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How First Nation Residents in Remote and Rural Communities in Ontario's Far North are using ICT and Online Services Supported by Keewaytinook Okimakanak

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Abstract: For the isolated and rural communities in the Sioux Lookout region of Northwestern Ontario, communication links are vital. They connect community members with each other, with members of other communities, and with people living elsewhere in Canada and around the world. Broadband networks support many of the community and social services in this region. Keewaytinook Okimakanak (KO), Northern Chiefs in Oji-Cree, is a tribal council supporting and providing broadband-enabled services to many of the region's remote and rural First Nations. In late 2011, an online survey was conducted of community members in the region. Participants responded to questions about how they are using ICT in their daily lives, how they are using KO's broadband-enabled services - specifically KO Telemedicine (KOTM) and the Keewaytinook Internet High School (KiHS)- and what supports they need to use these technologies and services more effectively. This paper discusses some of the survey findings.

1 Introduction

Some of Canada's most isolated and rural communities are located in the Sioux Lookout region of Northwestern Ontario. Community members live in more than 30 First Nations (population approximately 20,000) as well as the regional hub of Sioux Lookout (population 5,300) and outlying towns and regional centres. Almost all these remote First Nations communities are accessible only by flight except for short

periods when winter roads make it possible to drive - sometimes more than 30 hours on challenging roads - to Sioux Lookout and other regional hubs. Communication links among and between these communities and with elsewhere in Canada are integral to the familial, social, economic and cultural aspects of daily lives. The broadband infrastructure and networks support community life and the delivery of community services and support community organizations, businesses and regional institutions.

The tribal council Keewaytinook Okimakanak (KO) has been developing, supporting and providing broadband-enabled community services in many of the remote communities in the region since 1994. The Kuhkenah Network (KO-KNET) is the telecommunications department at KO. KO-KNET Services includes internet, email, data management and storage, videoconferencing, web interfaces, wireless, satellite, cable, fibre and cellular services. Telehealth and the KiHS internet high school, two important and popular KO services, deliver appropriate medical and educational services in these First Nations using these connections.

The current study examines how people living in First Nations in this region view these broadband enabled services, particularly the online health and education services delivered by Keewaytinook Okimakanak Telemedicine (KOTM) and the Keewaytinook Internet High School (KiHS). We also examine how community members use a variety of technologies and their perspectives on the role of technology in daily life.

During November 2011, KO-KNET email account holders were invited to participate in an online study: this paper explores the information gathered from the 401 participants currently residing in a First Nations community in Northwestern Ontario. A report on the responses of all participants, as well as just those from KO communities, have also been presented and can be found online (Beaton, Gibson, Kakekaspan, & O'Donnell, 2012; Beaton, Kakekaspan, & O'Donnell, 2012)

Our research partners in Ontario, Quebec and Atlantic are working with First Nations to develop, implement, maintain and innovate with broadband infrastructure, networks, service delivery and data and administrative systems. This study provides new information and insight into current connectivity and technology use by members of remote and rural First Nations in an isolated region in Northern Ontario. The findings can help KO and other organizations consider user needs when moving forward with strategies for developing broadband and ICT networks and services to meet the growing connectivity needs of people living in these First Nations.

2 Internet Use in the Home in Remote First Nations

Before discussing internet use in First Nations it is useful to look at rates overall in Canada. It is well-known that people living in different geographic areas and in different social and economic situations have different levels of access to broadband services and ICT. These differences are commonly referred to as the "digital divide." In Canada, the latest Canadian Internet Use Survey conducted by Statistics Canada in 2010 found that 8 of 10 Canadian households (79%) had access to the internet. Over

one-half of connected households used more than one type of device to go online. Looking at urban and rural differences, the Stats Can survey found that about 81% of households located in census metropolitan areas and 76% of households located in census agglomerations had home internet access, compared with 71% of households outside of these areas. Rates of access were highest in British Columbia (84%) and Alberta (83%), followed by Ontario, where the rate was 81%. The Stats Can survey information contains very little information about the homes in remote First Nations.

Past research on the digital divide has identified challenges associated with ICT use that can explain why rural areas have lower rates of internet access than urban areas (related to broadband, infrastructure, and more: see O'Donnell, Perley, & Simms, 2008 for a discussion of challenges of broadband and video communications in remote and rural communities). Other challenges identified with lower rates of internet use include gender and education levels (Moll and Shade, 2004; Norris, 2001). Differences in internet and technology use by gender and education have to our knowledge never before been studied in remote and rural First Nations.

Very little research exists on how members of remote and rural First Nations are using broadband technologies and ICT, aside from the VideoCom project that conducted this current study. Since 2006, VideoCom has produced almost 40 publications, all available online at <http://videocom.firstnation.ca>. Since 2010, the project has completed community-based research in three First Nations - the remote Fort Severn First Nation and isolated Mishkeegogamang First Nation in Ontario and rural Kitigan Zibi First Nation in Quebec. These studies found that in all three, there was active internet use, particularly for social networking (Gibson et al., 2012; Gray-McKay et al., 2012; Lockhart et al., 2012). Recent research on Keewaytinook Mobile community-based cellular services in Fort Severn First Nation also indicates that mobile and cellular services will continue to grow in First Nations in Northwestern Ontario (O'Donnell et al., 2011).

Research by Bell, Budka and Fiser (2007) and Budka (2012) is, similar to the current study, based on online surveys of residents of remote and rural communities in Northwestern Ontario. In his 2011 survey of 117 KO-KNET users, Budka found that social networking use was common. The vast majority of respondents indicated that they had MyKnet.org homepages and Facebook profiles (95% for each). Research on a different project in British Columbia with the Ktunaxa First Nation also found that community members used the internet for social purposes and to learn from friends and family members. Social applications, such as live chat and Facebook acted as a gateway to engage people in information exchange and cultural communication (Henley, 2010).

3 Broadband-Enabled Health and Education Services in Remote First Nations

Aside from evaluations of programs and pilot studies, little previous research exists on how community members living in remote First Nations are using broadband-enabled services. The current study is focused on services provided by Keewaytinook

Okimakanak, particularly community telemedicine services and distance education for secondary students.

The study partner, Keewaytinook Okimakanak (KO) which means “Northern Chiefs” in Oji-Cree, is a non-political, not-for-profit Chiefs Council in Northwestern Ontario. The KO telecommunication division is the Kuh-ke-nah Network (KO-KNET), a provider of network services based on social equality. From its office in Sioux Lookout, Ontario, KO-KNET provides web, internet, satellite, videoconferencing and cellular services, and infrastructure to remote communities in northern Ontario. KO-KNET carries out its operations with a view to helping sustain distinctive and minority cultures, planning and acting on community needs, mobilizing communities, encouraging and supporting individual use of ICT and providing observations on how to foster and encourage community-based use of ICT for social interaction (Beaton, Fiddler & Rowlandson, 2004; Carpenter, 2010; Fiser & Clement, 2009; KORl, 2005; O’Donnell et. al, 2009). KNET also supports the KO Telemedicine (KOTM) service and the KiHS (Keewaytinook Internet High School) discussed in this paper.

KOTM operates in the context of significant health inequalities that persist in First Nations, particularly rural and remote communities. These inequalities are rooted in the lack of opportunity faced by remote regions and health services modeled on Western medical traditions (Gideon, 2006). Keewaytinook Okimakanak Telemedicine (KOTM), the only Canadian telehealth network managed and operated by Aboriginal people, provides telehealth services in First Nations communities across northwestern Ontario. KOTM began providing remote access service in 2000 and now serves more than two dozen First Nation communities (Williams, 2010). KOTM recognizes the importance of incorporating First Nations values and beliefs into its operations and the value of respecting and instilling local beliefs and culture to ensure the adoption and acceptance of new health tools and methods. The key to this success is building First Nations ownership and control of both the network and service, and addressing cross-cultural barriers to implementing Western-based clinical service into a First Nation community (Carpenter & Kakepetum-Schultz, 2010). The VideoCom project has completed one study on the attitudes of First Nations community members toward telehealth services, specifically their perspectives on telemental health (Gibson, Coulson, Miles, Kakekakekung, Daniels & O’Donnell, 2011).

The second service - KiHS - is a response to the education challenges faced by young First Nations students and their families living in remote communities. First Nations students consistently under-perform their mainstream counterparts in high school in Canada. Those who graduate often struggle to adapt to the many challenges of the Western knowledge system inherent in college and university. “Best practices” based on the assumption that students must leave their communities to attend high school have contributed to the current crisis in education. Against this backdrop, the Keewaytinook Internet High School (KiHS) is the first accredited First Nations digital school in Canada. KiHS is a network of more than a dozen classrooms located in remote First Nations in Ontario’s far north connected to each other by a robust broadband network (Potter, 2010; Walmark, 2010).

4 Research Questions and Method

The review of literature raises a range of issues related to the use of ICT and broadband-enabled services by community members living in remote First Nations in the Sioux Lookout zone. To explore these issues, we surveyed people living in communities in the region to understand some of their challenges: How are people living in First Nations in Northwestern Ontario using technologies? What are their perspectives on community services delivered via broadband - specifically KOTM and KiHS? Are gender and education related to technology use and satisfaction among these users? What other factors are associated with high satisfaction with telehealth/KOTM and education/KiHS services?

The study was designed and conducted as a partnership between KO-KNET and the VideoCom research project at the University of New Brunswick. Together we employed an online self-report questionnaire for KO-KNET email account holders administered during the month of November 2011. KNET had 7,209 email accounts that month and during that month, 4,175 account holders accessed their email and received the invitation to complete the survey. The 663 responses represent a 16% response rate overall, with 568 completing the survey, a 14% completion rate.

In total, 401 survey participants reported that they were currently residing in a First Nations community in Northwestern Ontario. Participants ranged in age from 17 to over 70 (see Table 1 below). Of that number, 57.6% (231) were female and 42.4% (170) were male. Further, participants held a variety of roles within their community: many were mothers, fathers, educators, students, health service providers, hunters/trappers/fishers, and leaders/councilors. In addition, participants reported various levels of education, ranging from less than high school (28.7%), to high school or equivalent (16%), diploma/certificate (21.7%) and some college or university (19.5%), bachelor degree (9.2%) and graduate degree (4.2%).

Table 1. Age breakdown.

Age	Frequency	Percent
17 or younger	4	1
18-20	14	3.5
21-29	61	15.2
30-39	125	31.2
40-49	113	28.2
50-59	69	17.2
60-69	13	3.2
70 or older	2	.5

The online survey - created and administered using surveymonkey.com - included 29 items for quantitative responses plus several opportunities to contribute qualitative comments and feedback. Demographic information was collected (gender, age category, community that the participant lives in, level of education, role in community). There were questions on: the approach to adopting and engaging in

technologies; satisfaction and perspectives on the broadband based services and websites that KO-KNET provides - including telehealth, the internet high school, the cellular service, and more; users were asked about changes or improvements that they would like to see to the services; what is needed to support effective ICT use; frequency of technology use across various ICT; location of internet use; social media use within and across communities and elsewhere; and how they use the internet to preserve their culture.

The survey data from the 401 participants was analyzed in SPSS and that program was used to generate statistical frequencies as well as to conduct a spearman's rho correlational analysis to test statistical significance; spearman's rho is appropriate for non-interval variables. The reported frequency of technology use was converted to numbers (daily=4, weekly=3, monthly=2, rarely=1, never=0). The satisfaction ratings for the above services were also coded numerically (excellent=4, good=3, fair=2, poor=1) and were correlated with gender (female=1, male=2). This analysis allowed us to look for any relationships between the technology-related variables and gender and education. The relationships are correlational and not causal - although definitive conclusions cannot be made from this analysis, it offers interesting relationship observations and trends nonetheless. Finally, a significance level of $p = .05$ was used for this study, given that many of the relationships we were investigating were fairly exploratory in nature.

5 Research Findings and Discussion

The "participants" discussed in this research findings section are people living most of the time in First Nations communities in Ontario's Far North who hold KO-KNET email accounts and who responded to our online survey during the month of November 2011. The education level, gender and age of the participant group are described in the methodology section. Note that all the participants in this study have an email account and so are all connected to the internet.

5.1 Patterns of Technology Use and Online Activities in First Nations Communities

One key survey question asked where participants were using computers and the internet. They reported using computers in a variety of locations. For regular use (daily/weekly) the most popular locations were: home (89%), work (78%), school (26.4%), at a friend or relative's place (28.7), and at an e-centre or public place (13.9%). It is important to note that even though using computers and the internet at an e-centre or public place is the least popular location, it is highly likely that community members connecting to the internet in these public places have few other options, and so these community internet resources are valuable for ensuring that everyone in the community has connectivity.

Another key question for the study is what they are doing online. As illustrated in Chart 1 below, the most popular use of the internet is engaging with social networking sites. More than 86% of participants are doing this either daily or weekly.

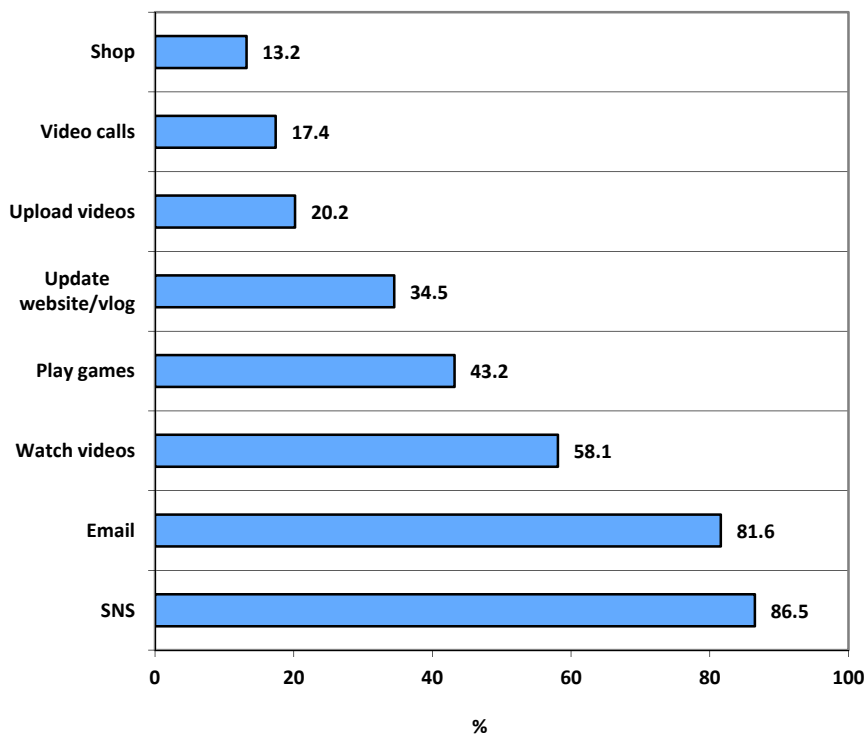
This finding echoes our earlier research indicating that using Facebook and MyKnet.org are very popular activities in the remote First Nations of Fort Severn and Mishkeegogamang.

Exchanging email is also a popular activity, with more than 80% of participants indicating they do this everyday or every week. One important finding from the study therefore is that the two most popular online activities are communicating with others (Chart 1).

Who are participants communicating with so often? They are using social media to communicate with people in their own community frequently: 84.1% do so regularly (daily or weekly), 5% do so monthly, 8.2% rarely, and 2.7% never. Similarly, participants use social media to connect with people in other communities in Northwestern Ontario: 74.8% do so regularly, 10.2% monthly, 11.2% rarely, and 3.7% never. Respondents also use social media to connect regularly with others elsewhere in Ontario (66.6%), elsewhere in Canada (48.7%) and in other countries (20%).

The third most popular online activity is watching videos, with 58% of participants doing this daily or weekly. After that, in decreasing order of popularity, are playing online games, updating a website or video blog, uploading a video, making video calls and online shopping (Chart 1).

Chart 1: Regular (Everyday or weekly) online activities

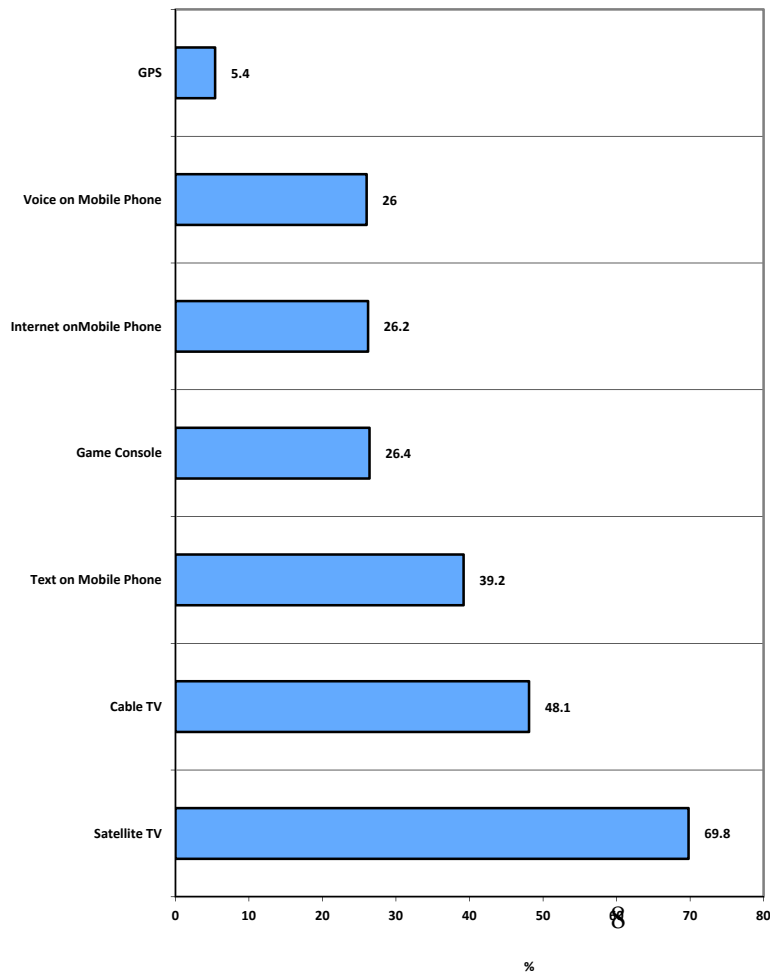


Several significant relationships were found between gender and these variables. Notably, a relationship between gender and frequency of social networking indicated a trend for women to use social networking (Facebook, MyKnet.Org) more frequently than men ($r_s[373] = -.11, p = .04$). A relationship between gender and watching online videos indicates that men watch online videos more frequently ($r_s[361] = .14, p = .01$).

Interestingly, no significant correlations were found between frequency of online activities and education. This suggests that education is not a significant factor in predicting which community members will use technologies more frequently than others for a broad range of online activities. This finding is interesting given that education is often cited as a key variable in the digital divide. On the contrary, our study suggests that community members across all educational levels are engaging with a range of technologies to meet their daily needs.

Another survey question asked about culture and online activities. Participants used a variety of methods to preserve their culture online: sharing self-created art or music online (13%), engaging in the music or art of Aboriginal artists (60.3%), posting announcements of cultural events (22.2%), writing a story and sharing it online (22.4%), reading books by Aboriginal authors (49.9%), posting stories and news online (60.3%): 12% of respondents indicated they do not preserve their culture in anyway.

Chart 2. Everyday or Weekly Use of Technologies.



In addition to asking about online activities, the survey also asked participants to indicate how often they use a range of technologies other than computers and the internet. As indicated in Chart 2 above, the two most popular technologies are related to television, with almost 70% of participants watching satellite TV daily or weekly and 48% watching cable TV daily or weekly.

Texting on a mobile phone was also popular, with almost 40% of participants doing this daily or weekly. Less popular were using a game console, accessing the internet on a mobile phone, making voice calls on a mobile phone, and using Global Positioning System (GPS) devices (Chart 2).

There were few significant relationships between gender and the frequency of technology use. However one was noted: men were more likely than women to be using gaming consoles more frequently ($r_s[230] = .20, p = .01$).

Two statistically significant relationships were also found between the frequency of technology use and education: participants with a higher education (more than high school) are making voice calls on a mobile phone ($r_s[222] = .14, p = .04$) and accessing the internet on a mobile phone ($r_s[228] = .14, p = .03$) more frequently than participants with a high school education or less.

5.2 Engagement and Satisfaction with Keewaytinook Okimakanak Telemedicine

As discussed earlier in this paper, Keewaytinook Okimakanak Telemedicine (KOTM) provides telehealth services to First Nations communities in Northwestern Ontario. However not all the communities participating in the survey have KOTM services so this should be considered when interpreting the findings.

Our survey found that 37.2% of participants have used telehealth. About half (49.4%) haven't used telehealth and 13% did not know if they had (which we interpret as likely not). When asked if they plan to use telehealth personally within the next year, 23.7% said yes and 57.1% did not know.

More than 65% of participants agreed that telehealth is a good alternative to visiting a health professional in person. Still, 47.1% reported that they would still like to travel for in-person visits. Privacy can be concerning and present a constraint to using this mode of engagement with health professionals. Almost half (45.9%) of participants indicated that they would be concerned about their privacy while using telehealth and only 29.4% indicated an absence of concerns; 24.5% indicated "I don't know."

When asked if telemedicine was a useful service, 54.4% agreed (35.4% said they didn't know, and 9.7% disagreed). Finally, 59.6% of participants felt that telemedicine services should be increased within their community (only 4.5% indicated disagreed, and 35.9% indicated "I don't know").

Next we asked how satisfied participants were with KOTM services. As indicated in Table 2 below, almost a quarter of participants (24.2%) rated the service as excellent, 38.2% said it was good and only a tiny percentage (2.7%) rated the service as poor.

Table 2. KOTM Satisfaction Ratings.

	Frequency	Percent
Excellent	97	24.2
Good	153	38.2
Fair	67	16.7
Poor	11	2.7
I don't know what this service is	73	18.2

We explored some trends for participants who reported being satisfied with KOTM/telehealth services (users who rated KOTM/telehealth as good or excellent), analyzing how satisfaction might correspond to certain variables (age, gender, education, previous use of service, KO community member, frequency of email use).

First, in terms of age, the highest percentage of satisfied users fell between the 30-39 range (34.4%): this is expected given that in the overall sample the highest number of users falls in this age range.

A statistically significant relationship was found between satisfaction with KOTM and gender: women were likely to rate the service higher ($rs[328] = -.13, p = .02$). No correlation was found between the education of the participants and KOTM satisfaction ratings.

Interestingly, no significant relationship was found between past use of KOTM and ratings, or between KO community membership and ratings.

Finally, we explored whether frequency/familiarity of technology use (using the frequency of email variable) was related to KOTM satisfaction: a significant correlation was found, indicating that the more frequently a participant uses email, the higher the rating they are likely to give to the KOTM service ($rs[324] = .14, p = .01$). Further study could explore if indeed people who are more comfortable with technology in their daily lives are also more comfortable with telehealth services.

5.3 Engagement and Satisfaction with Keewaytinook Internet High School (KiHS)

As discussed previously, the Keewaytinook Internet High School (KiHS) is a network of more than a dozen classrooms located in remote First Nations in Ontario's far north connected by a robust broadband network. The online school offers students and their families the opportunity to attend and complete high school in their remote First Nation community rather than move from their community to a larger regional centre for high school.

KiHS classrooms are located in many but not all of the communities that participated in the survey, so this should be considered when interpreting the findings. The survey found that many participants had family who had attended KiHS: 45.6% indicated that a member of their family is or was in KiHS (24.2% were unsure, and 29.4% did not have a family member in KiHS).

In evaluating the quality of the KiHS education, 29% of participants believed the quality of the education was the same as a high school in Sioux Lookout (59.5% did not know, and 10% disagreed). Further, 39.7% believed that KiHS students receive an excellent education (only 2.5% disagreed, 57.4% reported they did not know). About half (50.9%) of participants indicated they would be recommending KiHS in the next year (42.4% did not know, 6.7% disagreed), and again about half (53.6%) of participants felt that KiHS should have more students or capacity in their community (only 3.5% disagreed, and 42.1% indicated they did not know).

As indicated in Table 3 below, 21.4% of participants said that KiHS was excellent, 34.7% said it was good and only 2.4% said it was poor.

Table 3. KiHS Satisfaction Ratings.

	Frequency	Percent
Excellent	86	21.4
Good	139	34.7
Fair	47	11.7
Poor	10	2.5
I don't know what this service is	119	29.7

We also explored trends for participants who reported being satisfied with KiHS (users who rated KiHS as good or excellent), analyzing how satisfaction might correspond to certain variables (age, gender, education, previous use of service, KO community member, frequency of email use). Similar to the finding on satisfied KOTM participants, once again 31.1% of satisfied users fell in the 30-39 age category.

A statistically significant relationship was found between the satisfaction ratings and gender, suggesting that once again women were likely to rate the service higher ($rs[282] = -.12, p = .04$). No correlation was found between the education level of participants and KiHS satisfaction ratings. Additionally, no statistical relationship was found between having a family member who is in or had been in KiHS and satisfaction. Also similar to the KOTM findings, there was no relationship between people living in a KO community and ratings of the service.

Finally, satisfaction with KiHS was not correlated with frequency of email use; this suggests that familiarity with online technologies is unrelated to perceptions of KiHS.

5.4 Supporting Effective Use of ICT in the Lives of Community Members

The survey findings overall clearly indicated that most participants actively use technologies and that online communications and activities are a regular part of their lives. This is an expected finding, given that all the participants in the study have an email account. In response to a question about the role that technology plays in people's lives, 67.8% of participants indicated that "it helps," another 22.9% indicated that they couldn't live without it, while 9.2% reported that they "could live without it.'

Most participants identify as being considerate consumers of technology - 74.6% reported that they take "time to consider the usefulness of the product before I buy it" whereas only 7% reported that: "I buy the latest technology as soon as it is available." Another 18.5% indicated that they only purchase products once they have become standardized and there is no other option.

One of the objectives of the study was to identify what the needs are for remote First Nations community members in their use of technologies. One of the survey questions asked about those needs. Choosing from a provided list, participants endorsed various suggestions that they would find helpful in supporting their effective ICT use. Some participants also provided qualitative responses. The needs are listed in rank order in Table 4, below.

Table 4. Community Members' Technology Needs

Rank	Need	%	Comments
1	Better, faster internet	86	<i>"Improved speed of internet connectivity at the local level...will improve audio, video processing ... download and post data quicker and more effectively" and "Internet in the community is too slow. I attend online classes and the reception is not always reliable and I miss out on important instruction."</i>
2	A computer or better computer	51.9	-
3	Training	49.9	<i>"I would like to get training of fixing gate keeper issues," "have training and workshops for the parents & students" and "major training for all in the use of technology, including elders."</i>
4	A community cell network or better range on a cell network	48.1	<i>"Cell service along the winter road or expand the range of cell phones for safety reasons," "Wireless capability from my goose hunting blind," and "it would be great to have another cell phone tower to reach the 50 miles radius...because that's what the cell service providers promised!!"</i>

Rank	Need	%	Comments
5	A mobile phone that can access the internet	42.4	-
6	Money to pay for internet connection	34.7	<i>"Affordable rates for online use would benefit everyone"</i>
7	Someone to help with technology use	33.7	<i>"Currently, we need an upgrade on our internet line and services, we have problems in the summer: fuses burn out on the amps when there's a thunder storm. Also we need a local trained person that would work on our internet services."</i>
8	Nothing - have all I need	7.7	<i>"I am very satisfied! I look forward to all or any new technologies in the future. I am happy with everything ☺"</i>

Some additional ideas or needs that do not fit with the above categories were also put forward. For instance, one individual noted that their community could benefit from a larger e-center: *"Fort Severn needs a bigger e-center."*

Raising awareness about certain important and sensitive technology issues was also identified as important, in terms of helping facilitating critical and respectful technology use,

"Education...workshops done in communities that target the youth, to make them understand that it's not right to impersonate people by making bogus accounts...cyberbullying..."

Another participant noted the idea of having the K-net page available in other languages:

"I love k-net...nice and very simple to use. I wish my mom could use it too...but she doesn't speak or write English."

These needs identified by participants clearly point to an overall need for the remote First Nations to have adequate and sustainable resources for ongoing support and development of both their technology resources and human capacity development. The wide range of needs also underlines the need for communities to develop a comprehensive strategy for future technology development to ensure all the needs of communities are met now and in the coming years.

It is very notable that more than half of participants identified a computer or better computer as a need, and more than a third identified money to pay for an internet connection as a need. Clearly, many members of remote First Nations are finding the cost of using ICT a challenge. This points to the larger challenge of poverty in remote

First Nations, an issue outside the scope of this paper but very much on the radar of the research team. In other publications we have discussed the broad issues of colonialism and resource extraction that contribute to and support the conditions of marginalization and poverty experienced by many community members (O'Donnell et al., 2011).

6 Conclusions

The current study further develops the extant body of knowledge on First Nations connectivity. Our findings demonstrate that KO-KNET email account holders living in First Nations in Northern Ontario are actively engaging with a wide range of technologies and community services delivered via broadband. Overall, a high level of satisfaction with community services was observed. Very few significant relationships were found between these variables and education and gender (and those that were found explain only a small amount of variance).

This finding indicates that technologies are distributed and used widely in First Nations in Northwestern Ontario among community members for a range of purposes (e.g., education, health, cultural preservation). In these communities, women and men, youth and people of all ages and educational backgrounds are actively engaged with online technologies. They access the internet from a range of locations including community e-centres. Community members are going online to communicate on a regular basis, including social media interactions with other community members and people living elsewhere in the region, in Canada and other countries.

Many participants reported familiarity and satisfaction with using broadband education (KiHS - the internet high school) and health (KOTM) services. We learned that overall, women have a tendency to report being more satisfied with these services than men although it is not clear to us what that means.

Familiarity with technology (as measured by frequency of email use) was only related to KOTM satisfaction, and even then the relationship was quite small: it was not related to KiHS satisfaction. This suggests that familiarity with technology has a fairly small role in terms of influencing people's level of engagement or satisfaction with broadband health and educational services. Despite the good existing level of awareness about these services, some participants were unaware of the educational and health broadband services. This finding points to the potential benefit of education and awareness-raising activities to promote these services.

The investigations into correlations between education, gender, and the technology use and satisfaction variables were enlightening. Despite the fact that stereotypes around technology use exist, and the issues around potential digital divides, very few significant relationships were found overall. In terms of gender and online activity, women were more likely to be using social networking sites more frequently - but the relationship was quite small. The same applies to men watching online videos more frequently.

Level of education was not related to the frequency of engagement in any of the online activities. In terms of technology use differences, level of education was only related to more frequent use of voice calls and accessing the internet on mobile phones - and there was only one significant relationship found for gender (men were using gaming consoles more frequently). Again, this finding suggests that the technologies are more democratically dispersed in First Nations communities than they are in many mainstream communities where strong divides persist according to educational levels in particular.

All the survey participants had an email address so we cannot compare the levels of online activities found in this study with surveys of the general population elsewhere in Canada. It is clear that the sample of people in the study have a high level of technology use (overall, and across the education and gender variables).

When considering the situation of remote First Nation community members compared to urban dwellers, the sick and injured in cities have many options in the health care system. They can see their family doctor, go to a walk-in clinic or go to an ER. Community members in remote First Nations in Ontario's far north can either wait for the arrival of fly-in physician, sometimes for months, or book a telemedicine session with a physician located at a hospital or clinic in the urban south. The lack of options also applies to educational and employment opportunities on-reserve.

The existence of a carrier class broadband network capable of supporting IP video based telemedicine, digital education and cellular services located in a remote part of Canada is remarkable in itself. However the fact that the Kuh-ke-nah Network (KO-KNET) was built by community members in First Nations who face the same systemic barriers faced by Indigenous peoples around the world suggests that this is a model for development not an anomaly unique to special circumstances in a certain time and place.

The difference lies with community control and the authority to make decisions over all aspects of the broadband operation and access to adequate resources to build the network including the ability to make mistakes and learn from them. In line with this, survey participants demonstrated a great deal of interest in having KO-KNET staff visit their communities more often (which can allow for community engagement in service delivery planning, etc.). Furthermore, participants were very aware of what supports they needed in order to continue using technology effectively, this was evidenced by their many qualitative comments that contained specific and relevant requests.

This study provides an interesting investigation of the technology and broadband service use among First Nations community members in Northwestern Ontario - those with a KO-KNET email account. The exploration of the interconnection between technology use, gender and education, as well as the profiles of satisfied users of telehealth and education, can help us better understand the users of these services and the context around use. The diversity of the sample is also an advantage: a wide

age range was used (17 to over 70), community members held a variety of roles within their communities, and a variety of educational statuses were held.

The correlations we conducted simply indicate relationships and trends found to be statistically significant: neither causation nor direction can be assessed. With this in mind, and other methodological limitations (e.g., the sample was self-selecting and not random) we are limited in any generalizations we can make. Nevertheless our study did make interesting findings and suggest connections related to how community members in remote First Nations use technology and services delivered via broadband.

Future research ideas include exploring First Nations connectivity among youth. Most research to date, especially past research by KO and VideoCom, have examined the experiences of adult users of technology. Given that many of the KiHS users are below the age of 17, it would be helpful to develop a better understanding of their needs and uses of technology. These and other research possibilities will be explored by the research team in the coming years.

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