



Co-developing digital inclusion policy and programming with Indigenous partners: interventions from Canada

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Abstract: Diverse rural Indigenous communities in Canada, like those in many regions of the world, are facing a variety of challenges and opportunities associated with the development, deployment, and adoption of rapidly emerging digital technologies. These include supply-side challenges (such as availability and cost) and demand-side challenges (such as appropriate digital literacy programmes). This article discusses two examples of digital inclusion co-developed with Indigenous peoples in Canada: a supply-side intervention focused on digital access policy, and a demand-side intervention focused on digital adoption.

Keywords: Indigenous peoples, Community informatics, Digital policy, Digital literacy

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Declaration of novelty and no competing interests

By submitting this manuscript I declare that this manuscript and its essential content has not been published elsewhere or that it is considered for publication in another outlet. Parts of Section 1 are drawn from a previous draft article written with Dr. Sylvia Blake when she was a

PhD Candidate at Simon Fraser University and Denise Williams from the First Nations Technology Council. Parts of the concluding discussion are drawn from McMahon (2014), which is cited in the text.

No competing interests exist that have influenced or can be perceived to have influenced the text. I declared my involvement in the activities profiled in the two case studies discussed in this article. I receive some consulting fees for preparing regulatory interventions for the First Mile Connectivity Consortium; the CRTC cost claims process is outlined here: <https://crtc.gc.ca/eng/archive/2010/2010-963.htm> and cost claims are published on the commission's website.

INTRODUCTION: INDIGENOUS-LED SUPPLY-SIDE AND DEMAND-SIDE INTERVENTIONS TO SUPPORT DIGITAL INCLUSION

Diverse Indigenous peoples, including First Nations, Inuit and Métis peoples in Canada, are facing challenges and opportunities associated with the development, deployment, and adoption of rapidly emerging digital information and communication technologies (ICTs). Digital ICTs can support cultural resurgence and self-determined development (Alia, 2010; Bredin, 2001; Dyson & Grant, 2006; Salazar, 2007). For example, community data centres house digitised cultural resources; mobile phones connect people to emergency services while they are on the land; videoconferencing units link doctors and patients across distances; and mobile language apps are used by people of all ages (O'Donnell et al., 2016; Sandvig, 2012). But along with potentially positive outcomes, digital ICTs also introduce challenges, including digital access divides, ongoing maintenance and upgrade costs of technologies and infrastructures, and problematic online content (Beaton & Campbell, 2014; Duarte, 2017; Iseke-Barnes & Danard, 2007). While governments, companies, and civil society organisations are all paying increased attention to the potential of digital inclusion, gaps remain with respect to the specific needs and concerns of diverse underserved Indigenous populations. In this context it is essential that Indigenous peoples are substantively engaged in decisions regarding the planning and implementation of policy and programming in their territories (Hudson, 2014; Philpot, Beaton, & Whiteduck, 2014). This article discusses two examples of digital inclusion co-developed with Indigenous communities in Canada. I frame the discussion around 'supply-side' interventions focused on enabling the provision of adequate, affordable infrastructure and services to end users; and 'demand-side' interventions associated with the effective adoption and use of digital technologies according to the situated needs of user groups.

POLICY FRAMING: DIGITAL DIVIDES AND THE 'FIRST MILE'

Recent public policy and funding supports that aim to bridge both kinds of digital divides target rural and remote Indigenous communities to connect to high-speed digital infrastructure (Government of Canada, 2019). These supply-side interventions support the provision of broadband, such as through building infrastructure, establishing broadband services, and addressing consumer issues like affordability of service and data usage. In many regions where Inuit, First Nations and Métis peoples live, access to digital connectivity remains limited and unreliable, with high prices charged for services and data overage (Office of the Auditor General of Canada, 2018). For example, the national telecommunications regulator's most recent annual *Communications Monitoring Report* (CRTC, 2019) notes that fewer than one-third of First

Nations reserved areas have access to the basic service objective requirement of 50 Mbps download / 10 Mbps upload speeds (p. 38) -- and that no households in the three northern territories (Yukon, NWT and Nunavut) can access those speeds (p. 41). Affordability is a related supply-side challenge: monthly service costs are highest in rural and Northern communities, with average prices ranging from \$166 CAD in Québec, to \$220 CAD in the North (ibid, p.58).

In industry-driven telecommunications projects, the requirements of the people living and working inside these communities are typically framed as the “last mile” of development. Philpot, Beaton, and Whiteduck (2014) argue that digital inclusion initiatives too often limit opportunities for local engagement in favour of corporate needs, “a result of a discursive environment in which First Nations broadband issues are dealt with within a discourse of dependency” (para 3). In Canada, Indigenous technology advocates have worked hard to reform policy and regulatory frameworks to counter this “last mile” discourse, proposing an alternative approach to supply-side digital inclusion policy that focuses on the “First Mile” of community-driven development. The term “First Mile” frames community-owned and operated broadband infrastructure and services as an alternative to the “last mile” link from service providers to subscribers (Paisley & Richardson, 1998; Strover, 2000). As argued by McMahon et al. (2011):

To move beyond the historical context of paternalistic, colonial-derived development policies, the First Mile recognizes that First Nations communities and governments are best positioned to decide when and how they access and use newly developing technologies, including broadband systems (p. 2).

The diverse First Nations, Inuit and Métis peoples who reside in rural, remote and Northern regions have a long history of community-driven technology innovation (McMahon, Hudson, & Fabian, 2017). Countering the top-down ‘last-mile’ approach of technology transfer, some of these Indigenous communities have led local and regional community networking initiatives (see, for example, Carpenter, 2010; McMahon, Gurstein et al., 2014; Roth, 2013; Whiteduck, 2010). For example, the Swampy Cree community of Fort Severn, which is located on the shores of Hudson Bay, uses a community-owned satellite network to connect people to public services otherwise unavailable locally, such as telemedicine, e-learning, and video court proceedings (Gibson et al., 2012; Fiddler, 2019). Larger-scale regional networks, such as the Tamaani Internet system set up and managed by the Kativik Regional Government in the Inuit territory of Nunavik, provide connectivity and services to citizens in remote fly-in communities (FMCC, 2018). A host of initiatives demonstrate community efforts to deploy infrastructure in expensive to serve areas while retaining ownership and control of networks, services, and applications. The operations and sustainability of these digital resources requires a complex balance between local innovation, regional cooperation, supportive policy and regulatory conditions, and individual and organisational capacity.

INTRODUCING TWO CASE STUDIES OF DIGITAL INCLUSION

In this article, I discuss a case study describing how Indigenous organisations collaborated with university-based researchers to shape regulatory and policy frameworks to reflect First Mile development principles. I discuss the efforts of the First Mile Connectivity Consortium (FMCC), a national association of First Nations technology organisations that has intervened in a number of policy proceedings, including during 2012 hearings on Northwestel’s Modernization Plan, a 2014 inquiry on satellite services, and the 2015-2017 review of the “Basic Service Objective” for telecommunications in Canada (McMahon, Hudson, & Fabian, 2014). Through this work the

FMCC developed a model for supply-side digital inclusion that puts communities at the centre and the start of any digital network development process. This First Mile model stresses the importance of leaders from affected regions substantively engaging in policy decisions regarding how digital connectivity is built, setup, owned, paid for, distributed, managed, and used in and across their communities. As described in the first case study covered in this article, this process involves researchers working with Indigenous technology organisations to develop arguments and evidence to present to policymakers in formal proceedings.

The second kind of digital inclusion policy I discuss in this article refers to demand-side dynamics; that is, efforts to support and encourage people and organisations to adopt and utilise digital technologies. They include educational interventions, such as appropriate forms of digital literacy, as well as efforts to identify and showcase digital innovation as a means to encourage effective adoption and use. Historically, such interventions typically reflect the same shortcomings of supply-side initiatives: a focus on corporate-driven, 'one-size-fits-all' measures that reflect normative goals of efficiency and revenue generation rather than community-led efforts to secure greater control over digital resources and their impacts on society. In short, demand-side digital inclusion initiatives do not always examine the best ways to work with diverse user groups so that their ways of living and being are reflected in digital adoption and educational programmes.

However, First Nations, Inuit and Métis peoples are utilising digital applications in many creative ways (O'Donnell et al., 2016). A strong desire to document and share Indigenous cultures and languages reflects people's interest in exploring how newly available digital tools support such work. For example, Isuma has built a multilingual digital network showcasing more than 6,000 films and videos in 80 languages (over 1,300 in Inuktitut). Importantly, this project was carried out in regions of Canada where YouTube and Netflix are not yet widely available, due to inadequate and expensive connectivity (Dalseg & Abele, 2015; Kunuk & Cohn, 2010). Today, Isuma's 'low bandwidth' system uses a site-specific technical infrastructure to distribute digital content in ways that allows people across Nunavut to create and view community-curated 24/7 programming. Schools with low-speed, unreliable and expensive bandwidth can show students videos on topics like traditional ways of treating caribou and seal skins without having to rely on limited satellite links. This example -- and many others -- demonstrate how the effective, situated use of digital technologies might support the cultural resilience and sustainability of diverse Indigenous communities.

In this context, the second case study I describe in this paper focuses on digital literacy as a particular kind of demand-side digital adoption programme. Research indicates that Indigenous peoples living in rural, remote and Northern regions of Canada recognise the limited services, high costs of services, and potential changes that may come as a result of increased access to digital ICTs and the internet (O'Donnell et al., 2016). They are interested in digital literacy resources that will help them monitor speed and quality of service, ensure that pricing practices are fair, and protect their families and communities from online risks. As well, they note that while rapidly expanding digital connectivity can support the delivery of a host of public services, economic development opportunities, and social and cultural benefits, it also brings challenges. Along with creating new dependencies on digital infrastructures, applications, services, resources and data, ICTs can introduce a wave of English- or French-language content. As well, increased adoption of digital technologies raises concerns over privacy, surveillance, and the commodification of Indigenous knowledge. The widespread dissemination of commercial social media platforms threatens to spread incorrect information and inappropriate content, further undermining Indigenous protocols of knowledge stewardship and misrepresenting these diverse

cultures and societies. Therefore, it is important to learn from Indigenous peoples directly about how best to tailor digital literacy programmes to mitigate these risks and harness the potential of digital ICTs. The article's second case study provides an example of a digital literacy initiative that is grounded in Nation-specific cultural revitalisation activities, while supporting technical understanding and skills acquisition in areas including cultural representation, data stewardship, and digital storytelling. This approach combines digital literacy teaching/learning with efforts to document the rich cultural teachings of Elders: from the Piikani Blackfoot Nation in southern Alberta.

PROJECT METHODOLOGY

I am directly involved in both case studies described in this article. As a university-based participatory action researcher, I position myself as a facilitator working alongside my community-based colleagues, who are directly involved in all aspects of research design, data collection, data analysis, and presentation of results (including this article). My approach is inspired by critical pedagogy, Indigenous research methodologies (Kovach, 2009; Tuhiwai Smith, 1999; Wilson, 2008), and community informatics (Gurstein, 2003; 2012). Throughout this paper I have cited studies that I have been involved in, which reflect and inform the work described here, to demonstrate the process-oriented nature of my inquiry and praxis. Over the years I have learned from Indigenous friends and partners the importance of ensuring that research initiatives demonstrate tangible benefit to involved communities; these outcomes can range from policy proposals informed by evidence collected during research, to teaching/learning resources that support the delivery of community-based digital literacy workshops. In this spirit I endeavour to work with my colleagues to develop resources that can be taken up, modified, adapted, or dropped according to local needs and interests. Where possible, this work engages community members as research facilitators and assistants, as well as participants. Importantly, this process of shared discovery and knowledge mobilisation involves a recognition of both Indigenous protocol and formal institutional procedures; it necessitates long-term engagement and continuous reflection on emergent goals and outcomes. These debates, which at times reflect disagreement and divergence of opinion, are nonetheless essential to identify, document, and apply project processes and outcomes that are appropriate and relevant to the needs of involved community members.

The emergent process that I employ in these projects reflects many divergences, from challenges in empirical data collection and analysis, to changes in team composition, and even major shifts in project direction. It requires a dynamic, flexible project methodology that sometimes raises tensions with traditional academic research models. However, this way of working contributes to capacity building as well as concrete research outcomes; an observation consistent with other scholarship on community-engaged ICT research, as well as by the work of Indigenous scholars who are highlighting how daily practices contribute to the continual renewal of Indigenous communities against the challenges of settler colonialism (e.g., Alfred & Corntassel, 2005; Borrows, 2010; Simpson, 2011; Tuck, 2009). But despite strong research in the development and adoption of digital technologies by Indigenous groups, a knowledge gap exists with regards to how digital inclusion policies and programmes might best enable such outcomes. In this context, I argue that digital inclusion policy and programming requires more than a “one size fits all” approach; rather it must engage and reflect practices that will drive effective use and self-determined development initiatives in diverse and situated settings.

SECTION 1: SUPPLY-SIDE INTERVENTION - FIRST MILE CONNECTIVITY CONSORTIUM SHAPING DIGITAL ACCESS POLICY

In his 2014 book *Contradictions of Media Power*, Des Freedman argues that media reform initiatives emerge in a variety of forms, including those which require engagement with official structures like formal regulatory processes. He notes that this is often not the preferred route for media activists, who are more likely to be engaged in producing alternative content or setting up new organisations than in lobbying existing institutions to change (p. 132). Nonetheless, he argues that institutional reforms provide important contributions to more equitable, democratic media systems (p. 139). This tension between reforming existing institutional structures and establishing new ones also occurs in the area of telecommunications policy (Lentz, 2013), which is the focus of this case study. The work of telecommunications policy reformers has a dual focus: to both engage with policy as it is currently constituted, and to propose reforms about how they would like it to be.

INTRODUCING THE FIRST MILE CONNECTIVITY CONSORTIUM

Focusing on supply-side interventions in digital inclusion policy and programming, this section provides a case study of the First Mile Connectivity Consortium (FMCC), a national non-profit association of First Nations technology service providers focused on connecting rural, remote and Northern regions of Canada. The FMCC was established in 2012 by regional technology organisations that represent and are governed by groups of Indigenous communities (Carpenter, 2010; McMahon, Gurstein et al., 2014; O'Donnell et al., 2009). Its membership and board of directors consist of staff from First Nations technology organisations serving remote and rural areas across Canada, as well as university-based researchers including myself. It emerged from a ten-year participatory action research project called First Nations Innovation, and is informed by the Assembly of First Nations 'e-Community Strategy' (FMCC, 2018; Whiteduck, 2010). As a co-founder and board member of this association, I am directly engaged in its organisational activities, including strategic planning and preparation of regulatory and policy submissions related to digital inclusion. This work draws on empirical research that I conduct in my role as a university faculty member in partnership with Indigenous communities and FMCC member organisations. This experience provides me with insight in the process of developing and presenting formal policy proposals that are tied to the contexts of the members of the Indigenous communities that the FMCC members represent and serve.

While FMCC member organisations are spread over geographic areas and come from different organisational, cultural and political backgrounds, they share common goals in reforming digital policy and regulation to better support community and economic development, highlight local innovation, and overcome digital divides. It is important to note that there is a strong history of many Indigenous peoples in Canada setting up local and regional non-profit organisations to secure access to and control of emerging ICTs in a range of contexts, from community radio networks to digital archives (see for example Fiser & Clement, 2012; Hudson, 2013; Whiteduck, Beaton, Burton, & O'Donnell, 2012). In part, this work aimed to counter the widespread production and dissemination of colonial and homogenising discourses about diverse Indigenous peoples that is amplified through mass media. For example, in Canada, mass media consistently present Indigenous peoples as "childlike", incapable of self-determination, or dangerous (Harding, 2006). As well, English- and French-language media content typically

created in metropolitan centres has caused Indigenous leaders to raise concerns about its potential to contribute to social disintegration and unwelcome cultural hybridisation (Roth, 2005; Savard, 1998; Valaskakis, 1992). But alongside these developments, Indigenous peoples have created their own media and used it to document Indigenous knowledge and languages (Hudson, 2011; Menzies, 2015). Through this work, Indigenous peoples and their partners questioned not only Western-derived conventions of representation and distribution, but also central issues regarding the ownership and control of media production and distribution. In many cases, they developed their own institutions and production practices, the vibrancy and impact of which is reflected in a growing body of research and practice (Battiste, 2018; Perley, O'Donnell, George, Beaton, & Peter-Paul, 2016).

FMCC's work over the years reflects a similar trajectory of community-driven efforts to secure Indigenous ownership and control over emergent digital infrastructures. Here, I discuss one of FMCC's digital inclusion efforts, which proposed reforms to broadband funding mechanisms targeted to address digital access divides in Indigenous regions of Canada. In these areas connectivity services are very limited – particularly in comparison to high standards available in more populated and urban areas (CRTC, 2016a; Fiser & Jeffrey, 2013; Office of the Auditor General of Canada, 2018). Users in organisations and households share limited bandwidth capacity that is often congested, and if a connection goes down and no local technician is available to fix it, they can wait weeks for repairs. Further, many of these communities are served by satellite, which adds problems of latency to efforts to deliver services such as telehealth and distance education (Hudson, 2015; CRTC, 2014). Finally, the limited broadband available in these areas is expensive, especially when data caps are taken into consideration. Figure 1 illustrates these regions in blue.

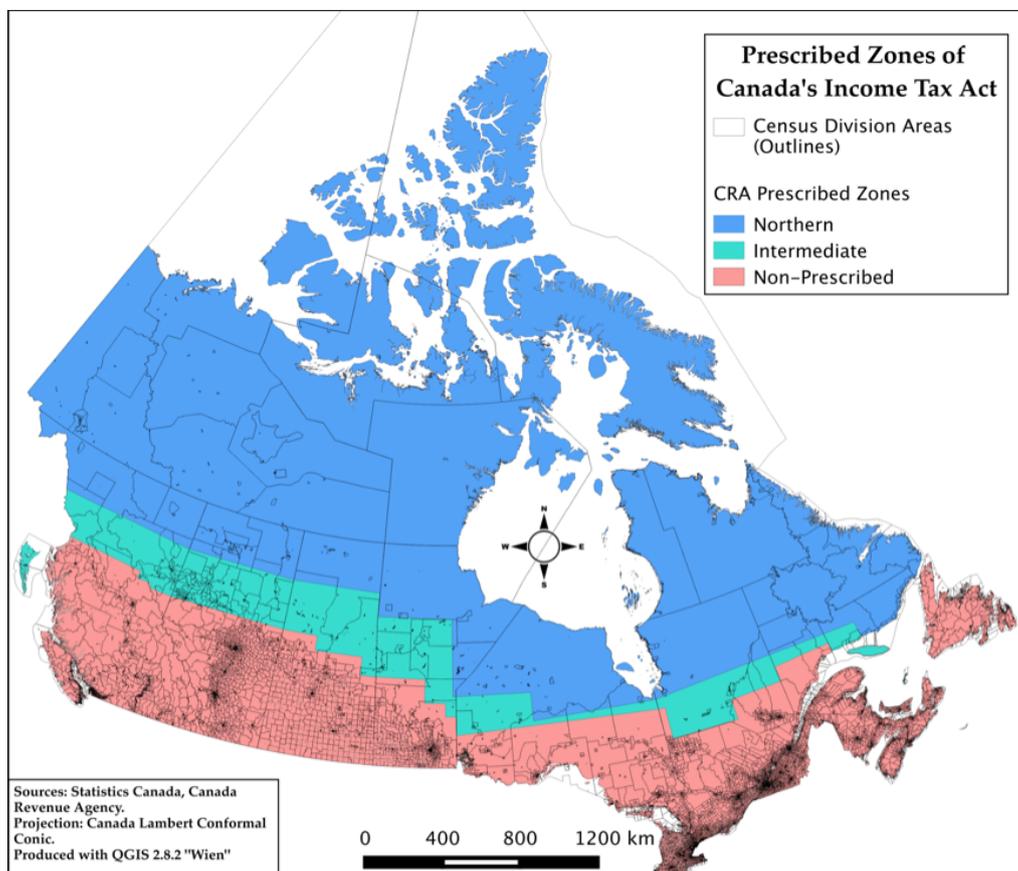


Figure 1: Northern, rural and remote regions

“Market forces” have failed to drive incumbent private sector telecommunications companies to develop broadband infrastructure and services in these regions, with the result that various government agencies have established subsidy programmes to encourage deployment (CRTC, 2015; McNally, Rathi, Evaniew, & Wu, 2017). Rajabiun and Middleton (2013) parse these programmes into two main types: urban-rural cross-subsidies drawn from the revenues of telecommunications providers and managed by the Canadian Radio-Television and Telecommunications Commission (CRTC); and budgetary contributions established through government funding initiatives. In this case study I focus on the first form of subsidy, tracing how the FMCC intervened in a series of formal regulatory proceedings in an attempt to influence its manifestation in broadband funding programmes.

POLICY ENGAGEMENT FOR FIRST MILE DEVELOPMENT

To contribute an effective intervention, it is important for reformers to learn the discourse, structure, and process employed in formal regulatory hearings (Shepherd, Taylor, & Middleton, 2014). Community-based technology organisations have few opportunities to influence the policies and regulations that shape the conditions they operate in. Despite the on-the-ground work they do in building and operating digital services, these parties often lack the financial, technical, institutional, and human resources that might support their intervention activities, given the technical language and formal procedures associated with regulatory hearings. At the same time, these groups can build relationships with state institutions so they become recognised and accepted as reputable sources. Further, as Hintz (2009) argues, such attempts to influence policy from the ‘inside’ require certain conditions in order to be effective. These include a political opportunity structure that will allow for change, strong alliances, weak (or fragmented) opponents, and the ability to effectively frame and communicate policy objectives to a target audience. Actors with expert knowledge in the area under consideration can provide valuable supports to policy deliberations. However, participation in formal proceedings that do not provide effective space for critical and open discussion, or in cases where decisions are pre-determined before a public proceeding has occurred, risks legitimising an inequitable and unfair process. Interventions such as the ones described in this case study are only possible because the policy-making environment represented in the CRTC’s regulatory hearings included positive conditions for civil society participation. It could not have been successful in the face of a less open process, a pre-determined outcome, or unreceptive policymakers.

FMCC began contributing to telecommunications regulatory proceedings in 2012, during a review of Northwestel’s proposed Modernisation Plan (CRTC, 2012-669) that concerned services provided by the incumbent telecommunications carrier in the three northern territories. Mobilising a panel of academic experts and staff from Indigenous technology organisations, FMCC pointed out that northern residents are providers as well as consumers of telecommunications services, and argued that subsidies to upgrade and operate facilities in the North should therefore not be limited to the incumbent. This process involved extensive planning, which included building a common discourse among participants situated in different cultural, political, economic and geographic contexts, as well as conducting research that was then adapted to meet the Commission’s requirements. Through this experience, the FMCC also learned the norms and rules of regulatory hearings, the kinds of evidence and argument allowed, and the format and structure of written filings and in-person presentations. The FMCC documented its experiences during this intervention, making process notes and written filings available to other groups interested in taking similar actions (McMahon, Hudson, & Fabian, 2014).

This experience informed FMCC’s subsequent regulatory activities. In its decision, the CRTC

recognised that broadband Internet access has become an important means of communication for northern Canadians, needed to achieve many social, economic, and cultural objectives (CRTC, 2013). Its findings recognised the special conditions and challenges in the Canadian North, and that market forces alone were not addressing them. However, rather than mandating any new or expanded subsidies, the Commission deferred the funding issue to a subsequent proceeding, to be held in 2015-2016. Through these decisions, the FMCC learned how the CRTC operates when ruling on regulatory proceedings; and importantly, that interventions should address the policy framework and questions under consideration in a specific hearing.

THE CRTC'S "BASIC SERVICE OBJECTIVE" PROCEEDINGS

The next phase of the FMCC's regulatory journey began in April 2015, when the CRTC announced a new proceeding "to conduct a comprehensive review of its policies regarding basic telecommunications services in Canada" (CRTC, 2015). The Commission's notice included an examination of how these services are used to access "essential services", their costs, and which areas are unserved or underserved. Importantly, the proceeding would also address whether a funding mechanism was required in the region of the incumbent telecommunications provider serving Canada's northern territories (Yukon, Northwest Territories, and Nunavut),² and adjacent regions such as the Northern parts of provinces that share similar challenges of limited infrastructure, challenging terrain for construction projects, and geographically dispersed, low-population communities. The opening notice provided a clear indication that the Commission was considering a review of the structure and focus of the broadband funding ecosystem, which FMCC took as an opportunity to contribute evidence on the public record of the shortcomings of existing funding initiatives, as well as to propose specific reforms.

As the hearings progressed, FMCC advanced proposals for reforms to existing funding mechanisms – focusing on those that the Commission had control over. FMCC noted that the CRTC could play a coordinating role in the broadband funding ecosystem, as an administrative tribunal with unique technical expertise and insight into the Canadian communications environment (FMCC, 2016a). FMCC also proposed a new subsidy scheme managed by the Commission. Indigenous organisations faced challenges in securing available funding programmes, and lacked access to the existing CRTC-managed subsidy available only to major incumbents with an obligation to serve (the National Contribution Fund, or NCF). In order to enable more equitable access to funding, FMCC proposed that organisations already providing telecommunications services in these areas become eligible for CRTC subsidy, and proposed an updated funding mechanism, termed the Northern Infrastructure and Services Fund (NISF). FMCC envisioned the administration of this fund through an independent entity licensed by the Commission and governed by representatives with strong ties to rural, remote and northern regions. The NISF was not designed to replace, consolidate or reduce existing federal funding programmes, but rather to complement them by supporting community-based providers, as well as traditional commercial providers, through a new subsidy drawn from industry revenues. This proposal clearly fell within the scope of the hearing, and particularly the focus to "examine whether a mechanism is required in Northwest's operating territory to support the provision of modern telecommunications services in rural and remote areas in Canada" (CRTC, 2015, para. 34). Since the proposal fell within the CRTC's mandate and jurisdiction, it could therefore be acted upon.

In April 2016, the FMCC presented the NISF proposal to the Commissioners during an in-person hearing in Gatineau, Québec. The public hearings included testimony from other Indigenous and consumer groups, as well as from major telecom providers. While the various interveners expressed a diversity of positions, the various Indigenous groups pointed out similar

challenges and potential solutions, including community ownership and control over digital infrastructure. This position was supported by some public interest organisations, although groups differed as to how such outcomes might be achieved. For example, the Public Interest Advocacy Centre favoured a ‘reverse auction’ approach to subsidising infrastructure development that sought to fund the lowest cost solution (regardless of design characteristics), while FMCC advocated for an ‘application-based’ model that would support a greater number and diversity of organisational applicants, including smaller non-profit and community-based organisations. After the FMCC’s presentation, the Commissioners engaged the team of representatives of Indigenous technology organisations and university-based researchers in over an hour of discussion and questions.



Figure 2: FMCC team at CRTC proceedings

After the FMCC’s presentation and halfway through the two-week public hearing phase of the proceedings, the CRTC broadened the proceedings to allow interveners to make proposals for a national broadband strategy for Canada (Dobby, 2016). In response, the FMCC submitted an additional proposal that situated the efforts of Indigenous broadband service providers in the context of decolonisation and Indigenous resurgence (FMCC, 2016a). The FMCC stressed the need for broadband as a basic service, and for the CRTC to play a coordinating role in the deployment of that service. This proposal included the specifics of the NISF proposal (noted above) as a permanent subsidy mechanism to support this work.

After more than a year of testimony and deliberation, the CRTC released its decision in

December 2016 (CRTC, 2016b). The decision indeed designated broadband a basic service, increasing target speeds to 50 Mbps download / 10 Mbps upload, and requiring providers to offer an ‘unlimited’ bandwidth option (that is, no data caps). The Commission also announced it was establishing a new infrastructure fund for ‘underserved’ areas: \$750 million CAD over five years. The fund, which was sourced from Telecommunication Service Providers’ revenues, was positioned as an attempt to align with the broader funding ecosystem for broadband. Unlike the previous National Contribution Fund, all qualified service providers – including Indigenous community-based organisations – are eligible to apply for this new fund, which will be managed at arm’s length, based on objective criteria determined in a subsequent proceeding (CRTC, 2016b). At the time of writing, these criteria have become publicly available and are included in the 2019 *Application Guide for the Broadband Fund* (CRTC, 2019). They include factors that groups including FMCC strongly advocated for, including eligibility of non-profit and Indigenous applicants, open access requirements for funded projects, requirements for community consultation, and recognition by applicants of any impacted Aboriginal and/or treaty rights (FMCC, 2017; FMCC, 2019). While the long-term implications of this decision for community-based service providers remain to be seen, it was nonetheless welcomed as a big win by the FMCC and other public and consumer interest groups (FMCC, 2016b; Open Media, 2016; Affordable Access Coalition, 2016).

Since the conclusion of these proceedings the government of Canada has established additional funding mechanisms for the deployment of broadband infrastructure (Government of Canada, 2019). The FMCC continues to intervene in regulatory hearings to advocate for its position that telecommunications policy frameworks should be designed and implemented in ways that enable communities to build, own and operate their own local telecommunications infrastructure and services. In short, FMCC continues working to advance a “First Mile” approach to supply-side digital inclusion policy.

SECTION 2: DEMAND-SIDE INTERVENTION - PIIKANI CULTURAL AND DIGITAL LITERACY CAMP PROGRAM

Digital literacy includes efforts to shape and use digital ICTs in ways that emerge from the self-determined needs of communities. This approach adopts the critical framework of community informatics, which foregrounds social practices of community development, capacity building, network formation, and effective use of ICTs as well as technical knowledge and skills (Gurstein, 2003; 2012). Community informatics extends ICT adoption beyond an individual’s ability to use a computer, software like Microsoft Office, or social media to include planning, managing, shaping, implementing, maintaining, and evaluating digital ICTs to address community-identified desires. This positioning responds to recent developments in the study and teaching of digital literacy that stress the need to encompass social practices as well as technical skills (Gillen & Barton, 2010; Ventimiglia & Pullman, 2016). From this perspective, digital literacy is grounded in local cultures and understandings - it is sustained by the ways people make meaning through their daily interactions with ICT (Media Smarts, n.d.; Rheingold, 2012).

In the context of Indigenous peoples in Canada, this orientation ties to the Truth and Reconciliation Commission’s *Calls to Action* (2015), which stress that contemporary educational activities involving Indigenous peoples must not repeat the failures of the past. Pointing to the country’s past and ongoing history of settler colonialism, the Commission describes the government’s activities as a form of cultural genocide, “the destruction of those structures and

practices that allow the group to continue as a group” (p. 5). Such activities, which sought to gain control over Indigenous land and resources, include banning language and cultural practices, working to destroy social and political institutions, seizing land and other property, persecuting spiritual practices, and disrupting families through residential schools. When based in a form of reconciliation that aims to try and overcome this conflict and establish healthy and respectful relationships, digital literacy initiatives reflect models of education more appropriate to Indigenous ways of knowing and teaching (Harding, 1998; McMahon et al., 2017; O’Connor, 2013; Molyneaux et al., 2012).

DIGITAL LITERACY INITIATIVES WITH PIIKANI FIRST NATION

In this second case study I discuss a digital literacy initiative co-created with Piikani First Nation in the southern region of the province of Alberta that aims to counter the negative implications of digital ICT adoption by organising digital literacy teaching and learning around Indigenous cultural revitalisation. I am the primary investigator on a series of grants that have supported this project, and in that role I have worked closely with Blackfoot Elder Herman Many Guns, who has guided the project to ensure that it follows Piikani cultural protocols as well as university ethics requirements. Since the community strongly encouraged this work to focus on local youth - and specifically, high school students - this initiative also involves the Peigan Board of Education and Piikani Nation Secondary School, and has been developed in close collaboration with these two First Nations educational organisations. Together, we decided that the project would focus on providing tangible outcomes with respect to Piikani-specific digital literacy resources and programming created for Grade 9 and 10 students. Our joint efforts to find ways to integrate Piikani culture and language with high school education and digital literacy courses has proven to be challenging but rewarding. Over the life of this project I have learned about Piikani ways of working with researchers, an approach that has informed the empirical research that I conducted during the activities described here. Ongoing planning conversations and cultural activities have greatly enriched my understanding of ways to envision and implement digital literacy initiatives that better reflect the lived experiences of participating community members. Project governance follows traditional protocols and Western partnership agreements, and is endorsed by both community (PBOE) and traditional (Elder’s Council) leadership. An important part of this initiative is combining traditional protocols with Western planning documents, a method proposed by the participating Elders to support project sustainability and address Piikani protocol (Bastien, 2004; Conaty, 2015). These activities are facilitated by Elder Herman, who led protocol to name the project in October 2017, and guides its ongoing development.

***II NA KAA SII NA KU PI TSI NII KII*: THE PIIKANI CULTURAL AND DIGITAL LITERACY CAMP PROGRAM**

Ii na kaa sii na ku pi tsi nii kii, the Piikani Cultural and Digital Literacy Camp Program, explores ways to emphasise Blackfoot cultural knowledge and modes of learning through digital skills development with high school students. While English is the main language spoken at Piikani Nation Secondary School, its approximately 200 students take at least a half-hour of daily Blackfoot language instruction, as well as cultural classes (Ross, 2020). However, few of the students speak Blackfoot at home or in their day-to-day lives, and so our team determined that digital literacy is a way to engage youth in not only being exposed to and understanding the words that connect them with their culture, but also provide them a structured means to digitally document that information for the benefit of themselves and future generations. This approach builds on the important work done by Blackfoot educators to develop land-based teachings (Blood, 2005; Enlivened Learning, 2015) and use digital tools to document language, such as through the [Blackfoot Online Language Resources](#) website.

In preparing the digital literacy programme, students, facilitators, and administrators from Piikani First Nation in Southern Alberta collaborate with university-based researchers to investigate, adapt, test, and refine digital literacy practices and resources. An ongoing planning and evaluation cycle supports continuous improvement, as the team reviews project scope, curriculum, and activities on an annual basis. Through discussions, surveys and interviews, the team engages in ongoing reflections about the implications of digital ICT on Piikani culture and language, and on digital inclusion more broadly. This considers appropriate ways of teaching digital literacy to youth, as well as how that learning might support community-building and resurgence. Importantly, this involves traditional Piikani Blackfoot protocol. Every year Herman (an Elder who holds appropriate Blackfoot knowledge transfer rights) leads camp preparations that include collecting willow tree branches, river stones, and firewood to build a sweat lodge offering (Ross, 2020). After blessing the ground of the camp with a smudge ceremony, he invites the participation of both upper and earthly beings in the event and asks the Creator to support the camp and students. Participants have the option to join the sweat lodge (for men) or listen to tipi teachings from a female Elder (for women). Each morning starts with a pipe ceremony to help ensure the day begins in a good way.

The Piikani Cultural and Digital Literacy Camp began in summer 2017, when our team piloted this approach. Early work involved assembling a project team (including community facilitators), creating learning materials (student workbook and facilitator handbook), and generating logistics planning and budgeting. The project has since evolved into a multi-day digital literacy Camp Program for students from Piikani Nation Secondary School, during which students receive Career and Technology Studies (CTS) course credits. Ongoing collaborative research and evaluation has led to eight modules that cover a range of digital skill-building activities, including video production, community-based data management, and analysis of cultural appropriation/appreciation. This classroom learning is blended with hands-on activities and experiential learning at the three-day/two-night outdoor camp, during which students apply their new digital skills to document and preserve the ancestral knowledge shared by Elders. Students are trained to film Piikani Elders showcasing local history and knowledge, including building sweat lodges and assembling tipis (see [Figure 3](#)).



Figure 3: Piikani digital literacy camp programme

As digital stewards, students are shown practices they can use to transfer their recordings to local institutions that will manage and preserve them, including PBOE and Piikani Traditional Knowledge Services. In this way they are introduced to data ownership and sharing protocols that support community management of digital data (videos, photos, and audio recordings) (Wemigwans, 2016). These activities reflect emerging principles of data sovereignty, which refer to the efforts of Indigenous peoples to secure control of their digital data (Rodriguez-Lonebear, 2016; Schnarch, 2004). The concept of data sovereignty is a way to think about data management practices that derives from the inherent sovereignty of Indigenous nations; it is defined as “the right of a nation to govern the collection, ownership, and application of its own data” (U.S. Indigenous Data Sovereignty Network, 2018, para. 2). In Canada, the First Nations principles of OCAP™ (Ownership, Control, Access and Possession) developed in the mid-1990s by the First Nations Information Governance Centre, are adaptable and designed to allow each First Nation community or region to interpret and implement them according to its specific context (First Nations Information Governance Centre, 2014; Schnarch, 2004). They provide an important set of guidelines when developing or using a digital platform to house and present Indigenous data.

At the time of writing, some 25 students have taken part in the three camps held so far (the 2017 pilot and camps in 2018 and 2019). Annual evaluations conducted through surveys and interviews with camp participants have indicated strong interest in the programme, as well as ideas about how to expand on existing local knowledge and capacities. Our team uses this feedback to revise curriculum and incorporate new topics, such as the importance of cyber-bullying and consent when posting to social media. Anecdotal comments have indicated some of the programme’s impacts among students. One 15-year-old student noted that “We got to catch a moment on camera so we can look back at it”, and said that she enjoyed sleeping in a tipi as her ancestors did, as well as recording her community’s traditions (Batkowski, 2017). Another 16-year-old student said that: “It’s cool that we are videotaping our culture and going to be sharing the video with other people” (ibid). Participating Elders have also observed the impacts of the camp programme. For example, Herman says several students improved their performance in school, and said while many students face social challenges and were shy at the beginning, the camp helped them come out of their shell (Ross, 2020). He said those living on low incomes enjoy it even more because they are less exposed to technology at home (ibid).

The team plans to hold the camp again in July 2020, after which we will explore ways to transfer ownership and control of the initiative over to the Piikani community. Piikani community members drive all aspects of the digital literacy programme; the project’s iterative, collaborative planning framework helps build capacity in partner organisations on an ongoing basis. Regular, ongoing interactions identify local needs and interests that in turn help integrate appropriate forms of digital literacy in this particular community context.

With respect to its implications for broader digital inclusion initiatives, the approach taken by the Piikani project team illustrates one way that demand-side interventions can better reflect the circumstances of communities who face challenges with respect to limited connectivity or access to devices, or raise concerns over digital impacts to culture and language. The Piikani community identified that digital literacy pedagogy should start from a foundation of cultural modes of land-based learning that the Piikani people have used for millennia. Importantly, this approach followed Nation-specific cultural protocol and sought to find ways that digital technologies enable language revitalisation and community development. We hope that these goals, and the ongoing involvement of community members in all aspects of the camp, will enable its long-term sustainability. We also suggest that these and other findings provide

important lessons for digital inclusion policy and practice.

CONCLUSION: SUPPORTING AN ENABLING ENVIRONMENT FOR DIGITAL INCLUSION

At present, digital inclusion policy and programming is open to new forms of engagement made possible by a combination of political will, citizen participation in decision-making, and the affordances of still-evolving digital infrastructures and technologies. The two case studies described here, as well as a host of other interventions, are outcomes of participatory opportunities made possible through regulatory proceedings, flexible proposals for digital literacy programming, and collaborations involving a diverse array of like-minded organisations and individuals. Several internal factors also supported this work: targeted research linked to the issues under deliberation, the capacity to formulate projects in the manner required by regulatory and educational institutions, and the passion and competencies of participating community members who effectively communicated the intricacies of ICT development, adoption, and use - and, importantly, what they meant for the present and future of their communities.

CO-DEVELOPING DIGITAL INCLUSION POLICY AND PROGRAMMING IN INDIGENOUS CONTEXTS

The two interventions described in this paper emerged over time through repeated iterations, during which participating organisations and individuals gained experience and understanding of the activities and issues under consideration. This work ties to a development trajectory grounded in Indigenous societies that existed and prospered long before the advent of digital ICTs available today, and the regulatory institutions set up by modern state governments to regulate their development and use (McMahon, 2014). Scholars of Indigenous resurgence stress this recognition of the inalienable and unique legal status of Indigenous peoples and the inherent, group-differentiated rights and responsibilities that flow from that status (Borrows, 2010). I suggest here that this position might be operationalised in digital inclusion policy and programming through an “enabling environment”: a concept that links laws and policies to the ideas, values and practices of participatory development (Price & Krug, 2002; Raboy, 2005). Development theorists like Amartya Sen (1999) have argued for policies to better support and account for human agency, encouraging both state governments and civil society organisations to avoid conflating the means of development with its ends. In this framework, enabling environments aim to create the conditions that might support endogenous forms of digital inclusion, such as the two interventions described in this paper.

This proposal reflects increasing consensus among United Nations (UN) member states on models of “internal decolonisation” that formally recognise Indigenous land claims, self-government rights, laws, and customs through the UN’s *Declaration on the Rights of Indigenous Peoples* (UNDRIP) (2007). The parties involved in drafting that document stressed the need to operationalise self-determination to fit their diverse lived experiences, and to this end outlined four broad categories of participatory rights (see Stavenhagen, 2011, pp. 273-4):

- The right to participate fully in the political, economic, social and cultural life of the state.
- The right to maintain and develop distinct political, legal, economic, social and cultural systems and institutions.
- The right of Indigenous institutions to act as a nexus between Indigenous peoples and states, to support participation in public life and control over their own affairs.

- The right that states give due recognition to Indigenous laws and customs.

UNDRIP recognises the laws and practices of Indigenous peoples, and reflects forms of self-determination that emerge from place-based laws, beliefs, and practices. This is seen, for example, in support for the development of Indigenous institutions, which arise autonomously and are best equipped to engage with the lived realities of members of Indigenous communities. This approach advocates for increased opportunities for community-based institutions to shape the state laws and policies that impact the lives of their constituent members. Examples of such reforms include the creation of reserved parliamentary seats for Indigenous representatives in New Zealand (where the Māori Party was founded in 2004), and subsidies to support Indigenous media and technology organisations in Canada.

Processes of technology development both shape and are shaped by broader negotiations over self-determination. Indigenous peoples engage with states over the policies and regulatory frameworks that reflect the development, adoption, and use of emergent technologies. These activities have normative outcomes: technologies are not only tools of self-determination, but can also entrench structures of colonialism and inequality. For example, state and corporate entities have used digital networks and technologies to undertake the surveillance and control of Indigenous peoples. However, to accept such negative effects at face value is to fall into the trap of social and technical determinism. It is impossible to define with conviction *a priori* the path or effects of any development. At best, we can attempt to describe its logics, activities, and structures, with the goal of critical analysis and reform. Framed this way, digital inclusion intersects with ongoing struggles over colonialism/self-determination. Digital networks and technologies are quickly achieving closure as the invisible platforms guiding many aspects of our lives, but for now, the ways that these new technologies are being shaped and diffused are subject to public review and deliberation. In this context, the enabling environments of policies and practices that support and constrain digital inclusion projects become a key site of negotiation. Examples of digital self-determination taking place in Indigenous communities demonstrate the kinds of initiatives that such enabling environments might support. However, they also contribute something more: new ways of thinking about how we can identify and re-shape the relations of inequality and potential that become embedded in our built environments.

FOCUS AREAS TO GUIDE FUTURE DIGITAL INCLUSION INITIATIVES

In this context, I end this article by proposing six focus areas to guide future digital inclusion interventions. These focus areas are drawn from my work over the past ten years with Indigenous communities and technology organisations in Canada, which itself rests on a foundation of decades of effort by university-based and community-based researchers. These six focus areas are:

1. Digital asset-mapping to support community development: Community members can identify digital assets that can be shared in learning resources and policy proposals. Assets to be explored might include: existing technology support organisations, broadband capacity, technical expertise, online applications, digital archives, language resources, and data management initiatives.

2. Supporting community technology organisations: Digital inclusion initiatives should document and share business cases, policy supports, regulatory frameworks, and funding initiatives that sustain community-owned and operated digital infrastructure and services. Digital access is important, but it should be accompanied with opportunities for local and regional organisations to secure resources to meet community development goals. This

identifies ways that community organisations can engage in development work at the ‘First Mile’.

3. Policy and regulatory advocacy for digital self-determination: Community members should be empowered to contribute to policy and regulatory decisions associated with appropriate technology development initiatives. Indigenous voices contribute to decision-making in both public and NGO sectors, and identify barriers to participation. This includes critically interrogating initiatives aimed to address digital divides to ensure they reflect local interests and desires.

4. Building and sustaining community networks: Participants should be empowered to learn digital networking technologies and gain experience setting up and testing broadband networks. This includes hands-on technical activities, such as building wireless networks for on-the-land connectivity. Activities can be taught by local facilitators.

5. Managing community-owned data: Community members already capture, organise, manage, and use a variety of data through digital ICT including photos, videos, and data management systems. Digital inclusion interventions should develop resources showcasing local ownership and control of this digital data, including for digitised Indigenous knowledge and self-government resources such as health and education data (Schnarch, 2004).

6. Developing appropriate digital literacy resources: Digital inclusion initiatives should strive to facilitate the creation and sharing of digital language and cultural resources by involved community members. Participants can gain hands-on experience using digital ICT such as digital cameras and GIS mapping applications, and complete learning modules to reflect on their relationships between digital ICT and cultural revitalisation. Digital media activities can be taught by Indigenous facilitators hired by projects, while curriculum can showcase existing Indigenous learning resources.

It is my hope that these six focus areas, and my efforts to document our experiences in the two case studies outlined in detail here, are useful to others working on similar initiatives in Canada and beyond. Critically oriented digital inclusion scholars and practitioners question the ability of existing institutions, policies, and programmes to adequately incorporate the voices of marginalised individuals and populations (Alexander, n.d.; Moll & Shade, 2013). Models of participatory development can foreground rhetoric at the expense of substantive reform, and so become a form of co-optation rather than transformation. Given the presence of intersectional structural inequalities, a range of individuals and populations must gain more voice and influence in the enabling policies and regulations shaping digital inclusion. As Sen (1999) writes: “capabilities [of persons] can be enhanced by public policy, but also, on the other side, the direction of public policy can be influenced by the effective use of participatory capabilities by the public” (p. 35). Put differently, digital inclusion policies and programmes must both shape, and be shaped by, broader struggles over self-determination.

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FOOTNOTES

1. The convention in Canada when writing about Indigenous peoples is to capitalise the word “Elder”, which is an honorific.
2. In Canada, provinces have more policy autonomy than territories. While provincial powers over areas such as health and education derive from the country’s constitution, territories have delegated powers from the Canadian parliament. This arrangement has implications for an array of jurisdictional, funding and other issues – including with respect to how digital inclusion initiatives are funded in territories *vis-à-vis* provinces.