



June 2015

Digital Data Management as Indigenous Resurgence in Kahnawà:ke

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Recommended Citation

McMahon, R. , LaHache, T. , Whiteduck, T. (2015). Digital Data Management as Indigenous Resurgence in Kahnawà:ke. *The International Indigenous Policy Journal*, 6(3) . Retrieved from: <http://ir.lib.uwo.ca/iipj/vol6/iss3/6>

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Abstract

Indigenous peoples are addressing the ongoing impacts of settler colonialism through a variety of expressions of community resurgence. Among these initiatives are those leveraging digital technologies. In the emergent network society, digital infrastructures, and information and communication technologies are powerful tools that can support self-government. In this context, we document the development of digital data management in the Mohawk community of Kahnawà:ke. Data is the digital information generated by a community, encompassing areas like research, education, finance, health, membership, housing, lands, and resources. As self-determining political entities, each First Nation determines how this data is interpreted and used, supported by tools like data management platforms and information-sharing protocols. In this article, we show how local practices regarding the collection, use, and sharing of digital data in Kahnawà:ke provides a clear example of Indigenous resurgence.

Keywords

First Nations, digital data management, Kahnawake, First Mile, community information and communication technology (ICT) development, data management policy, policy frameworks, broadband networks, community networks

Acknowledgments

We want to acknowledge and thank the Mohawk community of Kahnawà:ke for supporting this research, and the interview participants who helped with this project. Those people who consented to include their names are: Tracey Alfred, Janice Beauvais, Natalie Beauvais, Jason Calvert, Joyce Diabo, Tyler Diabo, Rhonda Kirby, Chris LeClaire, Jackie LeClaire, Petal McComber, and Terry White. The Kahnawà:ke Education Council provided administrative support for this research. The authors also thank their colleagues at the First Nations Innovation (FNI) project at the University of New Brunswick, and in particular primary investigator, Dr. Susan O'Donnell, who provided detailed feedback in an earlier version of this article. The FNI project has been funded since 2006 by the Social Sciences and Humanities Research Council of Canada (SSHRC), with in-kind contributions from the project partners. For more information, please visit: <http://fn-innovation-pn.com> The authors thank the anonymous reviewers for their helpful feedback. An earlier version of this paper was presented at the annual conference of the Canadian Sociological Association in St. Catherines, Ontario, May 25–30, 2014.

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Digital Data Management as Indigenous Resurgence in Kahnawà:ke

Indigenous peoples in Canada are addressing the ongoing impacts of settler colonialism through diverse expressions of everyday community resurgence (Alfred, 2009; Corntassel, 2012; Simpson, 2011), including developing strategies of interaction with the network society (Beaton & Campbell, 2014; O'Donnell, Kakekaspan, Beaton, Walmark, & Gibson, 2011). In this context, digital infrastructures and information and communication technologies (ICTs) are powerful tools that can support self-government and nation rebuilding. One element of these expressions of Indigenous resurgence through ICTs is the control and ownership of digital data. Our article explores how the Mohawk community of Kahnawà:ke is setting up and using ICT systems to manage their community data to support self-determination. In this context, community data encompasses research, education, finance, health, membership, housing, lands and resources, and other areas.

Across Canada, First Nations and their community intermediary support organizations (McMahon, Gurstein, Beaton, O'Donnell, & Whiteduck, 2014) are establishing a range of projects to retain and use community data. Kahnawà:ke is working with its partners in the First Nations Education Council (FNEC) to set up a data management system. Their work is guided by the Assembly of First Nations' e-Community strategy, a holistic planning approach to ICT development created and adopted by First Nations (Whiteduck, 2010; Whiteduck, Beaton, Burton, & O'Donnell, 2012). The e-Community strategy suggests that data and data management tools, competencies, and capacities help with planning and decision-making, which support the goals of Indigenous resurgence and strengthened First Nations communities.

As a component of its e-Community work, FNEC partnered with the Kahnawà:ke Education Council (KEC) to develop and implement a customized digital data management system called CANO, now being rolled out to other First Nations across the province of Québec. The CANO initiative is part of a larger struggle to rebuild First Nations' education systems in the context of settler colonialism. This process involves negotiations with provincial and federal levels of government regarding the jurisdiction, administration, and funding of First Nations data. This work is linked to the First Nations Student Success Program (FNSSP), which is managed by Aboriginal Affairs and Northern Development Canada (AANDC). A requirement for FNSSP funding is that First Nations provide reports on community educational results for the purposes of accountability. The Indigenous organizations discussed in our article set up their own data management system to address these requirements. This work on data management began at the start of FNSSP, when FNEC and its partners proposed creating both a data management system specific to First Nations schools in Québec, and a set of formal protocols to guide its use. As an early-stage adopter of this process and technology, Kahnawà:ke's experience demonstrates how community data management consists of interactions between governance decisions (policies and protocols), technical architectures (infrastructure, connectivity, and devices), data management platforms (CANO), and human resource capacities (including training).

Our community-based research project was designed in partnership with FNEC and KEC over a period of several months. FNEC and KEC have worked together for many years and, since 2008, FNEC has been part of the First Nations Innovation (<http://fn-innovation-pn.com/>) and First Mile (<http://firstmile.ca>) projects based at the University of New Brunswick. Research was approved by KEC and the Mohawk Council of Kahnawà:ke, and was supported through a formal Memorandum of

Understanding (MOU) between the university researchers and the Mohawk Council. The research ethics board at the researchers' home university reviewed the research protocol.

Our research triangulates data from interviews, documentary research (proposals, reports, and presentations), and community site visits. These visits took place in two phases: initial planning in September 2013, and two weeks of community interviews in February 2014. KEC staff set up meetings, assisted with interviews, and provided background information. The research team conducted semi-structured interviews with 22 community members involved in data management in several community organizations, including the Step-by-Step early childhood program, two elementary schools (Kateri School and Karihwanoron Mohawk Immersion School), the high school (Kahnawà:ke Survival School), a social service organization (Kahnawà:ke Shakotii'a'takenhas Community Services, or KSCS), and a health organization (Onkwata'karitáhtshera). Questions focused on how employees of community service organizations (primarily in the education sector) conceive of and use data, and sought to identify both opportunities as well as challenges regarding the role that data management plays in supporting self-government and Indigenous resurgence.

Digital Data Management and Indigenous Resurgence in Canada

In the past decade, Indigenous scholars have articulated new ways to think about self-determination and decolonization in the context of settler colonialism. This literature of Indigenous resurgence has foregrounded the fundamental role of land, place-based identities, resistance to colonization, and everyday practices (Alfred & Corntassel, 2005). Its proponents have emphatically stressed that "Decolonization is not a Metaphor," but rather a historically constituted process rooted in struggles over land and requiring material change (Tuck & Yang, 2012.). From this perspective, the existence and persistence of Indigenous peoples "is in large part lived as determined acts of survival against colonizing states' efforts to eradicate them culturally, politically and physically" (Alfred & Corntassel, 2005, p. 598; see also Palmater, 2011). These "acts of survival" reflect lived experiences that take place across a variety of fields, encompassing the many ways that Indigenous peoples are connecting to their communities, cultures, and homelands. As Hunt (2014) has written: "Indigeneity is not just an idea. It is not just words on a screen, theorizations, discourse analysis or a series of case studies. Indigeneity is also lived, practiced, and relational" (p. 29). From this perspective, decolonization and resurgence are expressed in everyday acts that continually resist the structures and effects of colonialism and support the political and cultural renewal of Indigenous communities (Alfred & Corntassel, 2005).

Everyday acts of resurgence can be difficult for many Indigenous communities given the political and socio-economic challenges they face. Their challenges are compounded due to the efforts of powerful economic and political entities to gain access to resources located on Indigenous lands. In some cases, compensation is provided and consultations take place but such activities do not always result in sustainable and positive outcomes for communities. As Waziyatawin (2012) has pointed out, "with promises of job training, education, and services, Indigenous people are baited into abandoning the struggle to defend the land and to actually participate in or help facilitate the destruction [of it]" (p. 73). These conflicts present deep challenges to decolonization efforts, but they do not prevent them. Indigenous communities and individuals engage in everyday practices that counteract the ongoing effects of settler colonialism on a continual basis. This frames Indigenous pathways to decolonization

and self-determination through the continual renewal of responsibilities, activities, and relationships taking place inside communities (Corntassel, 2012).

In this article, we suggest that community-based data management is an everyday practice of Indigenous resurgence. In building and utilizing the resources, capacities, and tools that support their management of community data, Indigenous peoples are establishing infrastructures and relationships to help sustain and grow their communities. Put differently, community data management provides another tool that Indigenous peoples are using to counter settler colonialism and enact self-determination.

We are conscious of the potential of this argument to slide into technological determinism—that digital tools are assumed to automatically support Indigenous efforts to decolonize and rebuild their nations. The development and use of ICTs is fraught with uncertainty, and can in fact exacerbate the effects of settler colonialism, such as when digital infrastructures accelerate centralizing processes of control and extraction into Indigenous territories. However, ICTs can also be shaped to decentralize power to communities. Indigenous peoples have always developed and used technologies to support their self-determined needs, as innovators and inventors. As Wane (2013) has written, regardless of the mediums they take shape in or the tools they employ, activities of Indigenous resurgence hold potential to support and reflect Indigenous cultures and traditions.

[T]he politics of reclamation is about taking something old and making it new again. It is about recognizing that culture shifts with time, location, and the social and political challenges that we face as communities. But, perhaps more than anything else, reclamation is about rediscovering the central tenants of our Indigenous cultures and applying them to our present context. (p. 94)

An important part of Indigenous resurgence is the ability of Indigenous peoples to retain control over their knowledge. However, in the context of settler colonialism the collection and use of information—or data—held by Indigenous peoples has become troubled. External organizations and individuals extracted informational resources held by Indigenous communities to use for their own purposes (Menziez, 2004; Tuhiwai Smith, 1999). As Bruhn (2014) wrote, in Canada these challenges continue today, given “long-standing colonial relationships, experiences of vulnerability to decision-makers, claims of jurisdiction, and concerns about collective privacy” (p. 1). In recent decades, these challenges have continued as federal government agencies have increased the accountability requirements for reporting and funding proposals that are associated with the services that First Nations organizations are responsible for delivering (see Gibson, O'Donnell & Rideout, 2007).

At the same time, Indigenous peoples in Canada have explored ways to retain the information generated by their communities. The report of the Royal Commission on Aboriginal Peoples (RCAP, 1996), published in 1996 but involving a process that began in 1991, stipulates the need for Indigenous communities to have complete control of information pertaining to different aspects of community life, including health, education, and culture. These data management practices reflect the goals and focus of Indigenous resurgence. Over time, this focus was expressed in four principles: Ownership, Control, Access, and Possession (OCAP™). In 1998, First Nations formally articulated the four principles of OCAP™ for data management (Assembly of First Nations [AFN], 2007). The first formal application of these principles was through the National Aboriginal Health Organization (NAHO) to protect Aboriginal control over health data: The Steering Committee of the First Nations Regional Longitudinal

Health Survey expressed this control as an application of self-determination in research (Schnarch, 2004).¹ Since then, the four OCAP™ principles “have become the de facto ethical standard not only for conducting research using First Nations data, but also for the collection and management of First Nations information in general” (FNIGC, 2014, p. 1). An AFN (2007) document has outlined the four principles in detail (see p. 5). Ownership refers to the relationship of a First Nation to its knowledge, data, and information. Control reflects the aspirations and inherent rights of First Nations, including in areas associated with data management. Access refers to the right of First Nations to gain access to, manage, and make decisions regarding information and data about their communities—wherever it is held. Finally, possession refers to the need for First Nations to retain their data, rather than it being housed in external organizations.

Building on the OCAP principles, First Nations have developed protocols pertaining to the collection, use, and sharing of community data. These protocols serve as guidelines for Indigenous resurgence. For example, Indigenous oral traditions include a complex set of rights and responsibilities concerning the use of community-held information (AFN, 2007). These traditions, undertaken by Indigenous communities on a continual basis, have served as a means to support social, economic, political, and cultural renewal at a time before settler colonialism (Culhane, 1998). Through these traditions, Indigenous peoples organized how their information was managed. Jurisdiction rested with individual communities, with each autonomous First Nation holding the right to determine how its information was interpreted and shared with external groups.

According to the AFN (2007), the principles of OCAP™ emerged as a means to adopt and adapt these traditional practices in the contemporary context of settler colonialism and self-government. They provided a formal means for First Nations to assert control over their data that also recognized and respected their traditional practices. In the contemporary context, when engaging with groups like government agencies or academic institutions, OCAP™ provides a basis for legislative and policy protection of Indigenous knowledge. OCAP™ principles also remain rooted in the lived realities of people and communities: Since each First Nation is unique, it decides how community information is collected, managed, analyzed, and disseminated.

But, as noted earlier, due to the ongoing effects of settler colonialism many structural and operational barriers limit the application of OCAP™ in practice. For example, federal and provincial legislation like the *Access to Information Act* and the *Library and Archives of Canada Act* compels First Nations to share information with third-party organizations and the public (see FNIGC, 2014). Another challenge relates to access: First Nations often cannot access administrative data and records about their citizens in the possession of third parties such as government agencies (Bruhn, 2014). Many people in First Nations also lack information about or knowledge of OCAP™ principles (FNIGC, 2014).

¹ NAHO, set up to address the needs of First Nations, Inuit, and Métis peoples, closed in June 2012 after the federal government, through Health Canada, cut its funding. Although NAHO’s funding has ended, OCAP™ remains in place, and today is associated with (and trademarked by) the First Nations Information Governance Centre (FNIGC), and also tied to the work of the Assembly of First Nations. In the past, the First Nations Statistical Institute was also tied to this work, but in 2012 the federal government also cut this organization’s funding.

Given these challenges, First Nations are undertaking various strategies to raise awareness of and implement OCAP™ principles. These diverse initiatives, which we position as expressions of Indigenous resurgence, are taking place inside local communities, at regional levels, and through national groups (Mi'kmaw Kina'matnewey, First Nations Education Council [FNEC], & Keewaytinook Okimakanak, 2013). They involve First Nations advocating for policy and regulatory supports for OCAP™ principles, for example through First Nation privacy laws (FNIGC, 2014). First Nations are also working with third party organizations to develop protocols regarding the collection, management, and sharing of information among stakeholders. For example, Chapter 9 of the 2nd edition of the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS2) (Research Involving the First Nations, Inuit, and Métis peoples of Canada) outlines specific guidelines for First Nations' control of data associated with research projects (Canadian Institutes of Health Research, National Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada, 2010).² Another example of such protocols are the regional and local agreements worked out between First Nations and third parties that restrict data sharing to minimal levels required by law or contract.

One well-known example is the First Nations Regional Health Survey (RHS) administered by the FNIGC (FNIGC, 2014). In the past, large numbers of First Nations people living on-reserve were not included in major national health surveys due both to the difficulties of accessing remote communities as well as resistance among some First Nations people in participating in research carried out by external parties like federal agencies. Health authorities therefore lacked basic information, such as the number of First Nations people with diabetes. The First Nations RHS sought to address this challenge through working with Health Canada and other health authorities, regional First Nations organizations, and local communities to collect information about the physical, emotional, spiritual, mental, environmental, economic, and social factors that determine health. Ownership, control, access, and possession of this data remained with the participating First Nations. Local community members carried out fieldwork and political leaders provided consent to this process, while data is housed at the FNIGC and First Nation data centers (Bruhn, 2014).

Along with establishing protocols, First Nations are also building internal capacities to control their data assets. This work involves various partners who engage First Nations in the research process and support their ownership and control over data. Partners also benefit, since the knowledge they draw on is collected, interpreted, and validated in cooperation with the people and communities involved. Some First Nations are setting up data management platforms in local communities, often in partnership with regional community intermediary organizations. For example, the Membertou Data Centre in the province of Nova Scotia houses community data, manages network connectivity, and provides technical support services to its First Nations members. The specifics of these activities are outlined in formal agreements between the data centre and its Indigenous member communities.³

² Read Chapter 9 here: <http://www.ethics.gc.ca/eng/policy-politique/initiatives/tcps2-eptc2/chapter9-chapitre9/>

³ For more information about the data centre, see <http://membertoucorporate.com/data-centre> or to watch a short video visit: <https://vimeo.com/23907575> or <http://firstnationhelp.com/fibre>

These various data management initiatives are also informed by the e-Community strategy developed by First Nations and ratified by the Chiefs-in-Council of the AFN (Whiteduck, 2010). This strategy outlined how the federal government can support community technology development, and includes data management as a component of this process (O'Donnell, Milliken, Chong & Walmark, 2010). In the context of data management, the e-Community strategy has supported the efforts of First Nations and their partners to house data, generate customized products and services, offer relevant training, support staff, provide technical support, manage partnerships and protocols, and develop common indicators for data analysis. In the remaining sections, we provide a case study of how this e-Community data management process emerged in the Mohawk community of Kahnawà:ke, positioning it as a concrete example of Indigenous resurgence. Our discussion illustrates how staff in these organizations manage and use community data in partnership and negotiation with both internal as well as external organizations.

Community-Based Data Management in Kahnawà:ke

The First Nations Education Council: An Intermediary Organization Supporting Kahnawà:ke's Data Management Strategy

A holistic e-Community environment includes several components: technical architectures (infrastructure, connectivity), data management systems, governance (policies and practices), and personnel (skills and capacities). Among First Nations in Québec, efforts to establish this environment are guided through partnerships with the First Nations Education Council (FNEC). Founded over two decades ago, FNEC represents 22 member communities⁴ from eight nations in the province: Abenaki, Algonquin, Atikamekw, Huron, Malecite, Mi'gmaq, Mohawk, and the Innu community of Mashteulash (see Figure 1). Mandated by its member communities to advocate First Nations control of education, the FNEC provides many services that include programs in education, special education, technology, youth training and employment, and Aboriginal languages. It works with federal agencies and First Nations to manage funding and programs to support educational initiatives in its member schools and communities. FNEC currently provides education services to an approximate combined student enrollment of 7,000.

As a First Nation community intermediary organization, FNEC's mission includes developing, implementing, and executing technology initiatives in ways that realize the needs and priorities of its members. Authority for decision-making rests with member communities, who engage FNEC to support local initiatives. Since its inception, the Chiefs of FNEC's member First Nations have tasked the organization to undertake consultation, support, and advocacy activities. Inside member communities, FNEC's technology division helps establish broadband connections distributed across public sector organizations. Key regional initiatives include deploying a network of videoconference systems and an initiative to install fibre optic infrastructure in all member communities (Whiteduck & Beaton, 2014).

⁴ Cacouna, Kipawa, Gesgapegiaq, Gespeg, Kahnawà:ke, Kanesatake, Kitchisakik, Kitigan Zibi, Lac Barriere, Lac Simon, Listuguj, Manawan, Mashteuiatsh, Odanak, Opitciwan, Pikogan, Timiskaming, Wemotaci, Wendake, Winneway, Wolf Lake, and Wôlinak.

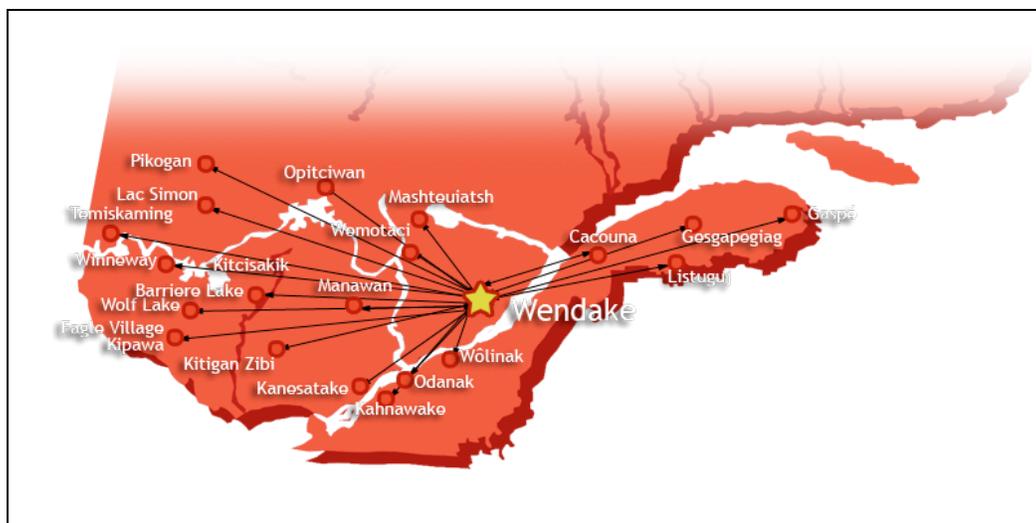


Figure 1. Map of FNEC member communities.

Both projects involve partnerships with government agencies including AANDC, Health Canada, and the province of Québec. FNEC offers technology services including connectivity, equipment, training, web and email hosting, and technical support. Cost-effective high-speed Internet and videoconferencing services are secured through agreements that outline special rates and interconnection options with three private sector telecommunications carriers in Québec. By pooling technical and financial resources and supporting economies of scale, FNEC can achieve significant cost savings for member communities.

For data management, FNEC supports its member First Nations to adopt the CANO (Student Information System) platform—which is available in both official languages—and makes it available free of charge to schools that are part of AANDC’s First Nations Student Success program (FNSSP). Local education authorities use the web-based CANO application to manage educational data and produce reports. First introduced in 2010 as a pilot project, by 2013 all of FNEC’s member communities with schools adopted the CANO system for attendance and report card management (FNEC, 2014). FNSSP provides supports to First Nations educators in literacy, numeracy, and student retention (AANDC, 2014) such as resources to develop and implement student learning assessments, performance measurements, and school success plans—all of which involve data management between regional organizations like FNEC and their partner communities. This work involves demonstrating how data can help measure student achievement and progress. Teachers can save time on tasks like tracking attendance, calculating grades, writing report records, searching for student information, and supporting behavioral plans. Administrators use CANO to manage finances, budgets, and human resources. The system can also track staff, and is used to allocate staffing resources. It supports strategic planning, allowing administrators to distribute resources and funds to various service areas according to evidence-based planning. To track this work, FNSSP established a series of indicators for things such as data collection, analysis, and reporting. First Nations use a school data management system like CANO to complete these assessment activities, which are mandatory to receive federal funding for education.

FNEC has technically modified CANO to support Indigenous data and information management protocols and practices, and to reflect OCAP principles. The CANO system provides First Nations with a means to share community data with third-party organizations like government agencies in ways that allow them to retain ownership, control, access, and possession of their information. FNEC, as an intermediary organization between First Nations communities and government agencies, provides resources to assist with this work, including policies outlining data management responsibilities and requirements, and forms to guide privacy and confidentiality standards.

FNEC also provides support in the implementation of CANO to help it meet the needs of diverse communities. The organization provides training for staff in communities who manage local data collection and use. As the CANO system is rolled out, FNEC has been working to streamline this process. As one of the first communities to utilize the system, Kahnawà:ke provides valuable lessons for others engaged in this work. FNEC's member communities are at different levels of data management capacity, and so the regional organization is working with them to assess readiness and assist in the transition to the system. In the following sections, we outline how educational organizations in Kahnawà:ke set up and use CANO for their community data management practices in order to help inform this work in other First Nations. The following discussion draws from interviews with people working on data management in community service organizations. To protect their privacy, we use an anonymous code (K1, K2, etc.) when citing these individuals.

Kahnawà:ke's Technical Architecture for Community Data Management

Adequate digital infrastructure and connectivity are key to supporting and sustaining community data management. This technical infrastructure must be secure, scalable, customizable, and interoperable. Once in place, it supports data transfer both inside and outside a community and allows system users to access various applications, including data management tools such as CANO. A technical infrastructure includes physical networks, connectivity, devices, and software and applications.

Kahnawà:ke has secured ownership and control over its physical networks and facilities, with the result that community organizations are now leveraging them for various broadband-enabled applications, including digital data management. Over time, the community has set up a secure network called *Tewatati* that interconnects several community institutions, including three schools, emergency services (fire hall and police station), the hospital, an economic development organization, and the Mohawk Council.⁵ More recently, in 2011, the FNEC supported the community to complete fiber optic expansion of the *Tewatati* network across 14 public sectors.

Inside Kahnawà:ke's education sector, *Tewatati* greatly improved connectivity in the schools and administrative offices of the Kahnawà:ke Education Centre. Today, staff and students can access a 100MB connection set up in partnership with FNEC. This infrastructure enabled full Wi-Fi coverage, Smart Board diffusion, videoconferencing, and consideration of a Voice-over-IP telephone system in the education sector. While this system provides technical supports for community data management, it also involves the social relationships that are described in the next section.

⁵ For a more detailed description of the network's development, please see McMahon, LaHache, & Whiteduck (2014).

Data Governance in Kahnawà:ke (Policies and Processes)

Technical infrastructure is a key enabling factor for community data management. However, its effective use is contingent on a corresponding social infrastructure that outlines the rights and responsibilities of different stakeholders. This includes the development and application of standards, data sharing agreements, and privacy and security policies (FNIGC, 2014). Such arrangements outline roles, responsibilities, and accountabilities, and clarify details on the planning, delivery, and evaluation of communication data (Bruhn, 2014). They address the balance between local control over the process and a regional or “community aggregate” approach that leverages economies of scale. Understandably, concerns can sometimes arise over these agreements, which involve many considerations around OCAP™ principles. Communities, organizations, and individuals hold different values and approaches to the management of data. For this reason, the arrangements described in this section reflect the careful negotiation of boundaries and agreements among parties. They seek to balance the diverse needs of the people and organizations involved in community data governance.

As a component of its work on the CANO system, FNEC and its member communities jointly established protocols guiding data management practices after several rounds of discussion and feedback (FNEC, 2014). FNEC identified the need for these protocols during the early stages of the FNSSP program, when it proposed the creation of community-managed data systems in First Nations schools in Québec. The organization worked with its member communities to establish a draft protocol to guide the data management process associated with these systems. After circulating a discussion document to communities, FNEC incorporated feedback and formally presented the protocol during a General Assembly of First Nations in Québec. Guided by a Data Management Committee that includes three FNEC community representatives, the protocol addressed the collection and use of community data as well as privacy and confidentiality. Modeled on OCAP principles, it outlined procedures regarding the assignment of role-based access to CANO, and how community educational data is housed and managed by FNEC. The draft protocol was ratified at a General Assembly in September 2014, and was subsequently distributed to First Nations for review and signing. At time of writing (November, 2014) nine First Nations had formally signed this agreement. Several others proposed changes that FNEC will incorporate in a new version of this document. This process reveals the importance of ensuring community input in each stage of establishing a protocol for community data management.

In the following section, we describe three forms of data governance in Kahnawà:ke among organizations in the educational sector, between different community organizations in Kahnawà:ke, and between Kahnawà:ke educational organizations and external organizations (specifically government agencies). Figure 2 provides a conceptual model of this process.

Data Management Inside Kahnawà:ke’s Educational Sector

As noted above, educational organizations in Kahnawà:ke interconnect through a shared technical infrastructure used to transfer data among the three community schools and the KEC administrative offices. For example, starting in 2013, elementary and high schools began using CANO to support the transfer of student files and records. KEC supports this work through an on-staff registrar, with FNEC acting as a regional data steward and support organization. KEC and FNEC developed formal policies as guidelines for staff in these data management processes.

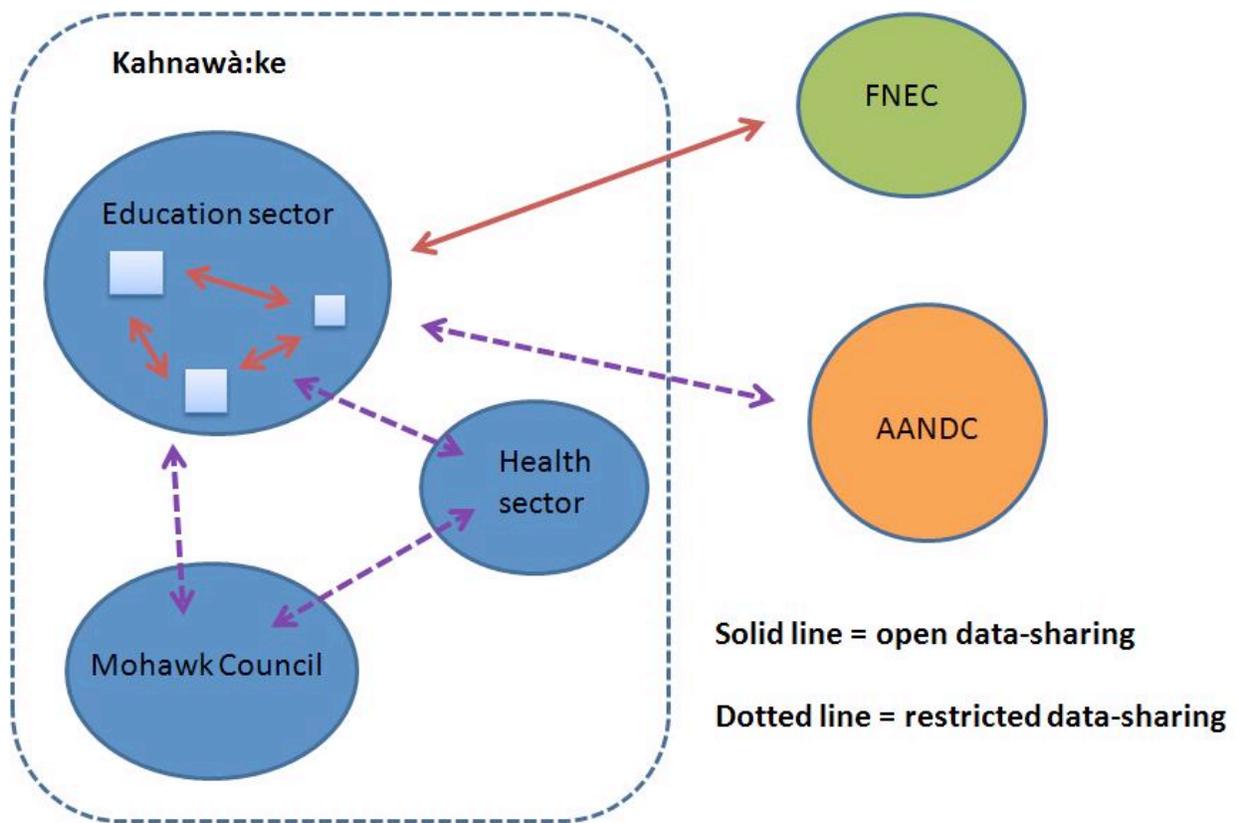


Figure 2. Data Management in Kahnawà:ke.

This work is encoded in the technical design of the CANO system (see McMahon, LaHache & Whiteduck, 2014). CANO was designed to provide a user-friendly, customized interface. School staff and administrators use different applications to manage data in areas like finances, budgets, and human resources. During our interviews with staff in Kahnawà:ke’s educational sector, everyone involved felt that the CANO system met their needs. However, some people also pointed out challenges regarding its reliability at certain times. For example, several noted that during past report card times, when many people are using the system simultaneously, it was unstable and prone to crash. That said, some participants noted that this issue was resolved when the database servers were moved from KEC to FNEC. Others noted that attendance tracking does not always work properly. Interview participants felt confident in CANO and expressed trust that data housed with FNEC were secure and managed properly; however, not everyone interviewed was aware where data was stored.

Most interview participants also stressed the importance of privacy and confidentiality regarding the data with which they work. This was particularly the case with student data, and especially for students with special needs. One way that privacy and confidentiality is maintained in CANO is through KEC managing user roles and access to different parts of the system. While some participants noted glitches

(such as not being able to access required information, or being able to access more information than was needed) most people expressed satisfaction with this arrangement.

Sharing Data Between Community Organizations in Kahnawà:ke

While data sharing inside Kahnawà:ke's educational institutions (schools and KEC) is relatively open, the process is more controlled for sharing educational data with the broader community. This is partly due to a perception among some staff that some community members are critical of Kahnawà:ke's educational system. Several interview participants noted that in the past the schools were very popular, but in recent years this has declined, and many community members now send their children to attend schools in Montréal. Some staff members believed this was due to a lack of information and public awareness about school programs and successes. One person stated, "we have the greatest schools and no one knows it" (K22). This perception has led to a protective stance among community education staff regarding data sharing with community members in general:

Our own community is our own worst enemy. . . So we're very protective of everything all the time. . . [Data] only stays with us. I wouldn't want that information at council, community services, anywhere. That information has to stay within education. (K22)

Other research about First Nations data management revealed similar tensions regarding data sharing among community organizations. For example, Bruhn (2014) interviewed a number of data management professionals in regional First Nations organizations and government agencies like Health Canada and AANDC. These people explained the need to integrate disparate data sources—now dispersed in siloed programs and jurisdictions—around individual First Nation citizens in a more holistic way. However, it is challenging to do so given a lack of trust among involved parties. This approach is similar to the e-Community strategy, which proposed a cross-sectoral approach to community data management and technology development more generally (Whiteduck, 2010).

Several interview participants in Kahnawà:ke expressed their support for holistic data sharing among community organizations. However, they also recognized the silos in place today. Community services are band council programs but administered independently; they also manage data independently and do not generally engage in data sharing. Several people felt that sharing data among these organizations would require major administrative shifts. For example, at present Step-by-Step's⁶ databases are neither technically nor socially integrated with the CANO system used in local elementary schools, which raises challenges for students transitioning between schools after early childhood education. In one person's words: "In theory, we are all supposed to share and be open about what we have. We're all part of this group. But in practice, we're kind of protective to a certain extent" (K11). Local politics are also a challenge, particularly in small, tight-knit communities like Kahnawà:ke. At the same time, some people said they "absolutely" share data with other community organizations through a blend of formal

⁶ The Step-by-Step Child and Family Centre (Tsi ionterihwaienhstahkwa ne Kahwatsiranór:ron) was founded 25 years ago as an inclusive centre for young children in Kahnawà:ke. At that time, seven mothers who had children with disabilities set up the centre since there was no school in the community that could accommodate their children. According to the program's website, Step-by-Step provides "inclusive early intervention and preventive educational and training programs to 'multi-handicapped, developmentally delayed and 'at risk' preschoolers and their families within their own community" (Step-by-Step, n.d., para. 1).

protocols and informal relationships. However, several interview participants noted that the process has not been easy. In one person's words:

It's taken a lot of time for anyone to be able to give up any information that they've had. Especially when it comes to community services . . . But I think that over the years all of the organizations are starting to realize that they need to work together in order to have, you know, productive, healthy community members." (K13)

Trust-building as well as frequent contact among parties can help address this issue (Bruhn, 2014). In Kahnawà:ke, several community organizations established a formal mechanism to do this in the 1990s through the *Quality Improvement Accountability Framework*.⁷ This framework led to the creation of the Executive Directors' Committee (EDC), composed of the executive directors of the nine major community service organizations. Although two organizations (including KEC) are no longer part of the EDC group, it continues to meet on a monthly basis to discuss common issues, such as gaps and overlaps in service delivery, and to streamline and pool resources and secure cost savings. The EDC develops MOU's outlining roles and responsibilities to guide how different community organizations work together. It is moving towards establishing common data sharing protocols.

Sharing Data with External Organizations

Kahnawà:ke community organizations also share data with third-party entities like federal government agencies. Bruhn (2014) noted that program and service delivery depends on productive partnerships between federal agencies and First Nations communities. In the case of Kahnawà:ke, FNEC acts as an intermediary between community organizations and government agencies like AANDC. It does not share any Kahnawà:ke data directly with external government agencies (or other groups). To ensure that this process does not undermine community control over data, as discussed earlier, FNEC has developed an information management policy that includes guidelines around the creation, development, access and delivery, monitoring, and measurement of community educational data.

To implement this policy in their reporting to AANDC, FNEC staff work with a KEC staff member designated as the FNSSP Coordinator. This individual generates a report from community data that FNEC sends to AANDC. This work is guided by a protocol established by FNEC called the *FNEC Program and Submission Report Deadlines for Communities* (currently being ratified by communities). Data is entered into the CANO system from various collection points in the school system and organized according to classifications hard-coded in CANO. Schools then use CANO to generate reports from this data according to requirements set by government funding agencies. These reports are collated by the FNSSP Coordinator and filed according to a set of protocols established by FNEC and KEC. Every month the FNSSP coordinator meets with a group of around 10 administrators, resource teachers, and teachers from all grade levels to discuss these reports, go over the school success plan, and identify any additional resources that may be needed. Finally, the reports are sent to FNEC, which then transmits them to AANDC.

⁷ The *Quality Improvement Accountability Framework* is open to the public and community members by contacting the Kahnawà:ke Education Centre office.

Trust is a clear challenge with regards to community organizations sharing their data with external organizations like AANDC. The 1996 *Report of the Royal Commission on Aboriginal Peoples* noted that “data gathering has frequently been imposed by outside authorities, [and so] it has met with resistance in many quarters” (RCAP, 1996, p. 4; also cited in Bruhn, 2014). Several interview participants expressed concerns that community data can be used by third-party organizations in ways that lack context or are detrimental to their needs (K10). A clear example of a trust challenge regarding community data in Kahnawà:ke is the potential impacts of the proposed *First Nations Education Act*. Many people in Kahnawà:ke strongly resisted the Act, as was evidenced in public demonstrations and opposition letters written by local leadership to the federal government.⁸ No one interviewed was in support of the Act, though some people were more specific in their criticisms than others.

Some people saw the proposed Act as a means for external organizations to increase their access to community educational data. In one person’s words: “to me it’s a concern if it’s [data] going directly into the hands of government or someone else that we don’t know” (K21). Others felt that the Act might undermine the community’s ability to manage the schools and educational system. Some felt it would impact funding and budgets, which limits the ability of community organizations to plan and manage their resources. Others felt it would increase monitoring. For example, one person noted that the proposed Act required the community to hire a school inspector, and, if they did not reach their FNSSP goals, the government could appoint a third-party manager. Another concern was the lack of provisions for culture and education in the proposed Act, which some felt might affect the viability of the Mohawk Immersion School. A related concern was about the potential impact of the proposed Act on staffing, since teachers at the Immersion School are sometimes hired for their Mohawk language abilities, rather than for their formal provincial accreditation. These concerns were also held by people in organizations not directly affected, such as Step-by-Step. As a feeder system for schools in Kahnawà:ke, staff at this organization remained concerned about issues around the professional accreditation of teachers, post-secondary funding, and culture and language support. In one person’s words:

I think the [proposed] *Education Act* is looking at data. Looking at data, at some communities that are poor. I think that’s the way government is using data to say look these schools are inadequate. And because of that, the kids going to school, we need to demolish the schools in the community and they need to go to the mainstream schools. Using data for the wrong reasons. Instead of looking at data and saying look how can we use the data in the schools to improve the situation that you’re in. (K5)

Given these challenges, community data management is seen as a tool to support Kahnawà:ke’s position vis-à-vis external evaluations. For example, CANO enables community organizations to make “evidence-based” arguments on issues such as accountability, reporting, and funding proposals. By collecting and analyzing their own data, and then presenting a report to AANDC, community organizations have more control over their data. In one person’s words:

⁸ That said, not everyone is against the Act and interview participants noted that some people in the community support it.

I think the fact that we have so much data through CANO is going to be to our benefit, because we can show that we have a successful educational system here. And we have the data to prove it. So I think that will be a testament to our success. (K4)

As a final point, staff in Kahnawà:ke organizations are interested in sharing data management strategies with other First Nations. Several community organizations already have staff who belong to provincial or regional associations that meet periodically to discuss technical issues and share knowledge and resources. This helps staff learn what other communities are doing, see what resources and support regional intermediaries like FNEC are providing, and share information about funding opportunities. Some felt that CANO might benefit from a section in which schools in different First Nations can share resources such as school success plans. FNEC supports this work through organizing workshops and conferences, and providing webinars and remote connections over Skype or videoconferencing.

Data Management Capacities

Finally, community data management includes the roles, responsibilities, and accountabilities of the staff involved in this work. Data can be used to design, plan, and manage First Nations government functions and operations. Data can show how political, demographic, social, and economic changes affect communities, consolidating information from multiple existing sources to introduce efficiencies, reduce reporting burdens, and improve compliance.

But while the goal of this work is local data management by First Nations, communities are at different levels of readiness and capacity. Overwhelmingly, interview participants in Kahnawà:ke identified the need for designated staff to support data management and provide on-site technical support. KEC has a systems administrator who manages networks and services for all three of the community's schools, and another who is a resource for CANO. This IT team was extremely busy given that they provide support for the different schools in the community. Several interview participants noted that dedicated staffing is a challenge, given the size of the community and the amount of data used by local organizations.

IT staff support is supplemented by training and workshops to general staff, provided by request and through scheduled training events run both by in-house staff (KEC) as well as FNEC. Teachers and other staff are trained as CANO "gurus" or champions. Those who had not received formal training on the system requested it, and several pointed to the necessity of some level of data management literacy. Training can help staff use CANO to more effectively manage day-to-day operations inside schools.

Conclusion

In this article, we have traced how the Mohawk community of Kahnawà:ke is leveraging its data resources to support self-government in the educational sector. We described how technical infrastructures, social relationships, policies and procedures, and human resource capacities combine to support community data management. We outlined the roles that local organizations, regional support institutions, and government agencies play in this process. We also described some of the tensions and challenges embedded in this work, as well as some of the successes achieved by the community.

We positioned Kahnawà:ke's data management work as an example of Indigenous resurgence, as described by Corntassel (2012), Simpson (2011), Alfred (2009), and others. This focus provides some

points that might support the work of Indigenous peoples in other contexts. First, we stressed the important role that community ownership and control play in data management. This work, as practiced by people every day, supports a continual renewal of Indigenous values, institutions, and practices, and serves to counteract the effects of settler colonialism. As Corntassel (2012) wrote: “by focusing on ‘everyday’ acts of resurgence, one disrupts the colonial physical, social and political boundaries designed to impede our actions to restore our nationhood” (p. 88). People working in the area of data management are actively engaged in the production, curation, and sharing of the community data assets that support Nation rebuilding and resurgence.

Our study demonstrates this point. Faced with a challenging situation rooted in the long-term and ongoing impacts of settler colonialism, Indigenous educators in Kahnawà:ke are engaged in the difficult work of rebuilding their educational system. Data management and digital ICTs provide important tools to support this work—if they are adequately owned, controlled, accessed and possessed by community-based organizations. In the coming years, efforts to build and develop data management systems and capacities will be key to these efforts, particularly as more aspects of society move online.

Second, to support this focus, we suggested that people working in this area envision community data management as a socio-technical process that encompasses both technologies—such as a fibre optic network like *Tewatati* and a data management platform like CANO—as well as social relations among the individuals and organizations using them. A successful community data management system consists of the interactions among these elements on a continual basis.

Further to this point, we emphasized the importance of data management protocols to guide these relationships and practices. These protocols must be clearly articulated, developed over time in consultation with all involved parties, and formally binding. As demonstrated in this article, the development of such protocols is a long-term process. It includes multiple changes and adjustments over time, and must adhere to community requirements as well as those of external agencies such as government programs like FNSSP. If developed properly, these protocols embody one of the core enabling factors for community data management: trust. Without trust among all parties, it is unlikely that data management will adequately support broader efforts of community resurgence.

The hard work of data management staff in Kahnawà:ke’s educational sector shows us how individuals and groups are taking ownership and control of this process in an incremental but steadily growing manner. It demonstrates that this is not an easy task, but rather one that faces many tensions and setbacks. It is these kinds of activities—in the decolonization processes that many First Nations people are engaged in every day—that best illustrate the key lessons we learned during our research. We hope that this article is of use to other communities engaging in similar efforts from their own diverse and locally rooted contexts.

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Appendix: Acronyms

Acronym	Description
AANDC	Aboriginal Affairs and Northern Development Canada
AFN	Assembly of First Nations
EDC	Executive Directors' Committee
FNEC	First Nations Education Council
FNIGC	First Nations Information Governance Centre
FNSSP	First Nations Student Success Program
ICT	Information and Communication Technologies
KEC	Kahnawà:ke Education Council
KSCS	Kahnawà:ke Shakotia'takenhas Community Services
MOU	Memorandum of Understanding
OCAP	Four Principles of Ownership, Control, Access, and Possession of Data
RHS	Regional Health Survey
TCPS2	<i>Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans</i> (2 nd ed.).
