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ICT Use Between School and Home in Kitigan Zibi Anishinabeg First Nation: Challenges and Opportunities for Moving Forward Collectively

Emily Lockhart
University of New Brunswick

Anita Tenasco
Kitigan Zibi Anishinabeg First Nation

Tim Whiteduck
First Nations Education Council

Susan O'Donnell
University of New Brunswick



Kitigan Zibi Kikinamadinan

1 Introduction

Kitigan Zibi Anishinabeg First Nation is an innovative rural community in Quebec. Located 130 kilometers north of Ottawa, it is the closest First Nation to the Canadian capital. In both population and territory, Kitigan Zibi is the largest of the ten Algonquin communities. Broadband connectivity and information and communication technologies (ICT) are important to the community and incorporated into everyday operations.

The education sector in the community includes Kitigan Zibi Kikinamadinan (high school and elementary), Paginawatik (junior and senior kindergartens), Wazonon (daycare), Odekan Head Start Program, and Post Secondary Student Support program. This sector services

approximately 206 students and 85 families. The education sector also provides services to members of the community who attend provincial school in the nearby town of Maniwaki. The Education sector's ultimate goal is: *"to give hope and encouragement to each student to reach his/her full potential academically, emotionally, socially, physically, and spiritually. Kitigan Zibi and Paginawatig School encourage each student to become a life long learner."* The community as a whole is passionate about trying to ensure that students are given the maximum education opportunities.

This paper explores the use of technology in the education sector in Kitigan Zibi, in particular the situation of having technology readily available at school and less so at home. This transition from a technology-filled classroom to limited or no ICT access at home is a challenge, not only for individual students and their families but also for the community as a whole.

Although education is the main focus of the paper, broadband networks and ICT are heavily embedded into all the service sectors in Kitigan Zibi. The use of these tools by service providers is important but can only be sustained and developed if all members of the community have access to and are able to actively and effectively use ICT devices in and out of the home. How Kitigan Zibi is using technology in its broader range of community services is explored in a separate study by the research team (O'Donnell, Tenasco, Whiteduck, Lockhart, 2012).

The current study is based on a survey of connectivity and ICT use in households with school-aged children and interviews with community education service providers. It is evident from the interviews that ICT connectivity and use is an important part of the education sector in Kitigan Zibi and that it will continue to evolve to better serve the community in the future.

2 First Nations Education, ICT, and Broadband Connectivity

A few background remarks are appropriate for readers unfamiliar with the situation of First Nations in Canada. In law, First Nations are sovereign political entities in treaty relationships with the Canadian state. Since the arrival of the European colonial powers more than five centuries ago, First Nations across this land have been in an ongoing struggle with the state to maintain control over their lands and resources (Royal Commission on Aboriginal Peoples, 1996). Alongside the ongoing treaty issues is the need for First Nations to control their community services and the infrastructure and resources to deliver those services in a holistic manner.

Across Canada, First Nations face serious funding challenges for education. In 2009, the First Nations Education Council (FNEC) reported major shortfalls in funding in Quebec, considering the population growth and the increased cost of living in First Nation communities. FNEC noted that although provincial funding had increased, it was not sufficient to meet the needs of the growing communities. In 2008 alone, there was an annual funding shortfall of \$233M in the province for First Nations education (FNEC, 2009).

Furthermore, FNEC argued that although First Nation young people between 6 and 16 of age are entitled to an education comparable to that received by non-Native students, the schools are unable to provide this due to the chronic underfunding (FNEC, 2009). This severe lack of funding is attributed to an outdated funding formula provided by INAC (Indian and Northern Affairs, now Aboriginal and Northern Affairs). The formula has not been modified since 1988 despite changes in the field of education and ways of learning, and advancements in technologies and scientific discoveries. FNEC argued that new technologies for educational purposes are available in most mainstream schools while First Nations schools are struggling to acquire funding to provide their students with these tools.

A recent field study of the situation across mainstream schools in Canada (Arntzen, Krug & Wen, 2008) found that information and communication technology (ICT) is widely acknowledged as an emerging and increasingly important area of K-16 education. Most provincial departments of education recommend that ICT be integrated into K-12 subject area curricula. Funding issues aside, Kitigan Zibi elementary and high school are certainly on board with this recommendation. They both have been incorporating technology into their lesson plans with various tools such as SMART boards, videos, computers, and many educational software programs. Incorporating technology into teaching and learning can only be sustained with ongoing funding.

It is important to recognize that quality of technology use is more critical to students' success than quantity and this requires consideration of a number of factors. Lei & Zhao (2007) found that quality of technology use was more important than quantity when referring to increases in students' grade averages.

Two groups of technology uses were found to have a positive impact on students' grades (Lei & Zhao, 2007). One group includes specific subject-related technology uses such as those produced to help students' improve their reading skills or designed to introduce Math curriculum for all types of learners. The second group includes technology uses that focus on student construction, creativity, and design. These types of programs enhance computer skills and allow for a learning experience that gives the students control over technology in a way that is unique to their individual or group needs and desires. A number of programs are available to accommodate different types of learners at all levels.

Administering quality over quantity implies several requirements. First, funding is needed for computer programs that are not free to users via the internet, such as multimedia packages, editing programs, and subject specific programs. Second, training for educators to use the various programs is essential to ensure that students are getting the most out of the particular learning program. Finally, to ensure that students are able to maximize their learning experience via these programs, it is important that they can access them from home.

Having technology readily available at school but not at home may contribute to differences in computer skills between students (Kuhlemeier and Hemker, 2007). After a careful review of the literature it is evident that there has been significant research conducted on ICT use at school but little research on how students are using ICT at home.

Our broader research project is exploring how rural and remote First Nation communities in Canada are using broadband networks and ICT. Our community research in Fort Severn First Nation and Mishkeegogamang First Nation in Ontario has highlighted both the successes and the challenges that these communities face with broadband infrastructure and connectivity (Gibson, Gray-McKay, O'Donnell, and the people of Mishkeegogamang, 2011; O'Donnell, Kakekaspan, Beaton, Walmark, Mason, & Mak, 2011). Many of the challenges result from inequities on many levels.

Connectivity in rural and remote communities across Canada - including First Nations communities - is lacking for many reasons, ranging from costly and difficult technological challenges to non-existent and ineffective government policies. Developing the "First Mile" of broadband infrastructure in communities in ways that support community ownership and control of services is an ongoing struggle (McMahon, O'Donnell, Smith, Woodman Simmonds & Walmark, 2010). In addition, the policies and funding programs do not support access to and effective use of technologies by community members (Gurstein, 2003; O'Donnell, Milliken, Chong, and Walmark, 2010). The challenges of providing technologies and support to First Nation schools and the leadership of key First Nations organizations in building the infrastructure have been documented (Whiteduck, T., 2010).

At the national level, the First Nations leadership has recognized that broadband infrastructure is essential to support First Nations to close gaps in education, health, economic development and services. In 2010, the AFN published an e-Community ICT model highlighting the need for communities to secure broadband infrastructure and human resources (Whiteduck, J., 2010). In December 2011, First Nation Chiefs-in-assembly passed a resolution for a First Nations e-Community Strategy (AFN, 2011). One objective is to ensure First Nations control, own and maintain sustainable broadband systems, applying OCAP principles (Schnarch, 2004).

3 Research Questions and Methodology

The review of the literature suggested three main research questions for this study:

- To what extent is the Kitigan Zibi education sector using broadband and ICT?
- How, and to what extent are community households with school-age children using ICT?
- What challenges are households experiencing with connectivity?

Our study was conducted in collaboration with Kitigan Zibi First Nation and in partnership with the First Nation Education Council in Quebec. Together they facilitated meetings with community leadership, setting up interviews with community service providers, and conducting the household survey.

To explore the research questions, the study used two different methods: 1) a survey on residential technology use distributed to households with school-aged children - 94 household surveys were completed, 61 with high-school students and 33 with elementary school students; 2) seven semi-structured interviews with community service providers who worked in the education sector in the community.

This mixed methods approach, combining qualitative interviews with a quantitative survey, gave us a clear picture of how ICT is an integral part of the education services in Kitigan Zibi as well as the community connectivity challenges for households with school-age children.

The research protocols, reviewed by the research ethics board of the researchers' home institution, follow the ethical guidelines for doing research with First Nations communities outlined in the Tri-Council Policy Statement (Government of Canada Panel on Research Ethics, 2011).

4 Study Findings

4.1 ICT and the Education Sector in Kitigan Zibi

Technology is an integral part of life in Kitigan Zibi First Nation. Service providers are quickly adopting new programs and tools to be more effective and efficient in the services that they provide to members of the community.

In the education sector in particular, technology is integrated into many aspects of teaching and learning. For example, SMART board technology has become a vital piece of lesson planning and educators are using these tools in creative ways to introduce new topics, incorporate and preserve the Algonquin language and culture, and target all types of learners.

One educator noted: *"...in the world we live in today, you can't live without the internet. As a teacher, myself, I use it so much now. I don't visit the library; I don't have to do much research anywhere but on the internet. There are lesson plans out there; we have SMART boards; there are SMART board lessons out there that I can download. You know, it's where I go for my information for my lessons and I build my units with it, so I'd be lost without it."*

Further emphasizing the community's strategy of integrating technology in education, another educator said: *"I find that's an advantage for students in our community that might not be there in other communities, just the technology itself, having an elementary and high school computer lab for our students to access and getting new computers every few years and even having the SMART board technology that a lot of schools don't have. We're really doing a lot in our community."*

The community shows a clear dedication to its members, which is evident by its strong education system. The number of students that leave Kitigan Zibi to obtain a post-secondary education in nearby centres such as Ottawa and Montreal is encouraging and educators in the community make post-secondary preparation a key focus of their teaching strategies. One educator pointed out: *"In my classroom, it's a larger reflection of the sort of the stated objective or the community-wide goal, and that is to put our young people in a position to make some very smart decisions about the role of technology in their postsecondary existence."*

4.2 Classroom use of ICT

As discussed in the literature review, quality of technology use is more essential than quantity when it comes to student success and increased grade averages. In other words, researchers found that providing students with the tools required to engage with technology was not enough if the programs were not available to enhance learning. It is not sufficient to have the large digital SMART board, if the educators lack adequate training to use it or adequate funding to purchase the desired programs to administer subjects to their students.

Lei & Zhao (2007) also found that having a computer in the classroom was only advantageous if students were using them for educative purposes and that they could actually hinder learning if they were not being used in this way. They found that when students were over using computers, they tended to drift and lose focus, often wandering off into the worldwide web and spending time doing other things unrelated to school (Lei and Zhao, 2007). This is the problem with quantity. Spending too much time using ICT will not increase a student's grade average unless that time has been spent engaging with e-learning or similar education related programs.

Quality of technology use, as mentioned above includes using subject-related programs. In Kitigan Zibi, educators are using these types of programs, which are available online. One educator explained that RAZ-Kids and DreamBox math are *“both very good programs that the kids use themselves.”* These subject-related programs require that teachers or schools purchase an annual license.

The second type of technology use considered good quality for educative purposes is technology that allows students to actively help to create something. Kitigan Zibi students are highly engaged in innovative and creative uses of technology that involves the use and understanding of multimedia. This includes scripting, shooting, editing, and uploading videos as well as producing other types of artistic projects with the use of these skills. Students at the high school level are introduced to new concepts and approaches surrounding the use of technology for individual and group creativity.

Upon seeing the work created by the students in the technology classes, one can see that the students involved feel a sense of pride and accomplishment. Educators at Kikinamadinan strive to give students the knowledge and tools to use technology to develop and launch their creative projects as well as understand how technology may affect their lives. Speaking to this, one educator said: *“Regardless of the career they choose, the path that they take, technology is going to play a part. Even [if] it's a matter of a student turning their back on a particular type of technology, they're making informed decisions and they're knowing what precisely they are turning their back on.... People have extensions of themselves that are digital or technological so we put them in a position to make some smart decisions about how to use those tools.”*

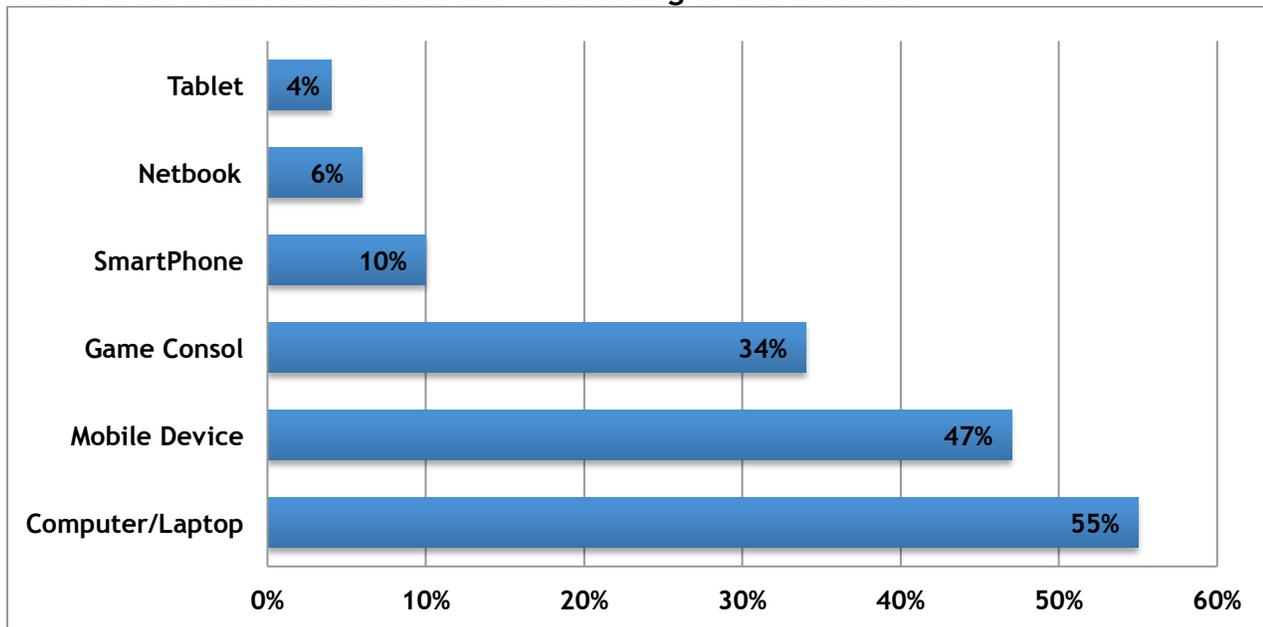
4.3 Families with School-aged Children and ICT at Home

With ICT so intertwined into the delivery of education services, it is important that students and their families are able to stay connected from home. A steady flow of connectivity from school to home allows students to access information for assignments and teachers to prepare lesson plans. Home connectivity allows parents and other family members to access online information about community services - such as healthcare, daycare, culture, housing, and more - that provide the holistic support necessary to ensure the best progress for the students through the education system.

The survey found that 73% of Kitigan Zibi households with school-age children are accessing the internet from home, and 27% are not connected to the internet. It is important to keep in mind that in surveys of the Canadian population as a whole, families with students at home tend to report higher rates of technology use than households without. This implies that the fewer than 73% of community households overall are connected to the internet.

Kitigan Zibi families with school-age children are connecting to the internet in a variety of ways including with computers, mobile phones, game consoles, tablets and more. Computers, mobile phones, and game consoles were reported as the most common technologies used in the home. As indicated in Chart 1, more than half of the respondents (55%) reported using a computer or laptop to access the Internet. Other popular methods of connecting to the net were through mobile phones (47%) and game consoles (34%).

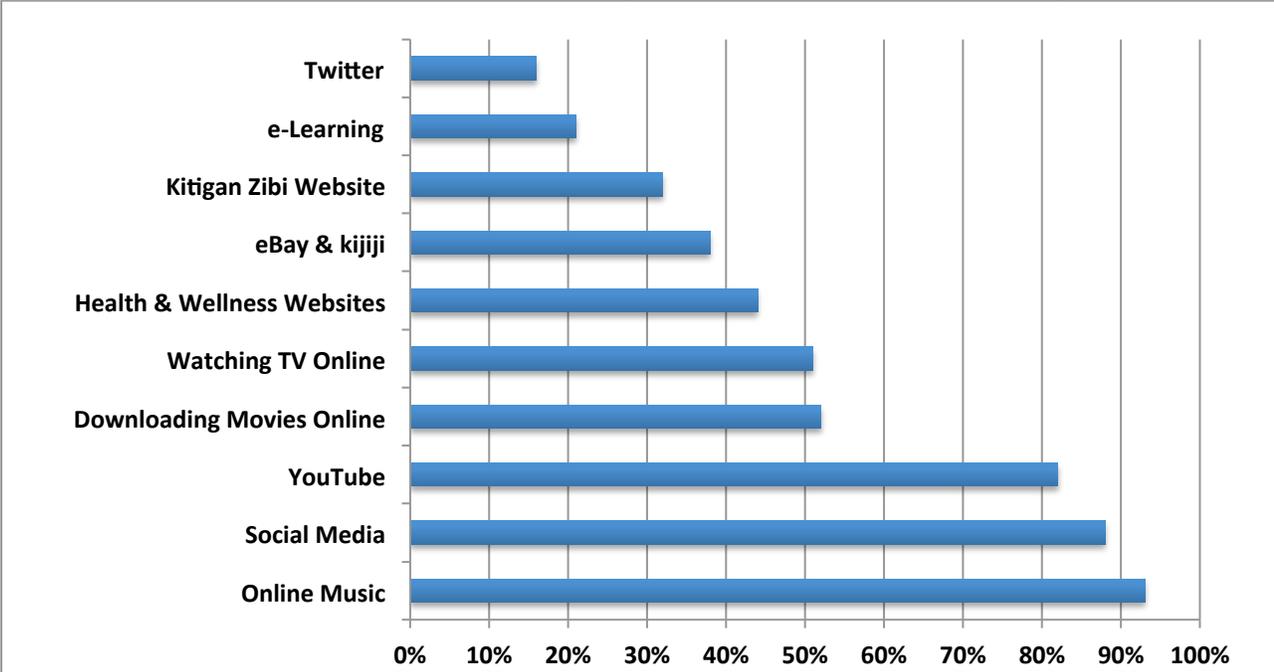
Chart 1: How KZA Households are Connecting to the Internet



The most common uses of the internet services are illustrated in Chart 2. These include online music, social media websites, YouTube and assessing the internet on a mobile phone. 44% of respondents indicated that they access health and wellness websites and 21% said that they used it for e-Learning. The community website (<http://kzadmin.com>) was also

mentioned on the survey and 32% of respondents indicated that they used the internet to access it.

Chart 2: Internet Services used at Home by KZA Families with School-aged Children



The finding about e-Learning is important here. Further to the importance of quality of technology use for students’ success, we need to highlight that less than one-quarter of the households with school aged children are accessing e-learning from home. This could be for a number of reasons including, but not limited to, lack of connectivity, training for parents, training for students, and cost. We must ask: how are students expected to continue improving their skills and learn if they are unable to access from home the programs available at school?

It is critical to acknowledge that a student’s success involves an ongoing learning process where they are able to engage with their schoolwork while at home. This allows students to not only have access to the various programs they are using in the classroom but also communicate with other students and teachers via web-discussions, blogs, or email. As the Kitigan Zibi education system continues to increase its engagement with ICT, students and parents need to be able to stay on board and up to speed with similar ICT at home.

4.4 Household Connectivity Challenges

The number one reason for not having a household internet connection was a lack of or no connectivity available to them in their residential area. 17% indicated that they had ‘no service’ in their home. Others were waiting to get connected or trying to get connected but were having difficulties with this process for a number of reasons including that the location of their home was outside the service area. Respondents indicated that high speed internet

was a fairly recent service in the community and some had not yet been able to change from dial-up to high speed.

Respondents indicated that service problems are not as common for mobile phones as they are for internet connections. Only 3% of respondents reported problems with accessing a mobile signal in their residential area. The most common reasons why community members choose not to use mobile phones are cost and lack of interest. Some indicated that mobile phone plans and contracts were unappealing but sometimes there is no alternative option if you require the service.

As noted above, some households live outside of the area that Bell services; they are unable to connect. One community member said: *“The school has a lot of connections, buildings have connections, but where I am right now, I could connect only one wireless with the Bell Canada turbo chip because I don't have cable. Cable has not come to my place. It stops maybe a mile away.”*

The Bell Turbo stick is an option available to remote homes situated outside of the zone that Bell Canada services with land lines. These devices are costly and some respondents indicated that they did not fit into their household's budget. One community member mentioned, *“We're too far, so we'd only get dial-up service and that's too slow. And to buy that ...like the Bell Turbo stick or whatever, it's pretty costly, so it's like do I want to invest in that.”*

Some respondents indicated that they chose not to use the internet at home because of the high costs associated with it. This is echoed in the interviews we conducted in the community that found the cost of an internet plan is a challenge for some community members. One community member interviewed expressed concerns about cost saying: *“There are community members who have children here who as parents just can't afford it. And so we can't really use it as a tool for everyone because they can't go home and use it.”*

Some respondents mentioned other reasons for the lack of household connectivity: they were uninterested, had an inadequate computer, or used the internet at the home of a family member. Sharing computers between households is a common trend in other First Nation communities that we have visited.

5 Discussion and Conclusions

Kitigan Zibi Anishinabeg is an innovative rural First Nation community - they are continuously integrating technologies into their everyday operations. Community members are, for the most part, using ICT to stay connected with others. The community's education sector in particular has placed considerable focus on the importance of ICT for teaching and learning.

Our study found that Kitigan Zibi was following the wise practice of quality of ICT use over quantity. They acknowledge the evidence that quality of ICT, not the time spent in front of a computer, is linked to increases in students' grade averages. Quality ICT use refers to the observation that Kitigan Zibi students engage in innovative and creative ICT use. In the

community high school, students are challenged with new approaches to ICT use for individual and group creativity.

To ensure this level of quality use of ICT, the community education sector must receive adequate funding. The education sector needs to continue to administer, develop and deliver these programs in the schools. The current funding arrangements for First Nations education will require a more holistic approach that supports First Nations in their ICT activities and programs for education.

The community's educators are adamant about staying up to speed with the latest programs for enhanced learning and student creativity. They are working together to ensure that Kitigan Zibi students are receiving the education needed to achieve their post-secondary, career, and life goals and on all fronts. The community is preparing their students to become contributing members of the Kitigan Zibi community and society at large.

Given that ICT is woven into the fabric of the education system's everyday functions, it seems only logical that students would be using these tools from home in order to continue developing their skills. One-quarter of the students' homes do not have internet connectivity. Homes with internet connectivity and school-aged children are using ICT mainly for social outlets and entertainment. Our survey indicates that e-Learning is not a trend for these families, although the students in the household are engaged with e-Learning from school.

Technology has considerable value for Kitigan Zibi. Our interview participants recognize the importance of bringing all community members on board as the collective moves forward. Addressing key challenges that keep community members from having access to and actively and effectively using technologies are important priorities. Kitigan Zibi will be successful in integrating ICT into everyday educational activities in the community - if all community members are able to access and use these technologies effectively.

As ICT use continues to develop in the Kitigan Zibi education system, it will be important to consider the effects that this may have on students who are unable to access similar services from home. Using ICT at home could be considered as an essential element for the continued skill development and improved learning for these students.

All the issues with lack of household connectivity need to be considered in any strategy for community technology development. This could require comprehensive and long-term planning. Our study found that the primary barriers to household connectivity were: lack of connectivity or affordable connection options in their local area and the cost of connectivity. These findings speak to larger challenges faced by Kitigan Zibi and most other rural and remote First Nations in Quebec and across Canada.

Broadband infrastructure provides connectivity to the community and all the services and homes in the community. Canada has no effective broadband strategy. The federal government's "Digital Economy Strategy" has yet to be revealed. The national leadership of First Nations continues to document the need for, and lobby for, a comprehensive First

Nations e-Community strategy for broadband connectivity in First Nations that includes resources for ongoing support and maintenance (AFN, 2011; Whiteduck, J., 2010).

The study indicated that some households in Kitigan Zibi are having difficulties finding the money to pay for internet connectivity. This situation reflects the experiences of many people living in other First Nations across Canada. It speaks to the need for all federal policies related the Digital Economy to ensure provisions for access to affordable broadband for everyone.

Federal policy should ensure that First Nations have the partnerships, resources and capacity necessary to provide broadband services and support ICT use in their communities. This includes support for communities to own, operate and maintain their local networks in a sustainable manner. In this way, broadband networks can support ongoing needs in the education sector as well as all other community services sectors. First Nations can also provide internet services to households, businesses and other organizations in the community. At minimum, all households in First Nations across the country should have the opportunity to be connected to broadband internet.

Options will need to be increased for Kitigan Zibi families without the money to use ICT at home. A strong focus on universal service and the right to internet access must be considered as a key point to this argument. Access to information and education is essential for the betterment of the student, their family, the education system and the community as a whole. Finally, the study points to the need to integrate a much more holistic concept of technology into federal First Nations education policies.

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