

BRIDGING CANADA'S DIGITAL DIVIDE: FIRST NATIONS' ACCESS TO NEW INFORMATION TECHNOLOGIES

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Abstract / Résumé

Geographic or social isolation, high costs, and lack of infrastructure contribute to a "digital divide" between First Nations peoples and other Canadians. Designed for profitable urban markets, digital networks and content that might address Native needs for education and information have not yet been fully extended to remote communities. This paper examines information disparities, assesses policies which affect First Nations' ability to bridge the digital divide, and discusses the development of Native-controlled networks.

L'isolation géographique et la manque des infrastructures contribuent à l'existence d'une division fondamentale entre les autochtones et des autres Canadiens en ce qui concerne l'accès à les technologies d'information. Construits afin de servir les marchés urbains et profitables les réseaux qui pourrait s'adresser aux besoins fondamentaux de l'information, ne sont pas encore disponible aux communautés autochtones. Cette dissertation considère comment le développement des réseaux d'information autochtones aide à combler les écarts d'ordre socioéconomique entre les collectivités canadiennes.

Introduction

The marginalization of First Nations peoples has deep roots in Canada's colonial history. This social, cultural and political marginalization shows no immediate signs of being reversed by the emergence of what is variously called the digital age, the network society, or the information economy. This paper begins with two key premises. First, the present exclusion of First Nations in the information economy follows from and contributes to the historical underdevelopment of Native communities by the dominant society. Secondly, information technologies, like broadcasting and other media before them, are designed within a capitalist political economy to produce and deliver "cultural commodities." Media and information technologies controlled by Canadian or American conglomerates will carry commercially driven content to Native communities with little reflection of local cultural knowledge or social needs. Limited access to and control of information technologies in First Nations communities thus reflects both an economic and a socio-cultural divide. While new digital networks are distinct from older media in many respects, there is also much about the so-called "information revolution" that reproduces existing inequities.

The objective of this paper is to situate the digital divide within the history of colonial relations and within the political economy of communications. As in other cultural and political arenas, First Nations groups continue to resist centralized control of communications and state domination of policy discourse. The analysis of how new information technologies are being successfully transformed by Native communities highlights the underlying human interests and cultural agency at work in their design and application. Once First Nations peoples do gain access to computer networks, the digital divide may be bridged in ways that support local needs and cultural capacities.

The paper is organized into three main sections. The first section introduces some critical tools for thinking about the digital divide. These tools are drawn from the literature on political economy of media and the rise of the information society. The second section outlines current Canadian debates on access and traces some examples of First Nations interventions in information policy discourse. The final section looks at some successful Native initiatives in bridging the digital divide and demonstrates how government programs and policies can be combined with local skills and resources to build a unique Indigenous information network.

1. The Digital Divide: Tools for Critical Analysis

A working definition of the term digital divide has characterized it as the gap between those who can make effective use of information technology and those who cannot (Digital Divide Network, 2001). In this definition the digital divide is measured not only by the presence or absence of new technologies in a community, but by their applications. Accordingly, the causes and effects of the digital divide may be assessed in four distinct areas: the degree of access to information tools such as computers, software and networks, the possession of basic literacy skills for the appropriate use of these tools, the possibility of receiving and producing relevant digital content, and the role of information technologies in the economic development of communities (Digital Divide Network, 2001).

The size and scope of the digital divide between First Nations peoples and other Canadians has not yet been clearly quantified in any of these four domains, but some indicators are immediately apparent. Seventy percent of Canadian adults had access to the Internet in 2000 (Angus Reid Group, 2000.) Recent research has shown that these users are concentrated among better educated upper income groups, while nonusers cite barriers of cost, literacy, and lack of relevant content (Reddick, 2000:7). Since many Native communities experience a lack of adequate telecommunications service, educational disadvantages and poverty, it is safe to assume that First Nations are over represented in the category of Internet "nonusers." More concrete measurements of Canada's information disparities are hard to locate. Researchers have little reliable national data on the extent of Aboriginal people's access to computers and other information technologies to draw upon. In fact, prior to 1998, household technology usage data was collected through Statistics Canada annual national Labour Force Survey. This survey did not include the Northern territories or Indian Reserves. Hence the national telephone penetration rate of 98.7% derived from the 1997 Labour Force Survey does not reflect telephone service in First Nations communities (Statistics Canada, as cited in Wawatay, 1998b). While numerical data are lacking, most observers would agree that the information highway is out of reach to those Native people who are unable to afford telephone or Internet service at home; who haven't had the advantage of learning basic computer skills, who can find little culturally relevant content on the Web, or whose community is struggling with generations of economic dependency created by government policies.

Critical tools for understanding the origins of the digital divide in Native communities can be found in literature on the political economy of communication and the rise of the global information society. This literature provides evidence that First Nations people are like other marginalized and

disadvantaged groups in their membership among the "information poor." Information disparities can be linked to the increasing corporate concentration in communications and cultural industries and to other social processes in the emergence of informational capitalism.

Political economy of communications and access to information technology

Several recent studies of the political economy of communications (Breen, 1997; McChesney, 1999; Menzies, 1996; Murdock and Golding, 1989; Schiller, 1996) have noted the initial development and adoption of new information technologies by an urban upper middle class and corporate elite. These analyses of control of new information technologies extend logically from prior work on the ownership of broadcasting and mass media. In communications studies, political economy approaches are defined by a concern for the public interest and belief that media of all kinds should support a viable public sphere in contemporary democracies. Vincent Mosco (1996:71) also suggests that the political economy of communication derives powerful explanatory value from its focus on media texts and practices as historically and economically determined. Political economists work to "de-centre" the mass media by showing how they are integrated with other economic, political, social and cultural processes. Information technologies can likewise be de-centred by considering the broader social contexts within which they are designed, developed, adopted, resisted or abandoned. The social and historical contexts within which First Nations communities encounter media and information technologies thus require careful examination. Exclusion of Native peoples from participation in digital cultures and economies can then be seen in connection to other processes of marginalization.

The work of Harold Adams Innis is central to Canadian traditions of both political economy and communications studies. A description of present information inequities in Canada would seem overwhelmingly familiar to him, with its tensions between metropolitan centres and regional hinterlands, its technocratic monopolies of knowledge, and its speed-of-light space-binding technologies. In a cogent critique of the information economy in Canada, Heather Menzies has argued very convincingly in the Innisian tradition. Menzies proposes that these new technologies facilitate the centralization of decision-making and control, while allowing the decentralization of work. Commercial design of computer networks encourages a strong centre-margin link, while weakening links between marginal entities. Menzies (1996:146) suggests that the increased speed of communication diminishes its "expressive complexity" and weakens the potential for un-

derstanding local communities and diverse cultural identities. She argues that the current information highway model treats information as a commodity and communication systems as means of distributing that commodity. According to Menzies, infrastructures built to enhance centralized control and speedy transmission are not necessarily hospitable to diverse forms of cultural knowledge or tradition (Menzies, 1996:146). Menzies' arguments are clearly applicable to the extension of new information technologies to many Aboriginal communities. The homogenising potential and centralizing force of the Internet must be actively resisted if First Nations communities are to use it to share local knowledge and produce culturally relevant content. Native groups who are applying information technologies to local social, cultural and political purposes are working against a built-in technological bias toward centralization and commercialization of networks and their content.

Political economists have suggested that the tendency to commodify information and to treat it as a marketable resource may also undermine people's ability to participate in political and economic decisions which affect their everyday lives. The growing use of the Internet for "e-commerce" and as a new vehicle for advertisers and on-line marketers has already begun to erode the perception and function of information systems as educational and cultural resources. In the late 1980s, British researchers Graham Murdock and Peter Golding linked the development of new information technologies to the privatization of public broadcasting and deregulation of the media. While market criteria were increasingly imposed on media content, cultural and recreational activities moved away from shared social or civic spaces toward individual household consumption of media and of products advertised in the media. Such a consumer-oriented, advertising driven information system "displaces other identities, in particular the identity of the citizen" (Murdock and Golding, 1989:180). The authors argue that rights to information are rights of citizenship. These rights are infringed when knowledge and information are shifted into the realm of markets, creating class-based information disparities.

The digital divide thus springs from the growing centralization and concentration of control over cultural production and the increasing privatization and individualization of cultural consumption. The poorest marginalized groups are often those most in need of relevant political and cultural knowledge, yet have the least purchasing power and the fewest consumer choices in the area of new media. Unemployment rates for Native people far exceed the national average and a family's dependence on subsistence economies or social assistance leaves little disposable income for "information products and services" as defined by the market. Access to com-

puter networks presently requires substantial individual investment in hardware, software, education and telecommunications services. First Nations individuals and communities who cannot afford this investment are experiencing further erosion of their "information rights." Building local infrastructures which relocate control of information technologies within the community and create a common on-line space for First Nations might help counteract this trend toward privatized and commodified information systems. As Alexander and Pal (1998:2) have argued, issues of power are at the core of technological change. Allocation of resources in the "new information order" will be determined largely by three forces: those who control information, those who control access and infrastructure, and those who control tools and software.

Finally, the literature on political economy of communications suggests that the speed and relative anonymity of global networks separates information from the conditions of its production. Marcus Breen refers to this separation as the "knowledge gap." High-speed information flows discourage network users from critically assessing digital content or evaluating its worth and relevance in relation to known and familiar contexts (Breen, 1997:3). Because individuals and communities cannot always verify the origin and authenticity of information derived from global computer networks, its value as knowledge upon which they might act or initiate change is diminished. In this way, the knowledge gap potentially limits the scope for social and political action. This might be especially true for isolated First Nations communities where the known and familiar contexts of the local community are rarely reproduced in the on-line world. At the same time, information from huge government or corporate sites circulates in the absence of local interaction and reflection on its value and relevance. The digital divide and the knowledge gap will be bridged as more culturally relevant digital content is generated, and as information from outside Native communities is situated within local contexts. Information relevant to local conditions and community needs, gathered and distributed on Native-controlled networks, can only enhance the potential for social change and political empowerment.

Globalization and social exclusion in the information economy

The marginalization of Native people within Canada's emerging information economy cannot be isolated from the trend toward economic and technological convergence in the media. The literature on political economy of communications gives some insight into how information inequities are related to media concentration and cultural commodification. This trend has been considered from a global perspective by Manuel Castells (1998) in his

comprehensive work on the "information age." Corporate control of information technologies is part of larger processes of economic globalization which impinge upon even the most remote First Nations communities. Like political economists, Castells insists that the extension of global information systems must be seen within the context of late capitalism. As a sociologist he focusses on how "informational capitalism" generates new forms of social differentiation. In the consumption and distribution of wealth, Castells (1998:71) notes a growing degree of inequality, polarization, poverty and misery between different nations and social groups. Relations of production within informational capitalism are likewise characterized by increasing individualization of work, over-exploitation of workers, social exclusion and an emerging global criminal economy.

It is Castells' definition of social exclusion that is perhaps most relevant to the marginalization of Native peoples in the digital era. According to Castells social exclusion is a shifting process by which entire countries, regions, neighbourhoods gradually come to lack political interest for powers that be. These regions are "bypassed by flows of wealth and information, and ultimately deprived of the basic technological infrastructure that allows us to communicate, innovate, produce and consume and even live in today's world" (Castells, 1998:74). This "uneven geography" of informational capitalism creates "black holes" which are clearly defined in spatial or territorial terms. Isolated remote and rural regions or marginalized urban ghettos can function equally to confine "systematically worthless populations, disconnected from networks of valuable functions and people" (Castells, 1998:161). Colonial histories which already underpin social isolation and economic underdevelopment in Native communities are thus likely to further contribute to exclusion within the network society. To avoid disappearing into these black holes, First Nations groups are working to connect isolated territories and excluded communities to national and international computer networks. In this case processes of marginalization and inclusion are clearly understood in relation to the geographic extension of basic telecommunication technology. Aboriginal people seek to build links to the digital "world without borders" which will, in fact enhance quality of life, economic opportunity and availability of health, education and social services at home.

Protecting Indigenous knowledge under hypercapitalism

As Breen, Menzies, Castells and others have suggested, the control of network design and the production of knowledge which circulates within these networks are key elements of informational power and politics. From this perspective, the digital divide indicates the relative social value of

certain groups and certain forms of knowledge within the "hypercapitalist" information economy (Graham, 2000:149). First Nations' information networks must be built to help establish and reinforce the perceived value of Native cultural knowledge within a global system of knowledge exchange. This raises key issues in debates about Aboriginal cultural and intellectual property. If information is merely a commodity, what prevents non-Native groups from producing and circulating information about Native cultures, languages and communities for their own professional or personal profit?

The appropriation and exploitation of Native cultural knowledge has been an integral part of European colonization of the New World. The World Wide Web has simply added a new dimension to this process. As Kade Twist (2001) suggests, the digital divide has done more than deprive Native people from accessing the Internet, it has prevented them from creating useful and accurate information and from sharing the sort of stories and music and art that reflect their experiences. The absence of digital content produced by Native people "has left wanderers of the Web with a peculiar and anaesthetized image of Indian life that has been created by cyber-tricksters"(Twist, 2001:1). Expensive and appealing Web sites often perpetuate non-Native fantasies about Native culture and generate unrealistic and inaccurate perceptions of First Nations peoples. This is especially so when Web users lack historically accurate knowledge with which to balance the stereotypical images of the "cyber-shaman."

The knowledge gap created by circulation of these distorted constructions of Native culture is reinforced by the relative lack of value attributed to indigenous knowledge in general. The unregulated use of international computer networks to distribute cultural and intellectual property in digital form has generated considerable legal debate over piracy and copyright. But the concept of intellectual property invoked in these cases is not value neutral. As Battiste and Henderson (2000: 250) have clearly argued:

...intellectual property protects only some kinds of culture, technology, communication, information and ideas. It has proven an awkward and inadequate tool for the protection of culture, communication and technology that fall outside its ideological underpinnings. This is especially so of material cultures such as ethnic or folk art... The major push for amendment of the law comes from the top so that areas such as computer technology or biogenetic engineering are receiving a lot of attention, and the law is gradually being altered to accommodate these forms of knowledge. Culture and knowledge on the "bottom" – where Indigenous knowledge is so often situated tend to be ignored.

The protection of Indigenous knowledge may come in part from a concerted effort to record, catalogue and store elements of spoken languages, oral traditions and visual and material culture in digital forms which allow this knowledge to circulate more easily within First Nations communities and outside them. The question of digital content development is a pressing one, Indigenous networks need indigenous content to compete with non-Indigenous viewpoints. James May (1998:225) points out the inadequacy of creating Native information networks when the information they need to use has not been collected and published or produced. If social exclusion in the network society is to be countered by the spatial connection to and territorial extension of information systems, then cultural marginality will be addressed by creating sophisticated digital sources for Aboriginal knowledge and information.

2. Information Policy and First Nations Access

The preceding review of the literature suggests that the digital divide must be confronted both as an economic concern for access to and control over information networks, and as a cultural concern for the value and integrity of Native knowledge exchanged within these networks. These two concerns have been addressed by First Nations groups working within the field of information technology and information policy in Canada. This second section examines some current debates on access and gives examples of First Nations interventions in this area.

While policy makers and Native activists alike have recognized the potential digital divide between First Nations and other Canadians, no single federal policy study or forum has been dedicated to measuring it or planning for means of bridging it. In contrast, the United States Office of Technology Assessment (OTA), as early as 1995, produced a full length report entitled *Telecommunications Technology and Native Americans: Opportunities and Challenges*. The report examined the potential use of information technologies in the economic and cultural development of Native American communities. The telecommunications technologies considered by the OTA include most of those now referred to as information technologies. The report laid out eight key telecommunications policy issues for Native Americans; grouped into those issues relevant to developments in other areas of Indian policy (self governance, education and health care) and those linked to telecom policy developments in the majority society (United States Office of Technology Assessment, 1995:7). The report argued the need to empower Native Americans by developing grassroots sources of local telecommunications expertise, building national Native strategies on telecommunications issues, designing user-friendly and cost-effective tech-

nologies, and encouraging Native owned and operated networks and information enterprises (United States Office of Technology Assessment, 1995:7). The OTA recommended that American federal policy on Native telecommunications should co-ordinate programs among various departments, establish harmony between federal telecom policy and federal Indian policies, develop information policies on non-Native access to sensitive religious and cultural knowledge, and provide for ongoing research and evaluation (United States Office of Technology Assessment, 1995:10). This American study provided a valuable framework for building Native information networks, but seems to have had little immediate impact on Canadian "information highway" policies which were being developed at the same time.

Universal information access in the Canadian context

There has been a consistent voice for a strong public component to the information highway in Canada. This advocacy has addressed general issues of universal information access as well as specific attributes of the digital divide which affect First Nations. Public interest groups have challenged limited definitions of access as "market choices" while articulating a broader concept of universal access to the information infrastructure. Carol Buchwald's (1996) history of the Canadian tradition of universality in telecommunications, broadcasting and public libraries shows how past policy rationales could be extended to the present design of the information highway. Andrew Clement and Leslie Regan Shade (1997:3) also consider universal access to information as a right of citizenship, an essential component of a viable public sphere, and a means of mitigating disparities between "information haves and have nots." Clement and Shade outline a scale along which access might be measured in economic, technical and social terms. Their "Access Rainbow" model considers the potential interoperability, cost and adaptability of technical network elements, the relevance of the content and services, the availability of service providers, the degree of skill, literacy and support needed for information use, and the means by which infrastructure governance is made accountable to citizens (Clement and Regan Shade, 1997:15). The Access Rainbow proposes to measure the availability of new technologies as well as the social contexts of their applications in a community. In this respect the model does not suggest specific solutions for increasing access, but alerts policy makers and activists to the range of different criteria that must be considered in planning community networks and local applications of information technologies. Generic models like the Access Rainbow, in combination with evaluation of specific Native telecommunications and information needs suggested in the

OTA framework, could provide some basic tools for assessing access to and application of networks. Where such assessments have been carried out, as in Northern Ontario, disparities between Native and non-Native communities in the cost of telecommunications services and local capacity to apply information technologies were clearly identified (FedNor, 1999a:151). At the same time ample opportunities for designing, building, funding and making productive use of information networks in Aboriginal communities are emerging from this kind of research and planning.

Policy processes surrounding the design and construction of the information highway in Canada initially treated First Nations' needs in a somewhat incidental fashion. In 1994 the federal government launched the Information Highway Advisory Council (IHAC) as a consultative body on new communications and information technologies. In both its Phase 1 and Phase 2 reports, IHAC encouraged the government to define and implement an access strategy and to monitor existing market mechanisms with respect to potential barriers to access in certain regions and groups, but offered few detailed suggestions for how these barriers might be overcome. In its 1995 hearings on convergence in broadcasting, telecommunications and information technology the Canadian Radio-Television and Telecommunications Commission (CRTC) also recognized that the competitive model of market supply would not necessarily provide affordable and universal access to information for all groups. Aboriginal representatives impressed upon the CRTC the need to extend the information highway to their communities. They emphasized the lack of efficient communications networks in remote areas characterised by high costs of travel, isolation and lack of social services (CRTC, 1995:6). In each of these cases First Nation concerns have been addressed within the larger context of national telecommunications and information policies.

In the years since the release of the IHAC and CRTC reports, the federal government has begun to implement strategies for expanding the information infrastructure in Canada and addressing the digital divide. These initiatives, including SchoolNet and the Community Access Program which were extended to First Nation communities, were brought together under the "Connecting Canadians" program in 1999. In January 2001, Industry Canada created the National Broadband Task Force to advise the federal government on making high speed Internet access available to businesses and residents in all Canadian communities by the year 2004. In many northern and remote Native communities the obstacle to achieving this goal still remains lack of affordable telephone service and the cost of making connections from individual homes and businesses to satellite-based networks, where these exist. Potential costs of upgrading telecommunications

services in communities in Yukon, Nunavut, the Northwest Territories and northern provinces are substantial, even with recent developments in wireless technologies and satellite uplinks. A substantial commitment of public funds will clearly be necessary if the federal government is to meet its 2004 goal. The Broadband Task Force report released in June 2001, clearly identified First Nation, Inuit, rural and remote communities as a priority for broadband deployment (Industry Canada, 2001:5). This recommendation may provide the catalyst for a comprehensive analysis of Native information technology needs and strategies for coordinating network development with other initiatives in Native self-government, education and health care.

Native interventions in information policy processes

Since 1996, Native groups have more actively participated in building a Canadian framework for First Nations information and telecommunications policy. In the Nishnawbe-Aski Nation (NAN) region of northwestern Ontario, for example, policy interventions have been undertaken on three separate fronts. Wawatay Native Communications Society, a regional radio and television broadcaster, took an early role in CRTC telecom hearings. The Aboriginal Working Group of FedNor undertook telecommunications policy research in the region between 1996 and 1999. Keewaytinook Okimakanak, a Chiefs' council representing six northern NAN communities and its information technology branch, K-Net Services, developed innovative practical applications of information technology while also lobbying for better local telecommunications services.

Since 1973, Wawatay has been acting as a communications advocate for the Cree, Oji-Cree and Ojibway communities in Northwestern Ontario. Wawatay was responsible for negotiating the construction of the first telephone networks in the region and has gone on to establish a successful bimonthly bilingual newspaper, a network of more than forty-five community radio stations operating in all three Aboriginal languages, and several weekly television programs. Like other northern Native broadcasters in Canada, Wawatay is funded by a small operating grant from the federal government but supports its own activities through advertising, community fund-raising and endless hours of volunteer contributions. Twenty-five years after designing the first local trail radio network Wawatay, in its tradition of advocacy for the northern communities it serves, was back in the telecommunications policy forum seeking to upgrade local services. The objective of this intervention was to ensure that First Nations communities would still be able to connect with one another in a rapidly changing communications environment.

As part of its mandate renewal process in April 1998, Wawatay identified the risks and advantages of new information infrastructures for its member communities. While the risks of cultural invasion and flow of foreign content into Aboriginal communities were recognized, three key advantages were identified: educational resources would be more accessible at the community level, communications with other Aboriginal peoples would be easier, and economic development opportunities could emerge from use of new technologies. "Wawatay's mandate in the next decade and beyond is thus seen as helping the communities we serve take charge of these information technologies and use them as tools to meet their own needs, just as we have done with community radio and Aboriginal television production" (Wawatay, 1998c:1).

With that mandate in mind Wawatay registered as an intervener in the CRTC's 1997-98 hearings into telecommunications services in High Cost Service Areas (HCSAs). These are areas where little competition to provide new or existing services exists because telecommunications conglomerates know there is no profit to be had. These areas include a disproportionate number of northern First Nations. The CRTC, recognising that the cost of building the information infrastructure in remote areas will leave these communities off the corporate networks, has suggested solutions including an indirect tax on telecommunications companies' profits in larger urban markets to be re-directed toward upgrading services in HCSAs. It is through these low profile hearings, conducted in the cryptic language of telecommunications regulation and requiring substantial legal and research resources to marshal evidence, that important decisions about universal access and essential services on the information highway are often made. Realizing this, Wawatay and other First Nations organizations do their utmost to participate on their own terms and with their own agendas firmly on the table.

In its submission to the CRTC hearings in 1998, Wawatay presented what evidence it had been able to collect on the existing state of telecommunications in the northern communities and the need for information equity for its Aboriginal constituents. Neither Bell Canada nor Statistics Canada had data on telephone penetration in the region, but in Wawatay's estimation fewer than fifty percent of homes in Native communities in northwestern Ontario had a telephone in 1998. Those with service experienced frequent problems, especially on long-distance calls. Internet access in the few communities with it was slow and unreliable and incurred long-distance charges. In its submission, Wawatay moved beyond these basic issues of telecommunications service to raise more comprehensive

questions of the long-term consequences of information technologies and systems in the communities it represents:

Whatever regulatory mechanisms are put in place by the Commission as a result of these proceedings have to be implemented in ways which will be sustainable. Piecemeal solutions which only consider the needs of the telephone companies, the regulators and their advisors will never deal adequately with the needs of our people (Wawatay, 1998b:13).

In this vein, Wawatay suggested that the CRTC needs to ask broader and more fundamental questions about how universal access and essential services are to be defined for First Nations and other information poor communities, especially in the absence of any other national Native access strategy. Wawatay's interventions in the CRTC hearings clearly located key obstacles to the development of Native information networks.

Telecommunications policy research specific to First Nations has also been undertaken by FedNor (Federal Economic Development Initiative in Northern Ontario, Industry Canada.) The Aboriginal Working Group of FedNor was established in May 1996. This group's objectives were to support economic development in Aboriginal communities by establishing or enhancing access to information technology. The Aboriginal Working Group commissioned a comprehensive study of telecommunications needs which compiled profiles of existing and potential uses of information technologies in 153 First Nations communities. In each of these communities the study assessed current uses of information technologies, identified gaps in the current infrastructure which affect quality of life, and in consultation with community members recommended short, medium and long term strategies to address these gaps (FedNor, 1999b). One of the primary reasons for this study was to encourage Aboriginal communities, political-territorial organizations and provincial and federal agencies to collaborate on improving access to and use of information technologies in the region (FedNor, 1999a:10).

Since 1998 the role of information policy advocacy for northwestern Ontario's First Nations communities has also been taken up by Keewaytinook Okimakanak and K-Net Services. After its initial intervention in the CRTC hearings Wawatay participated in the creation of a NAN-Wide Telecommunications Infrastructure Working Group to take on network planning for the region. In late 1998 K-Net assumed the lead role in implementing the NAN-wide telecommunications strategies proposed by the Infrastructure Working Group. K-Net established a planning process for information and communications technology projects at the regional and

local level that involved four stages: taking inventory of local telecommunications needs, developing network and applications designs to meet those needs, creating training and business strategies for building local skills, and identifying funding possibilities for both training and capital projects (K-Net, 2001: iii). K-Net is unique among First Nations organizations because it has taken on a demanding dual role of active participation in relevant provincial and national information policy processes, while staying at the forefront of planning and implementing information technology projects in the NAN region. For this reason K-Net stands as an instructive example of how Canada's digital divide can be bridged to strengthen the cultural and economic fabric of First Nations communities.

3. Building Bridges: Cultural Contexts of Indigenous Information Technologies

In this final section I would like to suggest points at which Aboriginal people have been able to design and apply information technologies for specific cultural, educational and social purposes. First Nations interventions in information policy just described followed precedents established in the development of Aboriginal broadcasting in Canada. Beginning in the late 1960s, the extension of mainstream broadcasting systems to Native communities triggered the demand for locally controlled, culturally relevant radio and television programming. Native groups actively intervened in communications policy debates to ensure equitable media access. Native broadcast undertakings were created and consolidated across the country, culminating in the 1999 licencing of the Aboriginal People's Television Network (APTN) included in all Canadian basic cable packages (David, 1998). Aboriginal people now have active control over local, regional and national broadcast media, which suggests the positive potential for similar adoption and transformation of information technologies in the Indigenous context. However the path from initial access to broadcast technologies, to complete Native control over all aspects of program production and delivery was long and difficult—a journey that Native information networks are just beginning.

Building networks for local knowledge

As the literature on political economy of media and the emerging global information age suggests, the production of knowledge and information cannot be divorced from human interests. From this point of view, new networks must be designed to support local knowledge and enhance reflection and action upon information which affects First Nations communities. As Wawatay's early response to emerging information technologies

indicated, the Internet and World Wide Web have the potential to support local applications, yet their users always risk being pulled into what Heather Menzies refers to as "global monoculture." Arguments about the centralizing pull of the information highway and global media as a force of "cultural imperialism" must, however, consider John Tomlinson's (1991:108) critique of the Eurocentric bias inherent in this model of cultural homogenization. Thus while Aboriginal cultures have changed in the post-contact period in North America, the process of cultural adaptation need not be defined only in terms of cultural loss. Aboriginal use of broadcast technologies from community radio to national television has clearly demonstrated how media can be redesigned and used to support Native languages and cultures, not just to deliver foreign cultural content. The challenge, then, is to use the capacity of information networks to support local goals and priorities, to enhance cultural expression and build social connections within Aboriginal communities. These tasks are paramount to sustaining cultural identities and differences in a digital world.

As Marike Finlay pointed out as early as 1987, there is much lip service paid to the participatory nature of new communications and information technologies. But distributed networks and on-line services will not, by their mere existence, promote people's participation. As Finlay puts it:

A two-way channel merely permits a two-way flow of messages. There is nothing built into this technology to ensure that each partner shares the same degree of stylistic or rhetorical competency. Nor is it likely that each partner would enjoy the same ability to program the computer communications system to best suit his or her needs... The bi-directional systems alone do not contain the inherent procedures of participatory dialogue (1987:18).

Indeed, the current two-way nature of the information highway remains somewhat unbalanced. While Internet and Web users can easily and rapidly consume information from corporate, institutional and government sources around the globe, their ability to produce and circulate information on the same scale is still limited.

Truly interactive and participatory uses of information involve more than exchanging Email and Web-browsing. The potential of information technologies to empower First Nations communities in information gathering and decision making is not necessarily inherent in their design, but evolves from their application. Providing physical access to local or global networks is a necessary first step, but the relevance of these tools to local needs and priorities must be demonstrated. Building and maintaining community-based networks will likely be most successful where Aboriginal people see

these as ways of solving immediate problems or meeting previously identified needs.

Information technology in Native education and economic development

In the last five years, a number of information technology projects have been launched in First Nations communities across the country. Brief thumbnail sketches of some of these projects provide a sense of the range of activities undertaken, but also of the lack of co-ordination amongst them. Online educational resources for First Nations have been developed through collaborations between SchoolNet (Industry Canada) and Abenaki Associates (an Aboriginal software development firm). SchoolNet connections were contracted for all 440 Aboriginal schools in Canada in 1998, providing each with some form of Internet access. A variety of new initiatives have been undertaken in education including distance education using electronic forms of course delivery to northern Native communities, wide area networks linking Northern schools, and Internet courses designed specifically for Aboriginal post-secondary education.

Apart from educational uses, Native communities have acquired information technology resources for local use under other federal programs. Several Internet access sites funded under Industry Canada's Community Access Program (CAP) are located in First Nations communities. These sites offer local public Internet access and are built with matching funds from the community and the government. The Electronic Data Initiative (EDI) of Indian and Northern Affairs Canada provides a small grant to allow Aboriginal communities to collect and submit population data electronically. The grant allows Band offices to purchase computer hardware, software and an Internet connection. In 1997 CANARIE, a joint federal government/private sector funding and research program in information technologies, established a Pilot Project for Aboriginal Networking. It awarded 1.25 million dollars to seven separate projects: "to further accelerate the development of network-based products and services by Canada's aboriginal communities." The projects were designed to meet First Nations' unique cultural, economic, political and social needs and included a network linking remote communities in the Eastern Arctic and Arctic Quebec for provision of services, a digital project for compiling, storing and retrieving examples of Aboriginal languages in Manitoba, and technology training in a distance education format for communities in Northern Alberta.

Also at the federal level, Aboriginal Business Canada (Industry Canada) administers a funding program focussing on innovation and technology, supporting adoption of information technology in Aboriginal

businesses, creating information products and providing financial support to Aboriginal firms in the information technology sector. In 1999, as part of a wider Aboriginal Business Development Initiative, Industry Canada launched the Aboriginal Business Services Network (ABSN) In Ontario, ABSN links fifteen sites already offering social services, business and economic development information, and training programs to their respective communities (<http://www.cbcs.org/ontario/ABSN/>). A variety of joint ventures between First Nations organizations and Aboriginal businesses have generated the development of local Internet service provision, technology training programs, and software development. These ventures have helped design local networks and applications both for Aboriginal communities and for non-Aboriginal individuals, organizations and businesses. Examples of these collaborative ventures include those between Deto'Cho and Abenaki Associates in Yellowknife, Aardicom Digital Communications and the Government of NWT, Sakku Arctic Technologies and the Igalaaq CAP Site in Rankin Inlet, PolarNet in Kitikmeot, Aboriginal Super Information Highway in Winnipeg, and File Hills Internet in Saskatchewan. Internet service provision is an area that many Aboriginal communities have recognized as a viable business opportunity.

While it is beyond the scope of this paper to go into any of these initiatives in detail, many of them reflect the priorities placed by Aboriginal communities on information needs for economic development and education. As these networks are created and consolidated First Nations communities will have greater access to information and services that urban non-Natives now take for granted. But it must be recognized that the production of culturally relevant digital content is an essential second step in creating these networks. Industry Canada's Aboriginal Digital Collections pilot program is an important move in this direction. The program provides funds to pay Aboriginal youth to create web sites featuring significant Canadian Aboriginal material. The current subject list of the Collections provides links to Aboriginal Web sites on art and artists, business profiles, community profiles, culture, economic development, education, entrepreneurship, history, language, natural resources, research materials tourism and traditional knowledge (<http://aboriginalcollections.ic.gc.ca/e/listssubject.htm>).

Though these initiatives have provided First Nations with some degree of physical access to new information technologies they have been undertaken in an ad hoc fashion. Communities with the requisite skills and resources and adequate telecommunications infrastructures have been able to take advantage of federal and provincial funding programs, while other perhaps more needy communities have not. Inevitably, some of these

Aboriginal information initiatives are designed and imposed with the existing capacities of systems and software in mind, not with the real needs of the community as the guiding force. Even an admirable effort such as SchoolNet's connections in every Aboriginal school cannot replace the valuable dedicated links that Aboriginal educators and students within one region or cultural and linguistic group might be making with each other. The sustainability of CAP sites and SchoolNet connections may also be a concern. Although shared-cost funding is provided for initial hardware and start-up costs, the resources to train people to develop and support community sites must be found elsewhere. Community access projects in Aboriginal communities thus risk becoming outdated and under-funded backwaters on the information highway without some kind of ongoing support.

K-Net: from access to outcomes

K-Net's work in the NAN region demonstrates how government programs and policies can be combined with local skills and resources to build a unique Indigenous information network. Created in 1994, K-Net began by linking high school students through a text-only, computer mediated "bulletin board," providing email, on-line conferences, computer training and technical support in the region. In 1996 K-Net moved its services onto the Internet providing a local portal for NAN communities and agencies. In 1998, K-Net co-ordinated the connection of seventeen communities to the Internet through the First Nations SchoolNet Program. Some of these communities still lacked local telephone service and so schools were supplied with a satellite telephone unit and a DirecPC satellite dish. At each school, a local person was trained to set up and maintain a Local Area Network so that as many computers as possible could share Internet access. K-Net's early initiatives were shaped by the goal of providing access so that communities could begin developing applications and uses for the technologies while human and technological capacities emerged (Beaton, 1998:5).

Between 1994 and 1998, K-Net actively developed local skills in computer use, web design and hardware maintenance through employment and training programs. These training programs were funded by the Sioux Lookout Area Aboriginal Management Board—a consortium of First Nations organizations that directs employment creation in the region. K-Net also supported the operation of local access centres in each community, using the online conferencing system to maintain contact with local staff in each First Nation (Beaton, 1998:4). K-Net helped design databases for local community health workers and began planning a broadband telehealth network linking a local hospital to the Ottawa Heart Institute for diagnosis

and consultation with distant specialists. The Ontario Ministry of Education and Training (MET), K-Net and Confederation College in Thunder Bay cooperated in the delivery of the Aboriginal Teacher Assistant program. Students completed the one-year diploma program from their homes using the K-Net conferences to communicate with instructors. By 1998, K-Net had recognized the emerging possibility of broadband technologies to link northern Native communities and initiated community consultations on the subject in each of the six remote Keewaytinook Okimakanak communities—Deer Lake, Fort Severn, Keewaywin, McDowell Lake, North Spirit Lake and Poplar Hill. The objective of these consultations was to collect information about potential applications and needs that a wide-area broadband network could address while promoting public awareness of advantages of high speed network access (Keewaytinook Okimakanak, 1999). Throughout this period, K-Net was actively participating in local, regional, provincial and federal program and policy development while co-ordinating this wide variety of information technology initiatives.

K-Net has articulated a vision for information technologies in First Nations communities which explicitly rejects forms of cultural commodification and social exclusion identified by political economists and sociologists as risks of the emerging information society. This vision is based on community control of network design and application, but it is also linked to the creation of culturally relevant digital content or 'e-culture prototypes.' Specific cultural projects developed at K-Net include the Iyash Saga site (<http://legends.knet.on.ca/>) and the Oji-Cree Dictionary site (<http://www.knet.on.ca/dictionary.html>). Brian Beaton and Jesse Fiddler (1999:9) suggest that K-Net's role as an incubator for Indigenous digital content "provides a window into the electronic possibilities that exist for a minority culture. It not only strengthens and renews Indigenous knowledge by supporting community level learning, but it also builds a bridge to other non-Indigenous audiences—children in school, policy makers, technicians, and media producers." What ties all these initiatives together is K-Net's emphasis on using technologies in ways that fit with local abilities and aspirations. The strategic use of existing federal and provincial funding programs along with local skills and resources have allowed K-Net to build information infrastructures that counteract corporate interests and agendas set in Canada's metropolitan centres. K-Net consistently puts local identities and development priorities in First Nations communities before these other interests so that marginalization and historical dependencies created by governments can be overcome.

Since 1999, K-Net has moved beyond building infrastructure and ensuring affordable access to developing unique applications of information

technologies and documenting some of the results in the connected communities (Ramirez and Richardson, 2000). In 2000, Keewaytinook Okimakanak and K-Net Services were the successful Aboriginal finalist among twelve other Canadian communities in Industry Canada's 'Smart Communities' three-year demonstration project. Over the life of the project, the 9.5 million dollar funding for the Kuh-ke-nah Smart Network will help build e-centres in the six Keewaytinook Okimakanak communities, provide homes, offices and businesses with high speed network connections, allow for skills development in information technology applications, enable the creation of the Keewaytinook Internet High School (<http://kihs.knet.on.ca>), a data warehouse and a telehealth project. The national recognition by the Smart Communities project, and substantial federal funding from various departments which comes with it, is the culmination of K-Net's ongoing commitment to bridging the digital divide for its member First Nations.

Conclusion

In Canada's First Nations communities, the digital divide has historical origins in colonial practices, it reinforces patterns of economic underdevelopment and it reproduces modes of cultural marginalization and social exclusion. Native interventions in telecommunications and information policy debates raise critical questions about information disparities in Canada while successfully advocating for local network needs beyond the limited framework of consumer choice and market demand. K-Net and other Native organizations have made strategic use of policies, programs and technological innovations to enable local control and application of digital tools. Their work has begun to redirect information flows toward, within and from First Nations communities in direct resistance to the centralizing pull of informational capitalism.

As new policies, programs and broadband technologies begin to address Canada's information inequities, Aboriginal peoples' wealth of cultural tradition, local knowledge and community values can begin to fill these new networks. Unlike the "old" media technologies, digital networks have a unique potential to connect individuals, to cross cultural, social and ideological divides in a multitude of immediate and unmediated moments. But for urgently required intercultural communication to occur in Canada, digital bridges must be built to the technical and cultural specifications of the Aboriginal communities who are to use them. In this manner, the digital divide can be crossed as part of the essential reconstruction of relations between Aboriginal people and other Canadians.

References

- Alexander, Cynthia J. and Leslie A. Pal
1998 Introduction, pp. 1-22 in *Digital Democracy: Policy and Politics in the Wired World*. Toronto and Oxford: Oxford University Press.
- Angus Reid Group
2000 *Canadian Internet Access Continues to Grow*. Retrieved from http://www.angusreid.com/media/content/displaypr.cfm?id_to_view=1061, April 30, 2001
- Battiste, Marie and James Sa'ke'j Youngblood Henderson
2000 *Protecting Indigenous knowledge and Heritage*. Saskatoon: Purich Publishing.
- Beaton, Brian and Jesse Fiddler
1999 *Living Smart in Two Worlds: Maintaining and Protecting First Nations Culture for Future Generations*. Paper presented to Local Knowledge/Global Challenge: Smart Community Development Conference. Summerside, Prince Edward Island.
- Breen, Marcus
1997 Information Does not Equal Knowledge: Theorizing the Political Economy of Virtuality. *Journal of Computer Mediated Communication* 3. Retrieved from <http://www.ascusc.org/jcmc/vol3/issue3/breen.html>, January 26, 1999.
- Buchwald, Carol
1996 *Canadian Universality Policy and the Information Infrastructure: Past Lessons, Future Directions*. Toronto: Information Policy Research Program, Faculty of Information Studies, University of Toronto.
- Canadian Radio Television and Telecommunications Commission
1995 *Competition and Culture on Canada's Information Highway. Managing the Realities of Transition*. Ottawa: Public Works and Government Services Canada.
- Castells, Manuel
1998 *End of Millennium*. Malden and Oxford: Blackwell Publishers Inc.
- Clement, Andrew and Leslie Regan Shade
1997 *What Do We Mean By 'Universal Access'? Social Perspectives in a Canadian Context*. Toronto: Information Policy Research Program, Faculty of Information Studies, University of Toronto.

David, Jennifer

- 1998 Seeing Ourselves, Being Ourselves: Broadcasting Aboriginal Television in Canada. *Cultural Survival Quarterly* 22 (2):36-39.

Digital Divide Network

- 2001 *Digital Divide Basics*. Retrieved from <http://www.digitaldividenetwork.org/content/sections/index.cfm?key=2>, April 30, 2001.

FedNor, Industry Canada

- 1999a *Aboriginal Telecommunications in Northern Ontario: Needs and Gaps Analysis*. Sault Ste. Marie, Ontario: FedNor/Industry Canada.

- 1999b *Aboriginal Telecommunications in Northern Ontario: Community Profiles*. Sault Ste. Marie, Ontario: FedNor/Industry Canada.

Finlay, Marika

- 1987 *Powermatics: A Discursive Critique of New Communications Technology*. London and New York: Routledge and Kegan Paul.

Graham, Philip

- 2000 Hypercapitalism: A Political Economy of Informational Idealism. *New Media and Society* 2:131-156.

Industry Canada, National Broadband Task Force

- 2001 *The New National Dream: Networking the Nation for Broadband Access*. Ottawa: Industry Canada.

Keewaytinook Okimakanak

- 1999 *Keewaytinook Okimakanak First Nations Telecommunications Consultation Report*. Retrieved from <http://smart.knet.on.ca/documents/CONSULT.html>, April 21, 2001.

K-Net Services

- 2001 *From Potential to Practice: Telecommunications and Development in the Nishnawbe-Aski Nation*. Sioux Lookout: K-Net Services, Keewaytinook Okimakanak.

May, James H.

- 1998 Information Technology for Indigenous Peoples: The North American Experience, pp. 220-237 in Cynthia J. Alexander and Leslie A. Pal (Editors): *Digital Democracy: Policy and Politics in the Wired World*. Toronto and Oxford: Oxford University Press.

- McChesney, Robert
1998 *Rich Media, Poor Democracy: Communication Politics in Dubious Times*. Urbana: University of Illinois Press.
- Menzies, Heather
1996 *Whose Brave New World? The Information Highway and the New Economy*. Toronto: Between the Lines.
- Mosco, Vincent
1996 *The Political Economy of Communication*. Thousand Oaks: Sage Publications.
- Murdock, Graham and Peter Golding
1989 Information Poverty and Inequality. *Journal of Communication* 39:180-195.
- Ramírez, Ricardo and Don Richardson
2000 *Research Project Report Year 1, PACTS for Rural (and Remote) Ontario (Partnerships, Accessibility, Connectivity, Transformation Strategies)*. Guelph Ontario: School of Rural Extension Studies, Faculty of Environmental Design and Rural Development, University of Guelph. Retrieved from <http://www.uoguelph.ca/~res/pacts/>, April 21, 2001.
- Reddick, Andrew, Christian Boucher, and Manon Groseillers
1998 *The Dual Digital Divide: The Information Highway in Canada*. Ottawa: Public Interest Advocacy Group
- Schiller, Herbert
1996 *Information Inequality: The Deepening Social Crisis in America*. New York: Routledge.
- Tomlinson, John
1991 *Cultural Imperialism: a Critical Introduction*. Baltimore: Johns Hopkins University Press.
- Twist, Kade L.
2001 *Cyber-Tricksters and Cyber-Shamen: The Other Side of the Digital Divide*. Retrieved from <http://www.digitaldividenetwork.org/content/stories/index.cfm?key=128>, April 30, 2001.
- US Congress, Office of Technology Assessment
1995 *Telecommunications Technology and Native Americans: Opportunities and Challenges*, OTA-ITC-621. Washington, DC: US Government Printing Office.

Wawatay Native Communications Society

- 1998a Unserved Communities in the NAN Area, in *Submission of Wawatay Native Communications Society to CRTC Regarding Public Notice 97-42: Telecom Services to High Cost Serving Areas – June 8, 1998 Timmins, Ontario*. Retrieved from <http://www.wawatay.on.ca/CRTC9742/Timmins/5.html>, June 12, 1998.
- 1998b Our Perspective on The Issues in This Hearing - 17, in *Submission of Wawatay Native Communications Society to CRTC Regarding Public Notice 97-42: Telecom Services to High Cost Serving Areas – June 8, 1998 Timmins, Ontario*. Retrieved from http://www.wawatay.on.ca/CRTC9742/Timmins/17_20.html, June 12, 1998.
- 1998c *Mandate Renewal Process 1998: Background Paper #1: The Information Age*. Retrieved from <http://www.wawatay.on.ca/MandateReview/infoage.html>, May 26, 1998.