

Case Study 1:

Video Conferencing and Remote and Rural First Nations

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Introduction

Video conferencing offers many benefits to individuals, organizations, and communities. Obvious benefits include saving travel time and money and reducing fossil fuel consumption when choosing video conferencing over travel (Molyneux et al. 2007). Another important benefit is allowing people living in different places to communicate face to face in real time. This provides more options for people living in remote and rural communities and people living in urban centres to access resources and services available only in distant locations.

Our research has highlighted examples of how remote and rural First Nations use video conferencing to support sustainable development. First Nations are using video conferencing not only for distance learning and telehealth, but also to increase their participation in a range of social, economic, political, and cultural activities (O'Donnell et al. 2007; O'Donnell, Beaton, and McKelvey 2008).

Video conferencing has obvious advantages for remote and rural First Nation communities, but a significant impediment to its more widespread use is the lack of a coordinated national plan to build, maintain, and support the necessary digital infrastructure. There are plans and policies for video conferencing for telehealth and education, but they are in separate silos and not aimed at increasing video conferencing for other purposes in communities. In addition, policy and program initiatives to develop broadband across Canada, including in First Nations, do not generally distinguish between high-speed Internet and broadband networks capable of sustaining real-time audio and video communication. High-speed Internet allows fast email and web browsing, but does not guarantee the quality of service required for reliable video conferencing. In contrast, broadband networks that support video conferencing have the capacity for rich visual and audio interaction (Perley and O'Donnell 2006).

The network infrastructure that allows many schools in remote and rural First Nations across the country to use video conferencing is supported by First Nations SchoolNet, a program of Indian and Northern Affairs Canada (INAC); however, the First Nations SchoolNet program faces an ongoing struggle for sustainability. Since 2006 the federal funding to Regional Management Organizations (RMOs) from SchoolNet has decreased significantly and there are no guarantees that the program will continue to be funded after 2009 (O'Donnell, Beaton, and McKelvey 2008). Without the networks supported by SchoolNet, many of the video confer-

encing activities in First Nations are in jeopardy, including telehealth, distance education programs, and the wider range of community-based activities using the technology.

This case study explores three main questions: Is visual communication important to remote and rural First Nations? What is the prevalence and purpose of video conferencing in non-institutional settings? What are the challenges for First Nations using video conferencing? Some recommended policy directions to increase the use of everyday video conferencing in remote and rural First Nations are also given.

Social Presence and Video Conferencing in Everyday Life

Our first question—about the importance of the visual aspect of video conferencing—requires some background discussion. Social science research on video conferencing began with attempts to understand why the visual is an important component of communication. A core theory from this early period is social presence. Social presence theory was originally developed by John Short and colleagues more than 30 years ago (1976) to understand the social psychology of video conferencing. According to this theory, video conferencing is richer in social presence than other non-visual media and communication channels—such as telephone conversations—because it can convey information important for good interpersonal communication.

Recent research in this area has highlighted three themes that make up social presence: 1) being together, including co-presence, co-location and mutual awareness; 2) psychological involvement, including saliency, immediacy, intimacy, and making oneself known; and 3) behavioural engagement, the immediacy behaviours through which social presence is realized (Rettie 2003). Other recent research argues that social presence is facilitated by observation of visual cues, such as facial expressions and body movements. Social presence and media richness theories suggest that increased richness of the media leads to increased social presence. Video, with its greater ability to support visual cues such as facial expression recognition, will give people a greater sense of social presence than audio alone (Roussel and Gueddana 2007).

Technology research and development on video conferencing has focused almost exclusively on improving the social presence and media richness of the experience, for example by creating higher-definition images, better camera placement and multiple cameras for increased eye contact, and larger screens for an immersive experience. In 1992, two researchers from the Bellcore labs in the United States published an influential paper that argued that instead, video conferencing should aim to be better than in-person communication by adding functionality to the communication experience that is not possible in an in-person setting (Hollan and Stornetta 1992). Their research is based on their belief that

video conferencing will reach a critical mass of users only when it is used widely for everyday communication. Further, they argue that unless video conferencing is better than in-person communication, it will not be used on a daily basis and thus will remain limited as a form of communication.

Research Focus, Questions, and Methodology

For the research discussed in this paper, a mixed methods approach was used. Methodologies included a content analysis of a random sample of 100 video conferences from the 293 video conferences archived on a K-Net server in October 2006; a traffic analysis of the K-Net video conference bridge log for a nine-week period ending early 2007; and 15 in-depth interviews with staff and associates of K-Net and the Atlantic Help Desk conducted during fieldwork visits to partner organizations in April 2007. In July 2007, the project organized and supported two national public multi-site video conferences connecting remote and rural First Nations with researchers and policy-makers in urban centres to discuss video conferencing issues. Transcripts of these two sessions were analyzed along with the 15 in-depth interviews to understand the video conferencing experiences of a wider range of participants.

More information about the participatory methods used in this project and the details of the interviews conducted are described in other publications from this project (O'Donnell et al. 2007, 2008a, 2008b; Simms, O'Donnell, and Perley 2008). The research methods and instruments were developed in consultation with the research partners. The research follows ethical guidelines developed by KORI (Keewaytinook Okimakanak Research Institute) in consultation with elders, youth, women, and other community members.¹

Research Findings

Importance of Visual Communication for First Nations

Earlier, we discussed the link between visual communication and social presence and how a high degree of social presence is important for effective interpersonal communication. In this section, we discuss the research findings on the importance of visual communication to First Nations people.

In the interviews, we asked specifically about the visual aspect of video conferencing. In their responses, all of the interview participants said that having visual communication is important when communicating at a distance. Many of the participants in the national public multi-site video conferences also mentioned the visual aspect of video conferencing. 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 meetings or gatherings more seriously because others are watching them. Several interview participants said visual communication allows them to build or maintain relationships with

people they cannot meet in person. Four quotations illustrate the importance of visual cues:

We're visual people, as humans, in general, and Native culture is even more so. I think there's a misconception when we talk about oral traditions. We tend to think only about sound, but I believe that oral traditions are audiovisual. When the granddad was telling those stories, and you were sitting around the campfire, you were thinking thoughts that had images attached to them. It's very definitely audiovisual ... it's not just sound. (Interview participant in Atlantic region)

It's just more personable. You see the person and their reaction, you know they're not working on other things. It gives you that closeness to that person ... After a while, it's just like meeting the person, so I think when you see them on camera, and when you see them in person, you kind of already feel that they're familiar. (Interview participant in northern Ontario)

You see. It's like you're there, you see everyone, and you see expressions on people's faces. You can see reactions to people as they're discussing, so you can engage and understand what they're presenting much, much better than only through audio. (Interview participant in Atlantic region)

The benefit of video conferencing is that we don't stop meeting face to face completely ... face-to-face meetings are very important by video conferencing compared to telephone. (Multi-site video conference event participant in Ottawa)

Some want visual communication primarily to be able to show things to the person they are speaking with, as illustrated in the quote below:

You can point the unit at the whiteboard and you can do a drawing and explain things which otherwise are really hard to do by emails going back and forth. Emails are second if you're trying to explain something, even worse than the telephone. (Interview participant in northern Ontario)

Several of the interview respondents highlighted the particular benefits of the visual for communicating at a distance with First Nations people with disabilities, the frail and elderly, and those staying in urban hospitals. Friends and relatives have used video conferencing to see for themselves how these people are doing. Video conferencing has also been important for Native-language speakers who want a visual connection with each other. Regular elders' video conferences, in which many participants speak Native languages, take place both in the K-Net and the Atlantic Help Desk communities. There are several examples where the only contact some elders have with people speaking Mi'kmaq is during these video conferences, because there are no other Native-language speakers in their communities. For them it is not necessary to make a speaking contribution to these gatherings—hearing the language and seeing the facial expressions and gestures is enough to help them feel connected to their language and culture. Recognizing the importance of the technology for family events, in December 2008, K-Net offered a seasonal service: “Meet your family for the Xmas holidays using video conference,” which provided families living in different communities with the opportunity to meet via real-time audio and video exchange over the holidays.

Prevalence and Purpose of Video Conferencing in Non-institutional Settings

The second research question addressed a different theme: video conferencing used by remote and rural First Nations for non-institutional purposes. Exploring this question primarily involved the analysis of the video conference bridge logs and the content analysis of archived video conferences.²

The analysis found that both the K-Net bridge and the Atlantic Help Desk bridge are used to support two-way video conferences, multi-site video conferences, and web streaming for simultaneous audiovisual exchange. In addition, K-Net, the Help Desk, and the community sites on their networks, also initiate point-to-point (two-site) video conferences within and outside their networks. Our findings suggest that K-Net supports about a thousand video conferences and multi-site video conferences a year, in addition to telehealth sessions. The findings suggest that the Atlantic Help Desk supports about 150 video conferences and multi-site video conferences a year.

These video conferences connect people in many different locations (sites). Of the video conferences we analyzed, only 3% connected two sites and the rest connected more: 44% of the video conferences connected six to ten sites, 28% connected three to five sites, and 15% connected more than ten sites. Most often video conferences connected people located in the same province (73%), but some video conferences were interprovincial (7%) or international (1%). Most of the video conferences (66%) had more than ten participants, 14% had six to ten participants, and 5% had three to five participants. Overall, the analysis of the gender ratio of participants suggests that video conferencing is used more often by women.

The content analysis of the video conferences archived on the K-Net server allowed us to develop statistics about the basic purpose of the video conferences: 62% were for learning related to personal, professional, or community development. For 14% of the video conferences, the main purpose was a meeting. For 14%, the main purpose was a community get-together; examples include the popular ongoing elders' video conferences to link elders in different communities who communicate in their Aboriginal language. Finally, 9% of the video conferences were streaming a large meeting to virtual participants; one example is a meeting in British Columbia about information and communication technology in First Nations, with participants joining by video conference from two other provinces, and which was streamed on the web to other participants across the country.

The content analysis found that the most common topic of the video conferences (59%) was health and wellness. Note that these were not clinical telehealth video conferences, but rather other kinds of sessions discussing health and wellness; a typical example is a multi-site interactive seminar for community health professionals on diabetes prevention. For 14%, the topic was education and learning.

For 9%, the topic was culture and language. For 6%, the main topic was information and communication technology; in addition, 32% of all the video conferences included discussion of information and communication technology as part of their main topic of discussion. For 5%, the topic was economic and community development.

Analysis of the interview transcripts found that video conferences are used by First Nations primarily when an in-person meeting or gathering would be appropriate but is impossible. The realities of remote and rural communities mean that travel is often too costly and time-consuming to be a realistic option. Alternatively, a tiny community may not be able to host a gathering because of a lack of food or appropriate accommodation for a large number of visitors. The quote below illustrates one example of family use of video conferencing:

The biggest thing is the reduction of travel costs. Patients don't have to leave home. They don't have to leave their families. They don't have to leave work. We also use it for family visits when high school students go out to school. They're able to visit their families here at home. (Participant in multi-site video conferencing event from northern Ontario)

Challenges for Video Conferencing in Remote and Rural First Nations

The final theme of our paper—the focus of the third research question—is challenges for First Nations using video conferencing. The data from the transcripts of interviews and public multi-site video conferences was analyzed to answer this question; our research findings are also discussed in our recent publication (O'Donnell, Perley, and Simms 2008). The challenges we identified were guided by a framework we developed for analyzing video communications for social interaction (O'Donnell, Molyneaux, and Gibson, forthcoming). The four categories in the framework are: technical infrastructure, the interactions of the users with the technical infrastructure, the production and reception of audiovisual content, and the organizational and social relations.

Our analysis found that the primary challenge for technical infrastructure in remote and rural First Nation communities is network and bandwidth constraints. Video conferencing requires much more network bandwidth than exchanging text data. Across Canada, the bandwidth available in urban communities is significantly greater than in rural and remote communities. In small communities, the commercial telecom providers are often not interested in providing network infrastructure, and if they do, it is expensive and can take considerable time to acquire. Some of the remote communities serviced by satellite have enough bandwidth for only one video conference at a time. The limited bandwidth has to be managed to ensure that video conferencing sessions are not degraded by other uses of the network, such as downloading and sharing large music and video files. Managing the network involves providing quality of service (QoS) for video conferencing, which requires human and technical resources that need to be maintained and sustained.

One example of the kind of technical infrastructure required to support video conferencing in remote First Nation communities is the introduction of a solar-powered tower and radio equipment installed in 2008 in Koocheching First Nation which will provide its residents with access to K-Net that will support the community's use of video conferencing, IP telephones, and high-speed data connections. The antenna will connect to K-Net at the site of the new cellular telecom tower located in Keewaywin First Nation.

Another infrastructure challenge is ensuring a critical mass of quality video conferencing units in First Nation communities. In the Sioux Lookout district of Ontario, the communities usually have three video conferencing units: in the school, health centre, and band office. In the Atlantic region, the communities with a school usually only have one in the school, although more Atlantic First Nation health centres are acquiring video conferencing units, and in a few communities the band office has one. The need for QoS implies using good quality set-top video conferencing systems. Although the cost of these systems is dropping, they are still expensive compared to desktop video conferencing systems using webcams. Currently desktop systems do not consistently provide the visual quality necessary for successful multi-site video conferencing sessions, although this may change in the future.

Moving on to the topic of community members interacting with the technology, a major challenge is the lack of awareness in communities that the technology is available and useful. Low levels of awareness and understanding remain after more than six years of introducing video conferencing equipment to these remote and rural communities. Sometimes, staff working in community organizations that have the capacity to use video conferencing are not aware that it exists and that they can use it. Organizations in First Nations need to change their work processes so that video conferencing fits within them, or, if video conferencing does fit their current work processes, they need to know how to make it work for their organization. This would involve basic training to use the equipment; in some organizations staff turnover is high, compounding the challenge.

Another primary challenge in this category is technical support. In urban government, institutional, and corporate offices there are trained technical contact persons who assist staff to use computer and video conferencing equipment. Conversely in remote and rural communities, these persons may not exist, and funding for such a position is always in short supply.

Another challenge is the difficulty of accessing the video conferencing equipment in remote and rural communities. The video conferencing unit is generally there for a specific purpose, such as health, education, or band office administration. It can be a daunting task to find out where and how to access the video conferencing unit in the community. In band offices, the units are often in meeting rooms that are heavily booked. The equipment in schools and health centres is usually not set up for community use; when it is, the rooms with the video conference units are often not available after 4 p.m. and on weekends.

Our analysis found several challenges related to organizing video conferencing events. In many First Nation communities, there is a perception that people prefer to travel to meetings outside the community rather than use video conferencing to attend the event. This is not always the case, but unless the video conference option is widely known and appreciated people will not have the option. There needs to be someone in the community willing to organize the video conference, and until this skill becomes as much a part of everyday life as making a phone call, there will be few volunteers. People will be hesitant to participate in video conference events until they become familiar with basic video conference etiquette and good practices. Some people are not sure of what to do for a video conference, where they should sit and so on—and they will not get this experience unless video conferencing is more widely used.

Finally, the analysis identified two main challenges related to broader organizational and social relations outside the community. The first was the need for outside funding to develop the community capacity to maintain and run the equipment, to train people how to use it, and to support its use. Most funding sources do not have a community or social development focus or provide for sustainable development in communities. As a result, funding is generally unavailable for most communities themselves to sustain video conferencing.

The final challenge is the low level of video conferencing activity by urban organizations. The interview respondents and participants in the multi-site video conferencing event identified a general lack of awareness, by professionals and institutions in urban centres, of the communication needs of rural and remote communities and the importance of video conferencing as a tool for connecting with community residents. In some cases, government and other partner organizations in urban areas do not have adequate support for video conferencing in their own organizations and need K-Net and the Atlantic Help Desk to support their use of the technology.

Conclusions and Policy Implications

Video conferencing—high-quality real-time visual and audio exchange among people separated by distance—offers real benefits for people living in remote and rural communities. The visual aspect of video conferencing is important for remote and rural First Nations because the increased social presence—compared with other non-visual modes of communicating over a distance—allows more effective interpersonal communication. People using it can experience the type of connection that builds trust and social relationships. Broadband networks that support video conferencing are found in most remote and rural First Nations across the country, many set up through the First Nations SchoolNet program and maintained by a national network of six RMOs. Our research with two of these RMOs—in Ontario and the Atlantic region—found that communities are using video conferencing not only for education and telehealth, but also for many

other community, social, and economic development purposes, and that non-institutional uses are limited. Our research identified significant social and organizational constraints that limit the more widespread diffusion and use of video conferencing in communities.

The main conclusion we draw from this investigation is that video conferencing is a powerful communication technology with the basic infrastructure to support it in place in many remote and rural First Nations. The technology meets the clearly articulated need to have a visual component involved in communicating with First Nations people; however, video conferencing will not be widely used for community, social, and economic development until it becomes a part of everyday life in communities.

How can video conferencing become more a part of everyday life in remote and rural First Nation communities across Canada? Making this happen will require changes and developments on many levels; this paper will make three recommendations on a national policy level:

1. All federal departments and agencies with a public service mandate need to review their own department's video conferencing capacity. At the 2007 public multi-site video conference analyzed for this study, several government participants said that many bureaucrats in Ottawa and other urban centres are not aware of video conferencing, and that the government lacks champions to promote video conferencing to reach out to First Nations. The long-term goal should be that all federal public servants who communicate now by telephone with the public should in future be able to communicate by video conference, which will enable them to reach remote and rural First Nations. In many departments it is likely that the internal computer support and technical service teams lack the expertise or are reluctant to use video conferencing. They may not know how to properly manage their video conferencing traffic within their own internal networks. This may be due to a lack of training or experience with video conferencing on the part of network managers. The best way to gain experience with video conferencing is to use it.
2. Federal departments with programs involving regular communications with people living in remote and rural First Nations need to work together on the infrastructure challenge. It makes little sense to have a patchwork quilt of broadband infrastructure development and support programs—one for schools, one for health, one for justice, and so on—when the same infrastructure will support many program areas. Further, if the support is for the infrastructure itself and not for specific uses of it, it frees up First Nation communities to dream up innovative ways to use the infrastructure for their own community, social, and economic development purposes. A common-purpose infrastructure with no program-specific strings attached will go a long way toward the goal of having video conferencing become a part of everyday life in communities.

“Infrastructure” refers to more than cable, satellite, and wireless connections, and the hardware and software that makes it usable. Infrastructure includes the capacity to use it. This means that the federal departments using this infrastructure need to ensure that they themselves have the capacity internally to use it. They also need to ensure that the remote and rural First Nations also have the capacity to use it. The goal should be to provide to the communities the same level of technical support available to the federal government partner.

Working together on the infrastructure will mean continuing to work with the RMOs currently funded by the First Nations SchoolNet program. They are the organizations nationally with the capacity to understand video conferencing and the needs of the communities they work with. The six RMOs have all expanded beyond supporting broadband connectivity in First Nation schools. They are the community-based organizations best positioned to work with the federal government and with the communities in their regions to develop partnerships and connectivity solutions with a range of players, from large telecommunications companies to local connectivity solution providers.

3. There should be a federal fund available to communities who want to increase their community capacity to use video conferencing for everyday non-program specific purposes, such as social networking and a wide range of community development initiatives. The fund would cover building community awareness, community skills training, and community-based technology support, as well as organizing multi-community events connected by multi-site video conferencing. The funding should also be available for communities that want to take the lead to develop resources to share good practices for community video conferencing.

Video conferencing will continue to be used by remote and rural First Nations. The big challenge raised in this paper is for all the partners in this process—the RMOs, their funders and government partners, their research partners, and the local technology and infrastructure providers—to work together to develop solutions that support innovative uses of this powerful technology by all members of remote and rural First Nation communities.

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Endnotes

- 1 To see the guidelines, go to <http://research.knet.ca/images/upload/06-12-11_Community%20Consultation%20Guidelines.pdf>.
- 2 For more information on the methodology used, see O'Donnell et al. 2007.

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