adoption and adaptation to the stage of enlightened expectations. Only at that point will there be an internal commitment to continue to pursue new possibilities. At this point, there will be an ideological sustainability, which must be accompanied by a technological and financial sustainability as well.

All of the interventions described in this paper are available only to those who have been able to step across the digital divide. Support of national, even global, policy and access initiatives are indispensable for global equity. In the interim, some solutions let specific target groups have guaranteed access at reasonable prices. Community learning centers have been discussed as the standard means of enabling whole communities to have access to ICTs. In regions where Internet connectivity is not available, much can be done with reference materials on CD-ROM, intranets, and web caching.⁹⁸

Further, the third world itself is developing products that will help to close the digital divide. Encore Software, based in Bangalore, India, has designed a handheld Internet appliance for less than \$200. Future versions are planned to support speech recognition and text-to-speech software in local languages for illiterate users.⁹⁹ Computer scientists at the Federal University of Minas Gerais in Brazil have also designed a basic Internet-ready computer that could retail for \$300; they are currently seeking a manufacturer.¹⁰⁰ It is important to watch for these new products and, where possible, help them to market.

Software solutions for special problems of indigenous languages are also becoming readily available, but they require some initial effort. The Linux open operating system provides a platform that can be translated into any language. Inexpensive, simple tools are readily available for creating fonts for indigenous languages, and keyboards can be reprogrammed for these new fonts. Culturally appropriate desktops and icons can be

⁹⁵ Academy for Educational Development, n.d.

⁹⁶ GLOBE Program, 2002.

⁹⁷ Odasz, 2000, p. 9.

⁹⁸ This refers to mirroring whole web sites and storing them on CD-ROM to include them as part of an intranet.

⁹⁹ PCWorld 2000, cited in United Nations Development Programme, 2001, p. 35.

¹⁰⁰ United Nations Development Programme, 2001, p. 98.

designed. Once these tools have been created, they must be distributed to all users. This process must be included in projects for the indigenous languages that have not yet standardized these tools.

While technology should never be implemented for its own sake, it commonly overshadows the social goals of a project. The challenge of installing a technology center, training new users, and keeping everything running can absorb all the time of even a skilled technician. When hiring and training staff,

Technical sophistication is less important than the ability to work with the community. Staff can be trained to operate hardware and software, but the necessary people skills that will successfully integrate the center are much more difficult to teach... . Successful centers have worked because of the personal ability of one or two individuals to rally the community around the new endeavor, with its seemingly exotic and sometimes out-of-place appearance and functions. Staff must maintain their enthusiasm and conviction despite initial slow acceptance and use.¹⁰¹

In indigenous communities, staff may need cross-cultural awareness training to understand the importance of indigenous language fonts and other tools that may be new to them.

Center administrators or technicians will not be able to solve every technical problem; however, with interest on their part and proper training, they should become able to isolate a specific problem. For example, a computer that “lost its Internet connection” could have any number of problems, each of which has a different solution: changed configuration, failing modem or network card, faulty connection or cable, problems with the telephone line, problems with the Internet service provider, problems in the Internet backbone.¹⁰² If the technician correctly identifies which of these is the problem, he or she will know whom to contact to resolve it.

From the most remote villages to the most modern high-technology hubs, people with an aptitude for technology and good interpersonal skills are in high demand. The workload in a busy school or community telecenter and a salary that is likely to be low mean that burnout and desertion are major risks. To help retain staff, telecenter projects are offering win-win perks; these may include frequent training, through workshops or virtual courses and by providing reference materials that help the staff to upgrade their skills. In addition, involvement in a virtual community of telecenter operators will help staff to feel less isolated in their struggles. Other projects have provided perks such as personal use of a laptop, which offers prestige as well as a practical means for helping employees to upgrade their skills.

An additional dimension to success and sustainability is financial. Technology programs require a large initial investment and involve many recurring costs such as connection fees, maintenance, and supplies. Further, the computers must be replaced every three to five years. How these costs will be met (without subsidies from a development partner) must be contemplated from the outset. To this end, projects and their local beneficiaries should develop a long-range (10-year) strategic plan that deals with meeting these costs.

A development project can simplify this process by using one of these three models.¹⁰³

- “The Medium-Term Market Maker”: A short- to medium-term mechanism to trigger accelerated innovation in the information economy that focuses on creating a market for local ICT services because of its <whom does “its” refer to?>diffusion effect on the community.
- “The Service Extension. The CLC <what does “CLC” stand for?>becomes an integral part of one of the initial sponsoring organizations. After the initial investment, this CLC comes to be

¹⁰¹ LearnLink , 2001a, p. 27.

¹⁰² LearnLink, 2001b, p. 7.

¹⁰³ LearnLink , 2001a, p. 6.

- financed through the base budget of this organization and is sustained in this manner.” Sponsors could be local groups supporting indigenous education, economic growth, etc.
- “The CLC ‘Business.’” This CLC is intended to become a financially self-sustaining entity.

Once the technical, administrative, and financial concerns are overcome, and a population is able to cross the digital divide, a completely new series of risks awaits it. These risks include right-to-use issues and the inevitable cultural change. If these risks are not managed well from the start, introducing ICTs can do more harm than good to an indigenous group.

Right-to-use issues can be divided principally into privacy, safety, inappropriate information, and authenticity. Users must learn how the openness of the Internet puts them at risk. They must guard tribal privacy by knowing what information can be shared with the world and what is secret. Activists must also understand how their communications (for example, in discussion lists) may be monitored by people who wish to do them harm.¹⁰⁴ Further, people who have lived in isolated communities are easy prey for an enticing outside world that wants them, so they can fall into traps of cyber porn and online gambling.¹⁰⁵ Indigenous groups have also found problems with non-authentic or inaccurate information about them being published by others on the Internet. This has been detected regarding cultural information¹⁰⁶ and non-native art being sold as authentic.¹⁰⁷

Television has long been blamed for much of the global assimilation we are seeing. ICTs, however, are simultaneously a homogenizing force and a means for strengthening a traditional culture. “This presents a trade-off for the Aboriginal community—losing a little distinctiveness while at the same time being strengthened.”¹⁰⁸ “Each cultural group must be their own ultimate authority for learning how best to deal with these potential challenges to the strength, integrity and future of their own traditional culture.”¹⁰⁹

Cultural changes go deeper than language of choice and other behaviors; they also affect ways of thinking. The digital age requires participants to think in a more goal-oriented, logical, and linear way, in contrast to indigenous thought patterns, which are more intuitive, interconnected, and abstract. The challenge is fusing these two ways of thinking.¹¹⁰

These cultural changes will only be an issue when an indigenous community decides to participate actively in the digital world. Sparking the group’s interest in participating is another challenge to overcome. Few active participants in the connected world would consider giving up their connectivity voluntarily. However, for populations that have relied on oral tradition and personal communication for generations, information and communication technologies will likely be seen as something they have no use for. In Brazil, it has been noted, “Although indigenous peoples occasionally utilize written forms of journalism, it has been difficult to move from this form to the electronic media. Non-indigenous persons (often anthropologists or missionaries) continue to mediate these systems which produce an image of an absentee indigenous voice reduced to a level of informant without agency.”¹¹¹ The first and foremost challenge of any project, then, is to help indigenous communities to discover a real need that can be met through use of ICTs. Only then will they begin to take ownership.

Final Thoughts

¹⁰⁴ Odasz, 2000.

¹⁰⁵ Zellen, 1998.

¹⁰⁶ Forsgren.

¹⁰⁷ Odasz, 2000.

¹⁰⁸ Zellen, 1998.

¹⁰⁹ Odasz, 2000, p. 9.

¹¹⁰ Zellen, 1998.

¹¹¹ Delgado-P, 1998.

Every decision I make, I have to take into consideration every Turtle Clan member seven generations into the future. The decision I make today has a direct effect on all those generations, this is a very important part of our decision-making process. So we are not only preserving our culture for the current generation, but also for the future generations to come.¹¹²

This paper has presented a glimpse of the ICT revolution that is reaching indigenous populations all over the world at varying speeds. Some degree of contact with these technologies is inevitable for all cultures and the majority of their members. To that end, indigenous groups and their supporters must take a pro-active approach by consciously and carefully stepping across the digital divide. There is no question that doing so will cause some cultural assimilation; however, once these populations realize they are in control, they will be empowered to solve problems caused by these same technological changes. Further, they will be able to use these technologies to strengthen their individual and collective identities.

Many of the examples presented in this paper are from the developed world. Yet, costs are dropping quickly, and the technology is becoming increasingly simple. What the Oneida were able to do in 1994 can be done more easily, quickly, and cheaply by indigenous communities today in any country. Developing country indigenous people are perfectly poised to reap the benefits of being second.¹¹³ By helping them now, we can reverse the trend of linguistic and cultural loss, before losing vital information that is certain to hold key pieces to the puzzle of how to heal and protect our planet and all of us who dwell on it.

¹¹² Dale Rood, quoted in Polly, 1998.

¹¹³ Weinstein, 1997, p. 339.

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