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Videoconferencing for First Nations Community-Controlled Education, Health and Development

Susan O'Donnell
University of New Brunswick
Fredricton, New Brunswick, Canada

Lyle Johnson
Keewaytinook Okimakanak
Fort Severn, Ontario, Canada

Tina Kakepetum-Schultz
Keewaytinook Okimakanak
Fort Severn, Ontario, Canada

Kevin Burton
Atlantic Canada's First Nation Help Desk
Memberton, Nova Scotia, Canada

Tim Whiteduck
First Nations Education Council
Wendake, Quebec, Canada

Raymond Mason
Keewaytinook Okimakanak
Fort Severn, Ontario, Canada

Brian Beaton
Keewaytinook Okimakanak
Fort Severn, Ontario, Canada

Rob McMahon
Simon Fraser University
Burnaby, British Columbia, Canada

Kerri Gibson
University of New Brunswick
Fredericton, New Brunswick, Canada

***Abstract**: Videoconferencing is a powerful tool that First Nations in Canada are using to create communication spaces for local control of community services and community development. For First Nations in Canada, videoconferencing sessions are alternative public spheres for engagement and interaction outside of mainstream control. This article discusses how First Nations are using videoconferencing to create and support community-controlled education and training, health services, and other community development activities. Perspectives of a videoconferencing bridge coordinator and a case study from Keewaywin First Nation are discussed. Challenges for videoconferencing in First Nations are reviewed, followed by some thoughts about the future of videoconferencing in these unique communities.*

First Nations in Canada are self-governing autonomous political entities; each is responsible for providing a range of political, social, economic, community and cultural services and activities to community members and residents. Since the arrival of the European colonial powers, First Nations have been in an ongoing struggle to maintain control over their lands and resources. Increasingly, their struggle is also to control the essential services and activities that their people need. For this reason, First Nations are using videoconferencing and other technologies to create alternative spaces for communication, engagement and service delivery. The spaces created by videoconferencing enable local control of community services and activities. In this sense, information and communication technologies like videoconferencing are powerful tools that First Nations are using to realize their rights as indigenous peoples (Fiddler, 2008).

Many of the more than 600 First Nations across the country are in rural and remote areas, and some have only fly-in access year round. The distances between them can be vast, and large parts of the country have few or no permanent roads. Given these conditions, videoconferencing offers these communities obvious benefits. An increasing number of First Nations people are comfortable being able to communicate this way. The spaces created by videoconferencing give them the power to speak their ideas, speak their minds, and to listen to each other's issues. The videoconferencing spaces support many First Nations people to help each other without feeling inadequate, and they can free them from isolation. They allow people to remain in their communities more often and at the same time engage in regional, national and international activities that would otherwise be inaccessible to them.

In this article, videoconferencing refers to digital connections over Internet Protocol (IP) broadband networks using industry standard videoconferencing units such as Tandberg or Polycom set up in specific rooms or moved around as needed. Other web-based and mobile forms of videoconferencing are discussed in the final section on the future of videoconferencing in First Nations. The article reviews the development and context of videoconferencing in remote and rural First Nations communities, how First Nations are using videoconferencing to create alternative spaces for education and training, health services, and other community development activities, and the challenges for maintaining and developing these unique communication spaces.

Videoconferencing Spaces as Alternative Public Spheres

In the field of communications, the story of First Nations' videoconferencing can be situated within alternative public sphere theory and specifically, previous work articulating an Aboriginal public sphere. Jurgen Habermas' theory of the public sphere (1962/1989) has become central to understanding the role of media and communications in society. Habermas posited that the growth of capitalism in the 18th and 19th centuries allowed a public sphere to emerge - an arena for rational debate and opinion-formation by citizens. In Habermas' conception, a single public sphere exists where all citizens can participate as equals and deliberate about issues that concern them. Nancy Fraser (1992), one of Habermas' most significant critics, sees his theory as substantively flawed. Far from being universal, public discourse is structured to exclude marginalized groups, preventing them from participating as peers. Fraser describes the emergence of alternative arenas – "where members of subordinated social groups invent and circulate counterdiscourses to formulate oppositional interpretations of their identities, interests and needs" (1992, p. 123). Further along these lines, Miller (2004) suggests that telecommunications is the ideal medium for public sphere deliberations because its interactive communication "seems to have more in common with aspects of oral-centric cultures" (2004, p. 11) compared to the one-way broadcast communication used by print media, radio and television. Fraser's and Miller's concept of alternative public spheres provide a framework for a First Nations or Aboriginal public sphere and the use of videoconferencing to support it.

The concept of an Aboriginal public sphere was first developed by Avison and Meadows (2000) in their study of Aboriginal print media in Canada and Australia. They suggest that Aboriginal public spheres enable Aboriginal people to deliberate together, develop their own counter-discourses, and interpret their own experiences. In an Aboriginal public sphere, people use storytelling, art and music, and even silence to communicate, and all these different communication styles are accommodated. A key aspect of these Aboriginal public spheres is control by Aboriginal peoples of the communication spaces. The ideal Aboriginal public sphere supports a kind of collective self-determination that includes all community members, especially women and children (Avison & Meadows, 2000). More recently, Meadows (2009) argues that the continuing failure by the broader public sphere and mainstream society to address Aboriginal cultural needs has fostered the ongoing development of Aboriginal public spheres in Aboriginal and Torres Strait Islander communities across Australia.

The Aboriginal public sphere concept can be mapped to the use of information and communication technologies (ICT) by First Nations groups. Aboriginal communication systems existed for tens of thousands of years before European colonization, and ICT, including videoconferencing, is part of the recent history of this development. In Canada, McKelvey & O'Donnell (2009) explored the links between alternative public sphere theory and a case study of a videoconference event with people participating from multiple First Nations and other sites. They found that the videoconferencing

event reconfigured the space of First Nations. The technology encouraged people to feel temporarily as though they existed in the same space. Videoconferencing connected remote communities so they could think regionally. As one speaker emphasized, “videoconferencing … is like you’re walking into an office that feels like it’s next door and it can be like 3,000 kilometres away, so that’s a very good feeling.” Individuals using the technology were less concerned with distance. Participants described the technology as convenient because without travelling they could be in a single room that encompassed an entire region. Videoconferencing allows First Nations community members to conceptualize their place in a shared networked space, instead of a geographic space (McKelvey & O’Donnell, 2009).

A second theoretical framework to understand First Nations videoconferencing is community informatics. Community informatics goes beyond individual and household measures of the “digital divide” to understand how technologies operate in community contexts (Gurstein, 2003). This multidisciplinary research area has leaders in fields ranging from business administration to computer science, communications, sociology and others. What unites the diverse members is their research on communities, ICT, and, in many cases, activism. Community informatics theory posits that technology will support community development only to the extent that the collective capacity is available to use the technology effectively. In a community context, Gurstein defines “effective use” of a technology as the capacity and opportunity to successfully integrate ICT to accomplish collaboratively-identified goals. This includes local leadership, coordinated planning and design, and training at all levels to make the service usable. Using community informatics theory, the restraints and barriers to using videoconferencing to create communication spaces in First Nations encompass a wide range of social and technical issues (O’Donnell et al., 2009).

Spaces for Community-Controlled Education and Training

The concept of an Aboriginal public sphere can explain how and why First Nations developed the videoconferencing network in communities across the country – it was necessary to create communication spaces that allowed First Nations to control, manage, and in many cases own, the services and activities supported by the network.

The national initiative most directly responsible for developing the videoconferencing networks in First Nations was First Nations SchoolNet. From 2002 to 2011, the federal program funded First Nations SchoolNet regional management organizations (RMOs) across Canada, and the RMOs still exist and continue to offer their services. From the beginning, the focus of the RMOs was to support First Nations to have more control over their education services (Whiteduck, 2010). In this sense, the RMOs can also be described as organizations that support First Nations to create and manage the telecommunication spaces required for local control of their services and activities.

In the alternative public spheres developed for education and training, participants use and accommodate many different communication modes and styles. First Nations elementary and high schools are using the spaces created by videoconferencing in many innovative ways. The Atlantic region RMO, Atlantic Canada's First Nation Helpdesk, supported a project called MMTV (Mi'kmaq/Maliseet TV) News – using videoconferencing for students to produce, record, edit and broadcast local, national and international stories; they learned about group cooperation, journalism, and current events. The RMO for Alberta and Saskatchewan, Keewatin Career Development Corporation, produced the Breaking Barriers series - interactive spaces created by videoconference that allowed students to learn about careers, life stories, and educational programs, better preparing them for active participation in life after school.

Other examples of how First Nations have created spaces using videoconferencing for innovative exchanges involving school children include: a national Christmas concert in which First Nations students and elders across the country presented songs and readings to celebrate the season; a teen stress workshop for First Nations students in Atlantic, Saskatchewan and Alberta; connecting students in Saskatchewan and Alberta First Nation schools with partner classrooms from around the world to promote reading through a program called Read Around the Planet; and linking in the National Chief of the Assembly of First Nations along with other community, regional and national leaders to numerous national videoconferences (Whiteduck, 2010). All these are examples of how First Nations are using videoconferencing to create alternative public spheres to support students living in communities to develop unique cultural perspectives.

First Nations across Canada use videoconferencing extensively to create spaces for professional development to support people wishing to access or continue to hold high-paying jobs in their communities. In these cases, the alternative public spheres created by videoconferencing are a response to the failure of the mainstream society to address the economic needs of First Nations. For example, the Keewaytinook Okimakanak tribal council in northwestern Ontario developed a community-based approach for e-servicing water treatment in First Nations in the region. This highly innovative approach to the community delivery of water treatment services uses videoconferencing for mentoring, continuing education and support, and remote monitoring and electronic servicing of community water treatment plants (Gurstein, Beaton, & Sherlock, 2009; Strachan, 2010). Many rural and remote First Nations across Canada use videoconferencing to create culturally-appropriate training spaces for community members. In British Columbia for example, the Inter-Tribal Health Authority formed partnerships with two post-secondary institutions to bring mini credit courses to 51 First Nations communities via videoconference, supporting students who otherwise would have been required to leave their communities for training (Johnston, 2008).

To give two final examples, the Keewatin Career Development Corporation, the RMO in Saskatchewan, led the development of a partnership between the RMOs and

Cisco for the delivery of Cisco's Networking Academy training programs in First Nations. The program developed resource materials tailored for First Nations and delivered through e-learning and videoconferencing by First Nations instructors from several provinces. The RMO in Quebec, the First Nations Education Council, partnered with a university to use videoconferencing to create a space for engaging students in a First Nations Leadership Certificate program aimed at increasing knowledge about First Nations dynamics and issues. The program has high participation rates from First Nations communities across the province (Whiteduck, 2010).

Spaces for Community-Controlled Health Services and Wellness Activities

The videoconferencing network developed by the RMOs under the First Nations SchoolNet program was originally intended for community schools. However the RMOs fostered a relationship-building approach and a community-centred philosophy of sharing the benefits of the infrastructure and videoconferencing networks among other community service areas (Whiteduck, 2010). In this way, the same videoconferencing infrastructure that supports the alternative spheres used for education is also supporting other communication spheres used for health services and community wellness activities.

When the First Nations communities themselves control telehealth and telemedicine services and the communication spaces used to deliver these interactions, they are culturally appropriate. Videoconferencing is central to many First Nations health and wellness activities in remote communities. The ultimate goal of First Nations clinical telehealth is to enable a comprehensive (as opposed to a one-off) level of clinical health service for the communities (equitable service regardless of geography) that is managed and controlled by the communities themselves (Carpenter & Kakepetum-Schultz, 2010; Gideon et al., 2009; O'Donnell et al., 2010).

Flagship First Nations telehealth networks like Keewaytinook Okimakanak Telemedicine (KOTM) that began in 2002 in Ontario are positioned to deliver all of the "tele" health services using videoconferencing – if a clinical health service is in demand by communities, and a willing clinician is available, then the KOTM service will make it happen (Rowlandson, Williams, & Williams, 2008; Williams, 2010). The First Nations served by KOTM have a holistic culture and KOTM is a holistic model – it has a spiritual base to it, in addition to the mental (mind), physical (body), and emotional (feelings) elements.

To give a few more examples, the Alberta First Nations Telehealth Change Management Project supports First Nations-managed videoconferencing in diabetes care, mental health and discharge; the project plans to expand to oncology, geriatrics and psychiatry (Bruner, 2009). In Manitoba, 15 First Nations communities had telehealth capabilities using videoconferencing by 2009 and its use increased by more than 300% from 2008 to 2009. The specialities include oncology, anaesthetics, respirology, psychiatry and dermatology (Sanderson, McKenzie, Clarke,

Ramchandar, & Asgarali, 2009). Telehealth and telemedicine pilot projects run by First Nations and using videoconferencing are underway in all regions of the country. For example a pilot project to bring telemedicine to some of the most underserved First Nations communities in Ontario along the James Bay Coast has had positive results, with engaged leadership and good acceptance and adoption rates (Carpenter & Rowlandson, 2009). When telemedicine (videoconferencing) began in 2004 in that region, there were 50 referrals; by 2009, there were almost 600 referrals (Helmer, 2010).

Among the many other uses of videoconferencing to create community-controlled and culturally appropriate communication spaces for health services are speech and language assessments (SLA) and tele-audiology. The remote First Nation of Sandy Lake provides monthly day-long SLA sessions for elementary school students with a Toronto based SLA therapist for early intervention and support. Another example is how the Thunder Bay District Health Unit began its remote diagnostic audiology brainstem response (ABR) service in early 2008. The system requires videoconferencing so the audiologist can see the infant at the remote site and interact with the technician, infant and family; a secure data stream allows the audiologist to control the remote ABR equipment. Although there are drawbacks to doing this diagnosis remotely, without this service, infants and their families in remote communities would be unable to access to ABR diagnosis, and infants would miss the opportunity for follow-up and further testing (Polovoy, 2008). In addition to using videoconferencing for more typical clinical or consultation reasons, some First Nations communities have used videoconferencing to create tele-spirituality initiatives to facilitate sharing circles (Gibson et al., 2011), and to share traditional knowledge and medicine with other communities.

Spaces for Community Engagement

Another way that KO Telemedicine (KOTM) has been using videoconferencing to create interactive spaces for health is engaging the First Nations leadership to exchange information and ideas on health issues. The Chiefs are chairing their own meetings; the people have taken ownership of what content and which government agencies to invite. KOTM is finding out is that if First Nations are allowed to run their own programs, meetings or gatherings, there is more interest and more participants. First Nations are tired of sitting back and listening. Now it is the First Nations people who are in control in these meetings; they are the ones sitting on the power-chairs. In a recent example, First Nations Chiefs from remote and rural communities in northwestern Ontario used videoconferencing to connect with each other during a public health crisis, to share information and discuss strategies for action.

The concept of alternative public spheres is most commonly associated with interactive engagement and opinion-formation by groups outside the mainstream. In this context, First Nations are actively using videoconferencing to create communication spaces for these interactions.

A study conducted in 2007 with the Regional Management Organisations (RMOs) in Ontario and the Atlantic region found that together they supported First Nations in those regions to create more than 1,100 of these spaces for community engagement in a year; these were in addition to telehealth and school sessions (O'Donnell et al., 2010). These spaces for community engagement allowed community members to participate in events that otherwise would have been impossible due to time and travel constraints. The videoconference spaces provided community members with access to region-wide discussions and activities, promoting interaction between people and groups that are unable to connect in person. The focus of discussion included culture and language, economic and community development, and a wide range of other community issues. Most of these spaces connected people living in First Nations communities in the same province or region but many connected people living in two or more provinces; several connected First Nations community members with participants living outside of Canada (O'Donnell et al., 2010).

The 2007 study looked specifically at the visual aspect of videoconferencing. All the study participants said having visual communication is important when communicating at a distance. They want to see the other person during a discussion, and to be able to see that people are paying attention when they are speaking. With visual communication, people take the interactions more seriously because others are watching them. Visual communication allows them to build or maintain relationships with people they are unable to meet in person.

There are many other examples of how these alternative spaces created by First Nations using videoconferencing connect people to engage with each other. Recognizing the importance of these spaces for connecting families, in December 2008, K-Net in Ontario offered a seasonal service: "Meet your family for the Xmas holidays using videoconference," which provided families living in different communities with the opportunity to meet via real-time audio and video over the holidays. These communication spaces have been important for Native-language speakers who want a visual connection with each other. Regular elders' videoconferences, in which many participants speak Native languages, take place in Saskatchewan, Ontario and Atlantic First Nations communities. In the Atlantic region, sometimes the only contact some elders have with people speaking Mi'kmaq is in these communication spaces, because there are no other Native-language speakers in their communities. They can communicate without even making a speaking contribution – hearing the language and seeing the facial expressions and gestures is said to be enough to help them feel connected to their language and culture. In one videoconference space that connected people in multiple locations, the participants were pleased and amazed that the singing of a traditional Mi'kmaw song by a woman in Wagmatcook First Nation was spontaneously accompanied by a hand-drumming man in Indian Brook First Nation.

To give one final example, a satellite connection was used by Muskrat Dam First Nation in Ontario to create a videoconference space for participants to discuss Native languages resources. The theme was the use and preservation of the Native Oji

Cree language and the resources available by the Kwayaciiwin Education Resource Centre in Sioux Lookout. K-Net provided the videoconference bridge and the staff resources to coordinate the technical aspects of the event. The space connected 20 participants in Muskrat Dam, including a dozen children, and 15 participants in eight other communities in the region. The speakers used the visual aspects of the videoconference to demonstrate how to give different lessons using the materials in classrooms, and participants had the opportunity to ask questions and discuss issues raised.

Challenges for Videoconferencing in First Nations

As discussed earlier, community informatics theory posits that the restraints and barriers to using ICT effectively in communities encompass a wide range of social and technical issues and relations. A complex web of context mediates the relationship between the social and the technical, including structure and agency, history, culture and meaning systems, political and social processes, and symbolic and material interests and resources (Gurstein, 2003; Robbin & Day, 2006).

Videoconferencing, used as described in the previous sections to create spaces for communication among people in First Nations communities, requires much more than a good internet connection. For these communication spaces to be effective, they require a two-way symmetrical connection and the telecommunications infrastructure and human resources to support them. Therefore videoconferencing is also a lever for communities to access quality telecommunications infrastructure, bandwidth and support services capable of supporting these quality connections.

From a community perspective, a major challenge for First Nations in their use of videoconferencing is a lack of resources to support it. Simply purchasing a videoconference unit is only the first step - resources are also required for the human and technical infrastructure to create the spaces needed for a wide range of uses in communities. This challenge relates to the capitalist structure and ongoing socio-economic inequalities in Canadian society. Government funds for services in First Nations are guaranteed because of the treaty relationships but the funding is 1) insufficient, and 2) administered in a manner inappropriate for the needs of First Nations. As just one consequence of this situation, many remote and rural First Nations communities own a videoconferencing unit, but have no full-time IT support persons to manage them, and so the schools, health centres and other administrative offices have to fend for themselves or rely on costly external services for IT support. Another consequence is that these potential transformative technologies fall by the wayside. Government funding is supporting corporate telecom solutions rather than creating community owned infrastructure development opportunities and the local capacity to support their effective use (McMahon et al., 2010).

First Nations face many other social challenges related to their use of videoconferencing. Long term societal changes will be required to make online communication a financially attractive alternative to travel for meetings and events.

An ongoing social challenge is low levels of awareness in First Nations communities that these technologies are available in their communities to create communication spaces they can use for work and other activities. Even 10 years after introducing videoconferencing equipment to these remote and rural communities, many people have yet to integrate their potential in their own work and daily lives. Developing the communication skills that are able to use these tools and spaces effectively is a long term effort that everyone needs to be willing to adopt.

On an organizational level, many First Nations organizations are increasing their use of videoconferencing, but more organizational and staff attitude change is needed to ensure this relatively new mode of communication fits their work processes. This would involve basic training to use the equipment; in some organizations staff turnover is high, compounding the challenge. In many First Nation communities and in most urban institutions, there is a perception that people prefer to travel to meetings outside the community rather than use videoconferencing to create the meeting space. This is often untrue, but unless the videoconference option is widely known and appreciated people will be unable to appreciate this option.

An ongoing technical challenge is ensuring adequate levels and controls of the necessary bandwidth to and in communities. Some of the remote communities serviced by satellite have enough bandwidth for only one videoconference at a time, and so must employ technically sophisticated bandwidth management strategies to accommodate various simultaneous IP applications while a videoconference session is in progress. As mentioned earlier, this requires human and technical resources and expertise that needs to be maintained and sustained.

View from the Inside: Perspective of a Videoconferencing Bridge Coordinator

Lyle Johnson is the videoconferencing bridge coordinator for K-Net, Keewaytinook Okimakanak. K-Net has one of busiest videoconferencing bridges in Canada, creating communication spaces that connect dozens of remote and rural First Nations across Ontario and Canada. These spaces connect either point-to-point (participants at two different locations) or multi-site (participants in more than two locations). Participants can be in the same region or across the country or outside Canada. Here, he offers this inside view of videoconferencing in remote and rural First Nations, showing how videoconferencing relies on social as much as technical networks.

Building a successful communication space using videoconferencing is much like putting together a puzzle. Every piece must be put together carefully and in the correct manner for the communication space to be a positive experience for everyone involved. As people become more familiar with the equipment, their meeting environment, and the communication space, the challenges slowly become less onerous.

Videoconference management systems are becoming more practical and capable of

supporting more comfortable meeting spaces and experiences. Being able to switch between single screen (video switching) and multi-screen (continuous presence) formats gives the participants a better sense of who they are sharing the communication space with. Adjusting the audio levels and colour contrasts in each of the locations are additional features to make the space more effective for everyone involved. Desktop videoconferencing solutions such as Polycom CMA are now also available to allow participants to connect to the common space in an environment in which they are more comfortable.

Working with everyone involved in the communication space requires effective communication skills. Because all the work is done at-a-distance over the telephone and/or by videoconference, practical e-learning strategies must be in place along with a caring personality to deliver the support and training for everyone using these spaces. Training and troubleshooting are a common every day experience for every effective videoconference bridge operator.

Everyone engaging within a communication space created by videoconference needs to be determined to make it work. An example of this is a young Keewaytinook Internet High School graduate who had to leave his home community where he was studying before the end of the school year so he could be with his father who was ill in a remote northern First Nation in Quebec. The student successfully completed all his required courses online from his new home and he wanted to participate in the graduation ceremony with the other three graduates who were in Saugeen Nation in northern Ontario. The student worked with the bridge operator to get his computer set up with the required CMA software while utilizing his neighbour's Wi-Fi connection. He set up the computer in his window to get a good signal, dressed up for the graduation ceremony, participated and spoke at the online event. Everyone was so pleased to see this young man making the technologies work for him so he could successfully graduate and participate from his homes in these small remote First Nations.

Making videoconferencing spaces work effectively for participants in First Nations is a multi-faceted job that takes a lot of hand holding and encouragement. Changing the way that people meet and interact together online is an important requirement for all bridge operators. It is much more than just being that invisible person behind the scenes. Often the bridge operator needs to appear in the meeting space to encourage someone to turn off their microphone or to get someone to disconnect in the hope of establishing a better connection.

Case Study: Videoconferencing in Keewaywin First Nation

In November 1999, the leadership of Keewaywin First Nation met with Bell Canada and Industry Canada representatives to discuss bringing telephone and high speed data services to their community. The meeting along with pictures is documented online at http://knet.ca/keewaywintelecomm. The community was successful in raising the required $1.56 million from various sources and by December 2000

telephone and data service was available throughout the community. In January, 2001 the KO-KNET team installed a videoconferencing unit in the Keewaytinook Internet High School classroom in Keewaywin. The first communication space the community created with their videoconference was a meeting between community members and staff at the Keewaytinook Okimakanak office in Red Lake. And thus began the development of a thriving videoconferencing service in Keewaywin First Nation.

Keewaywin, from an Ojibway word meaning “going home,” achieved official Band status in April of 1985. Keewaywin First Nation is a remote community of approximately 400 Oji-Cree residents living on reserve with a total membership of 718 (Indian and Northern Affairs Canada, 2011). The community is located approximately 225 kilometres north of Red Lake on Sandy Lake in the remote part of northwestern Ontario, Canada. Access to the community is by air transportation year round plus an existing winter road connected to Pickle Lake and a second winter road route to Red Lake, Ontario. The winter road routes are usually open about 6 to 8 weeks during the coldest months of the year. Currently the total distances to major service and supply centres are in the order of 1,100 kilometres to Thunder Bay, Ontario or 1,150 kilometres to Winnipeg, Manitoba by the existing winter road system.

The community at present operates their own elementary school with grades K4 (kindergarten age 4) to 8. Some students in grades 9-12 attend the school in Sandy Lake while others travel to towns such as Sioux Lookout, Red Lake and Thunder Bay to attend high school. In 1994 the Wahsa Distance Education program began delivering radio and correspondence based secondary programs from Sioux Lookout. The Keewaytinook Internet High School was first introduced in Keewaywin in 2002. Keewaywin’s nursing station (built in 1998) delivers a full range of health services with visiting doctors traveling from Sioux Lookout for monthly visits. Child and Family Services are provided by Tikinagan Child and Family services in Sioux Lookout. Policing is provided by Nishnawbe-Aski Police Services with two full time police officers rotating shifts.

Keewaywin First Nation established its own cable network delivering high speed data connections to all the homes and community buildings in 2002 as part of the Keewaytinook Okimakanak Smart Communities initiative; Keewaywin residents thus had access to computers and the internet before residential phones were installed. Presently two Bell Aliant T1 circuits on the private managed Kuhkenah Network are available to serve the community’s IP applications. Additional bandwidth is required with a 10Mb circuit ordered and scheduled to be implemented in the coming months. The community-owned IP cellular service was turned on in the fall 2008.

The July 2009 launch of their new cell service was planned months in advance. Officials from Ottawa, the United States and other centres traveled to Sioux Lookout to catch a flight to Keewaywin for the celebration. On the day of the launch, all flights to Keewaywin were cancelled due to weather conditions. The planned

videoconference space to connect other communities to the event became the only way for all the dignitaries from other centres to deliver their speeches and presentations.

Videoconferencing units are presently located in the Keewaywin Band administration complex, the nursing station (one telemedicine unit and one public unit), the elementary school, the KIHS classroom and the community e-centre. The programs and services that utilize videoconferencing in Keewaywin presently provides five full-time jobs in this small remote community (the Keewaywin IT Technician, the Community Telehealth Coordinator, the KIHS Teacher and Classroom Assistant, the First Nation Community Liaison) that support the effective use of these tools and their associated applications.

In March 2005, a two day international online conference was held to celebrate the success of the Keewaytinook Okimakanak Smart First Nations project. During the event, Keewaywin First Nation created a videoconferencing space to allow leaders and community members to share their success stories with participants from around the world. This interaction led to a doctoral student from Vienna, Austria deciding to complete his doctoral research and thesis on the effective use of online social media (the myknet.org homepages) for sharing and communicating (Budka, Bell & Fiser, 2009).

Telemedicine clinical and heath education services are now widely accepted as the first level of support available for local patients for both early diagnosis and for follow up procedures. Videoconferencing is used daily at the local health centre to create secure private spaces for scheduled clinical sessions with doctors and health professionals. During a meeting space created by videoconference, the Chief of Keewaywin stated, “It is now easier and much quicker to access health professionals and the best part is that we can do this from the comforts of our own community using our own support systems.”

In June 2011, the Chief joined family members in Keewaywin at the online Keewaytinook Okimakanak High School graduation ceremony with 12 other First Nations across the region as everyone celebrated the high school graduation of local community members. This videoconference space was used for participants to share stories of the success of ten years of development work in establishing a locally owned, operated, full high school program in Keewaywin.

Keewaywin First Nation embraces the effective use of videoconferencing by participating in regional, national and international events that allow local community members to share their stories and connect with people, organizations, corporations and governments to create a healthy and vibrant community for future generations.

Future Prospects for Videoconferencing in First Nations

Earlier we identified the lack of funding for human and technical infrastructure in

communities as a major challenge for videoconferencing in First Nations. Supporting these levels of funding is a political decision that must be made by the federal government. Telecom corporations and governments are challenged to accommodate the unique needs of all remote and rural First Nations across Canada. The wide geographically and environmental realities across Canada's vast northern regions require different business and development strategies than those presently being applied so that First Nations can continue to use videoconferencing to ensure their local priorities and needs can be adequately addressed.

On the positive side, the broadband infrastructure situation in many remote and rural First Nations across the country continues to improve. New fibre cable builds are increasing bandwidth capacity or even in some cases replacing limited satellite bandwidth with vastly improved fibre capacity. Having more bandwidth available in communities should mean that more video communications will be possible - at a cost.

There are significant opportunities for First Nations political representatives – Chiefs and band councils – to increase their use of videoconferencing to create spaces for meetings and organizing at regional and national levels. The new Assembly of First Nations (AFN) National Chief has demonstrated an interest in using video – he has been posting a news video online on the AFN website every month – that could translate into more use of video for national activities, especially as the bandwidth continues to increase in First Nations across Canada. National assemblies are now webcast live. The next step will be to establish interactive communication spaces so people from the First Nations are able to effectively contribute and participate in these gatherings.

The recent elimination of direct funding for the First Nations SchoolNet program will have a negative impact on the future development of traditional videoconferencing in First Nations schools. In 2010, the RMOs in the Atlantic, Quebec and Ontario regions purchased the web-based Polycom CMA system and are currently rolling it out on a trial basis to communities, including schools. It is too early to gauge the extent of uptake and use of this system in the communities – a study is in the early planning stages for the Quebec region. As bandwidth increases in communities, more community members will be able to use internet-based videoconferencing systems such as Skype. Ongoing developments in the video communication market make it difficult to predict the long-term future of internet-based videoconferencing in First Nations.

In the short to medium term, videoconferencing via the internet delivered on mobile devices may be very slow to develop in remote and rural First Nations. A recent study on video communications in Canada suggests that few people are using mobile video now on their cell phones (Molyneaux, O'Donnell & Milliken, 2011) and the high cost to the user of mobile video will likely keep it out of the reach of most remote and rural First Nations community members. This situation will change in future if pricing structures shift to low cost video calling on mobile devices. However many remote

First Nations are without cell service capable of supporting mobile video, a situation that will remain unchanged in the short term (O'Donnell, et al., 2012).

For telehealth and telemedicine applications, internet-based videoconferencing will remain inappropriate for the foreseeable future. Applications like Skype do not meet Canadian provincial health system standards for privacy and security, and may not meet requirements for health data in First Nations that adhere to OCAP (Ownership, Control, Access, and Possession) principles (Schnarch, 2004). In addition, telemedicine applications depending on high quality video will require more bandwidth than available with internet videoconferencing applications. It looks like videoconferencing for telemedicine will drive much of the future videoconferencing development using Polycom and Tandberg systems in First Nations.

Conclusion

Aboriginal public spheres enable First Nations community residents to deliberate together, develop their own counter-discourses, interpret their own experiences. First Nations in Canada are using videoconferencing to create communication spaces that allow communities to maintain control over services and communications for community members. These spaces controlled by First Nations and supported by videoconferencing allow community members opportunities for engaging in activities that would otherwise be unavailable to them or difficult to access. These spaces support a kind of collective self-determination that engages many community members, including women and children, and thus are Aboriginal public spheres as described by Avison and Meadows (2000).

In Canada, hundreds of small, politically sovereign, rural and remote First Nations communities are using videoconferencing to create and control spaces that community members use to engage in education, health and wellness, and other community development activities. At the same time, First Nations are maintaining a political struggle for control over these services and activities through ongoing negotiations with the nation-state of Canada. More work is needed to ensure that control over these activities remains with the First Nations engaging in them. This First Nations story is part of the larger international story of how indigenous peoples everywhere are using digital networks and information and communication technologies to continue to rebuild and maintain control over their ways of life (McMahon, 2011).

The final perspective on the topic of videoconferencing in First Nations is from one of the First Nations authors on this paper. First Nations people may come from what the mainstream society call impoverished lifestyles but there is a great wealth of culture and pride in our identities as First Nations. We overcome hardships over and over again. We band together over videoconferencing and laugh even though the topic at hand is life-threatening. We have young people who can write and compose their own music just by connecting with the world through computers. We have Elders who are becoming young at heart by visiting each other through videoconferencing. We

have Elders and patients dying with dignity because they have access to telehomecare. They are able to say their goodbyes and give closure to their family in the way it was done in the past. Videoconferencing helps us express our faith and love of family and leadership.

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