



***Lessons Learned: Effectiveness of Courses Developed for Aboriginal Teacher Candidates
Delivered at a Distance***

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Abstract

Recent Ontario provincial and federal education policy developments propose to increase the academic success of an ever increasing number of First Nation children attending urban and First Nation schools. Key to achieving that goal is increasing the number of Aboriginal educators who are skilled in teaching that is grounded in culturally responsive and relational pedagogy. In many instances, those interested in pursuing such a career in education are limited in their ability to attend conventional teacher education programs because they live in remote communities, have familial responsibilities, and/or have limitations related to their employment. Creating and resourcing teacher education programs that consider the realities of First Nation peoples will be fundamental to achieving the goals set out by the Ontario and federal governments. This paper highlights factors that limit access to university education for First Nation peoples and presents the results of a pilot study that evaluated a unique teacher education program for Aboriginal students delivered at a distance from their home communities. The paper also discusses the opportunities and pitfalls associated with technology-mediated Aboriginal teacher education.

Résumé

En Ontario, les récents développements des politiques en matière d'éducation au niveau provincial et fédéral proposent d'augmenter la réussite scolaire d'un nombre toujours croissant d'enfants des Premières nations qui fréquentent des écoles urbaines et celles des Premières nations. La clé pour atteindre cet objectif est d'augmenter le nombre d'éducateurs autochtones qui sont spécialisés dans l'enseignement fondé sur la pédagogie adaptée à la culture et la pédagogie relationnelle. Dans de nombreux cas, les personnes intéressées à poursuivre une telle carrière en éducation sont limitées dans leur capacité à participer à des programmes conventionnels de formation des enseignants parce qu'ils vivent dans des communautés éloignées, ont des responsabilités familiales, et/ou ont des limitations liées à leur emploi. Il sera fondamental de créer et de faire le ressourcement des programmes de formation des enseignants qui tiennent compte des réalités des peuples des Premières nations pour atteindre les objectifs fixés par les gouvernements ontarien et fédéral. Ce document met en évidence les facteurs qui limitent l'accès à la formation universitaire pour les peuples des Premières nations et présente les résultats d'une étude pilote visant à évaluer un programme unique de formation des enseignants pour les étudiants autochtones offert à distance à partir de leurs communautés d'origine. Le document examine également les possibilités et les pièges associés à la technologie par les médias pour la formation des enseignants autochtones.



INTRODUCTION

Half of First Nation peoples in Canada live in remote areas (Statistics Canada, 2011) and they are increasingly embracing technology (Voyageur, 2001) in their daily lives. Educational programming delivered via the Internet has been regarded as the answer to increasing access to higher education by Aboriginal peoples living in remote communities in Canada (Davis, 2000; Facey, 2001; Fiddler, 1992; Greenall & Loizides, 2001). Though the infrastructure and tools of online education hold potential for effective learning environments for First Nation learners (Rice-Green & Dumbrill, 2005), their lived realities and ways of knowing reflect different epistemological traditions and pedagogies than those rooted in pedagogies that shape mainstream distance education (Dion, 2009; Dumbrill & Rice-Green, 2007).

Information drawn from the National Household Survey reveals that 1, 400, 685 people identified themselves as Aboriginal in 2011; this is the equivalent of 4.3% of the Canadian population. This percentage has steadily increased from 2.8% in 1996 to 3.3% in 2001 to the 2011 percentage (Statistics Canada, 2011). Additionally, the number of younger Aboriginal persons is increasing, "Aboriginal children aged 14 and under made up 28.0% of the total Aboriginal population and 7.0% of all children in Canada" (Statistics Canada, 2011, p. 2). Understandably, these children and youth are flooding into the education system. At the same time, the 2011 Canadian census indicates that, in Spring/Summer 2011, only 65.3% of First Nations, 82.4% of Métis, and 82.4% of Inuit individuals in Ontario between the ages of 20-24 had completed high school (Statistics Canada, 2011). These demographic realities have led to a push for educational reform in Ontario (Ontario Ministry of Training, Colleges and Universities, 2011), since government sees these demographics as a problem for the future labour market (Rumble, 1995). It is in the best interest of the provincial and federal governments to do everything possible to close the academic achievement gap between Aboriginal and non-Aboriginal students if Canada wants to remain competitive in a global economy.

One way to address the low academic retention and achievement rates of young Aboriginal students is to increase the number of qualified Aboriginal teachers in provincially and federally funded (on-reserve) schools. In the Ontario Ministry of Education's release of the Ontario First Nation, Métis, and Inuit Education Policy Framework (2007) and the more recently proposed Bill on First Nation Education (Aboriginal Affairs & Northern Development, 2013) tabled by the federal government, the primary recommendation is to increase the number of provincially certified Aboriginal educators. As these visions converge, Boards of Education and First Nation Education Authorities will increasingly press Faculties of Education for alternative teacher education delivery models that support the needs of the next generation of Aboriginal educators. As suggested earlier, in Canada, the fastest growing population of 21st century learners is composed of Aboriginal Peoples. Significantly, there is an emerging research literature that considers the costs of developing culturally responsive online programs from the learner's perspective (Hodson, 2002; Conference Board of Canada, 2010; Industry Canada, 2005; McCue, 2009; Sharpe, Philpott, & Bourgeois, 2011; Vaughan, Auger, Sacher, & Sacher, 2014; Voyageur, 2001).

The study described in this paper contributes to the growing body of knowledge on distance and e-learning education for Aboriginal teacher candidates (ATC) from a holistic perspective that aligns with



Aboriginal Peoples' epistemological worldview. In the study, the effectiveness of distance courses delivered to ATCs in their home communities in Ontario, Canada was investigated. By including the voices of Aboriginal Peoples, this study provides important information for distance educators and administrators so that they might provide more culturally responsive and relationally (Bishop, O'Sullivan & Berryman, 2010) focused distance education experiences for Aboriginal learners.

A REVIEW OF E-LEARNING AND DISTANCE EDUCATION

Pedagogical Models in E-Learning and Distance Education

Anderson and Dron's (2012) discussion of the evolution of pedagogical models for distance education emphasizes how distance education is defined by specific epistemological roots, "...historically constituted in the thinking and behavioural patterns of those who developed, tested, and implemented what were online novel systems" (p. 1). Based on different pedagogies, technologies, learning activities, and assessment criteria, Anderson and Dron define three pedagogical eras, which, they argue, can be "effectively used to address the full spectrum of learning needs and aspirations of 21st century learners" (p. 2). These eras include the cognitive-behaviourist, social-constructivist, and connectivist models. Separate from these three models of distance education is the holistic approach (Kitchen, Hodson, & Hodson, 2014) that is fundamental to culturally responsive Aboriginal pedagogy for 21st century First Nation learners.

While elements of cognitivist-behaviourist, social-constructivist, and connectivist models may relate to culturally responsive relational Aboriginal pedagogy (e.g., the social-constructivist emphasis on social presence), none of the models originated from those who live and communicate through epistemological traditions that reflect Aboriginal Peoples. Rice-Green and Drumbrill (2005) emphasize this point when they state that there is a need for more research on Aboriginal online learning, "[W]ithout paying attention to both decolonization and holistic knowledge systems, web-based education may bridge geographic divides, but will reinforce the divide between different peoples and different ways of knowing" (as cited in Brant, 2013, p. 83). In other words, we may be able to connect to this group of people electronically but remain unable to connect in order to provide an effective or meaningful online learning experience for Aboriginal Peoples. To provide an effective teaching and learning experience, we need to become aware of Aboriginal Peoples' ways of knowing, and include this knowledge in our pedagogical approaches to teaching and learning.

Relational Pedagogy and Iconography as Teaching Approaches

Evolving from cognitive theory (Miller, 2003), cognitive-behaviourist pedagogical models in distance education rely heavily on the absence of social relationships among students, student peers, instructors, and administrators (Anderson & Dron, 2012). In these models, learning is a highly individualized process experienced by the student. Developing from the work of Dewey (1933/1998) and Vygotsky (1934), distance education social-constructivist pedagogy finds its place in two-way synchronous and asynchronous interactions among students and the instructor. This pedagogy views learners as joint producers in the construction of knowledge (Anderson & Dron, 2012).



Consistent with the cognitive-behaviourist model is connectivism (Siemens 2005; Downes, 2007) which stems from actor-network theory and encourages the building of networks of information and contacts online. In this type of learning environment, the educator assumes that learners have the knowledge they need to navigate online networks that can connect them to different people, digital artifacts, and content, in turn, moving them beyond face-to-face contact and towards learning modes such as Twitter, voice threads, wikis, and threaded conferences (Anderson & Dron, 2012).

Relational pedagogy, on the other hand, is an approach that requires learners to situate their learning in personal experiences and to examine their beliefs and experiences with evidence (Brownlee & Berthelsen, 2005). Relational pedagogy is complementary to an Aboriginal epistemological view and intellectual tradition, such as the Four Aspects of Self-Medicine Wheel Teaching (Kitchen, Hodson, & Hodson, 2014). "This particular teaching contends that a human being has a Spiritual, Emotional, Intellectual and Physical reality that must be in balance if that individual is to be in balance" (p. 6). An important goal of Aboriginal education is to ensure that learners are able to see and understand different contexts and compare them to their own. One way to accomplish this is through a teaching strategy called iconography. Iconography uses symbols and images as means for learners to consider their personal experiences during the learning process (Sarafini, 2011). Moreover, iconography provides an opportunity to infuse Indigenous content (e.g., a general theme or visual images) into the learning process and to tie together both Aboriginal and non-Aboriginal content. This approach helps learners to see themselves and their culture in relation to course materials and enables them to connect spiritually. Learners can maintain a true sense of self during lessons involving non-Aboriginal content.

STUDY BACKGROUND AND CONTEXT

This study examined the advantages and disadvantages of delivering synchronous online courses at a distance via a course management system (CMS) and based on the perspectives of key stakeholders, including students and administrators involved in an Aboriginal teacher education program. The students in the course were Aboriginal, with half of them already teaching in Band-operated schools in remote First Nation communities in Northwestern Ontario when they began the program. The administrators included web administrators, technical support staff, and professors located at a southern Ontario university. The teacher educators delivering the program from southern Ontario were both Aboriginal and non-Aboriginal. A range of teaching approaches was employed by the instructors, including lecture, classroom discussion, cooperative learning, Indigenous activities, and analysis of documents, artifacts, and video.

The program began in 2005 with an extensive community-based needs assessment. The needs assessment explored, in part, Internet-mediated program delivery as a means of lowering the high transportation costs associated with the transport of ATCs living in remote communities in northwestern Ontario to educational facilities located elsewhere. The goal was to minimize their absences from their families and, in some instances, the schools in which they taught. It was assumed that the level of Internet connectivity and familiarity with distance education in the involved communities would be an asset for such an initiative.



An initial audit of the communities confirmed an extensive degree of connectivity although the connectivity was by no means uniform across the communities and varied from low speed dial up to high speed connectivity and Internet access. This connectivity factor, combined with the pedagogical needs of Aboriginal learners, proved to be a limiting factor in the choice of a course management system (CMS) that would be used in this research study. The selected CMS was adopted because it claimed to have a high level of versatility, and was one of the commonly used platforms in universities.

THE PILOT PROJECT

Distance Course Development Challenges

Once the CMS was selected, the online courses to be delivered to the ATCs in the rural Aboriginal communities had to be developed. ATC courses were developed and characterized by the following features: 1) each course was hosted in the adopted CMS to provide synchronous opportunities for ATCs and instructors to meet at a distance in real-time, and 2) each course incorporated design features such as Aboriginal icons and symbols (e.g., iconography) to facilitate learning of particular content. The iconographic design features of each course appeared throughout all of the associated learning materials and, reflecting the cultural norms of the ATCs, tied the entire program into a cohesive whole. Of special interest was the Anishinabe graphic artist who was contracted to work with the team of teacher educators and technologists for each on-line course. Based on the experience of the researchers, these features were considered an appropriate approach to teaching ATCs in Ontario and perhaps across Canada.

Key stakeholders in the course development process included administrators, course developers, and instructors, all with little practical experience in teaching or learning with the CMS. A number of challenges, including epistemic differences, different levels of knowledge regarding e-learning and distance education, varying levels of skill with the CMS, connectivity issues, and different experiences teaching in online courses were identified. All of these challenges and barriers had to be overcome within a limited time frame of two months to ensure that the courses were developed, mounted, and completed prior to the start of classes for the ATCs. As indicated earlier, the overall purpose of the study was to explore the perceptions and experiences of administrators and ATCs associated with the courses.

METHODS

Research Design

The researchers employed a multiphase convergent parallel design to study the effectiveness of the courses delivered at a distance to the ATCs. The researchers defined effectiveness as the ability of the ATCs and their instructors to consistently connect through the Internet and participate in an educational experience that reflected the needs of the learning cohort. A multiphase design builds on the convergent mixed method design described by Creswell (2012). This design involves studying a series of phases that examine different sets of research questions that advance a single research objective (Creswell, 1998, 2012). Building on this, in a convergent design, quantitative and qualitative data are

collected simultaneously. Each dataset is analyzed separately, and results are interpreted to determine whether or not the results support or contradict each other. Figure 1 represents the data collection procedures as modified from Creswell's (2012) model. With this approach, it is assumed that investigating multiple sources of data leads to better understanding of the research objective, while it also combines the advantages of qualitative with quantitative methods (Creswell, 2012).

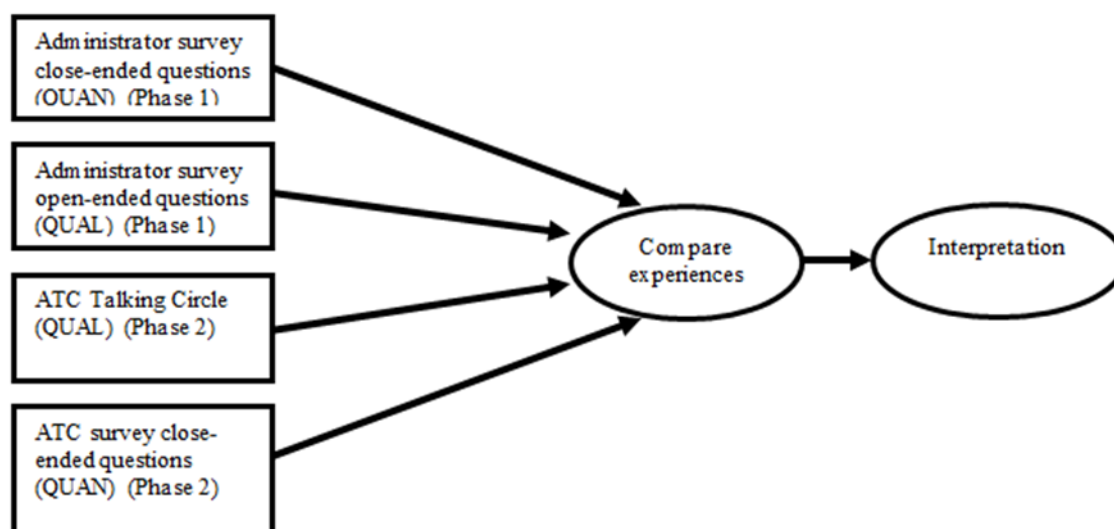


Figure 1. Multiphase convergent parallel mixed method design used for the pilot study. Adapted from Creswell (2012)

Participant Recruitment

Purposive sampling techniques were used to recruit administrators (i.e., web administrators, technical support staff, and professors) and ATCs involved in the project. The goal was to gather as many participants as possible from the population. Recruitment strategies included: (a) an email with an invitation letter, (b) face to face contacts made by administrators, and (c) face to face distribution of recruitment materials by the researcher during a social gathering. The researchers initially planned to recruit ATC participants via email; however, obtaining reliable email addresses for the ATCs proved to be difficult and prompted the research team to rethink the email strategy for the recruitment of ATCs. The researchers attributed this difficulty to the tendency of ATCs to use their personal email accounts more so than the email accounts assigned to them by the university. Due to these challenges, it was decided that administrators would distribute recruitment materials to ATCs in person; this, however, resulted in no participants. The researchers tentatively interpreted ATC reluctance to participate as “research fatigue” because many of the ATCs were involved in other research studies. A third attempt to solicit participation was made at a social event, where recruitment materials were distributed by one member of the research team. This strategy was successful in recruiting three ATCs who agreed to participate in the Talking Circle and eight ATCs who completed a quantitative survey.



The researchers were satisfied with this response. In research studies that target specific Aboriginal populations, it is common for the resulting sample to be small due to the target population also being small. The researchers attributed the three ATCs' willingness to participate to the nature of the relationship between the researcher and the ATCs. Nurtured relationships between the researcher and the ATCs may have overcome their "research fatigue" and motivated them to participate.

The recruitment of university administrators was easier; through initial and follow-up emails, 12 participants were recruited. This success was possibly due to the individuals' personal interest in the project. The tasks of the project and the types of relationships the participants had with the research team (e.g., colleague relationships with the principal investigator and co-investigators, 'employer to employee' relationships with the co-investigators) had comprised a significant period of time within the participants' work portfolios. Due to these circumstances, there is the possibility that the administrators felt obligated to participate. In this study administrators were conceptualized as web administrators, technical support staff, professors, and instructors.

Data Collection: Administrators

Data were gathered from the administrators (n = 12; 100% response rate) via researcher-developed surveys, which were distributed and returned via email. The survey questions, quantitative and qualitative in nature, focused on time, costs, and tasks related to course development and were based on the literature (Berge, 2001; Henderson, 1996; Hodson, 2004). Henderson (1996) has offered a "cultural critique" of the use of learning technologies involving Aboriginal learners, while Hodson (2004) has cautioned against wholesale CMS adoption without examining issues of Aboriginal learners' identities. Open-ended questions provided the administrators the opportunity to share narrative comments and additional information related to specific questions. Appendix A provides the specific questions to which administrators responded.

Data Collection: ATCs

Two methods of data collection were used to gather the perspectives of the ATCs: a researcher-developed quantitative survey (see Appendix B) and a Talking Circle, which generated qualitative data. Eight ATCs (66% response rate) completed the quantitative survey, which was then collected by a participant volunteer. Completed surveys were sealed in an envelope and passed to the research team. Three ATCs (25% response rate, (N = 12) participated in a Talking Circle, which is a methodological element of the Wildfire Research Method (WRM) (Kompf & Hodson, 2000).

The WRM is a holistic pattern of research engagement that removes artificial barriers between Aboriginal and non-Aboriginal populations through an approach that reflects Aboriginal cultural norms. In this instance, the WRM was expressed as a Talking Circle; Talking Circle is part of traditional Aboriginal democratic processes for sharing and consultation where there are diverse perceptions, experiences, and knowledge. At one level, the WRM can be understood to be what Strauss and Corbin (1990) refer to as a grounded theory "that provides a procedure for developing categories of information, interconnecting the categories, building a 'story' that connects the categories, and ending with a



discursive set of theoretical propositions” (as cited in Creswell, 2002, p. 150). By reflecting cultural norms and embedding them in respectful research, the WRM fosters meaningful learning for participants and sets the tone for strong future professional and research relationships. Through this pattern of engagement, participants witness their thoughts and feelings, which may be heard for the first time (Castellano, Davis, & Lahache, 2000). Thus, Aboriginal and non-Aboriginal persons and communities can move away from being the subjects of research to being partners and active participants in research and can move to benefiting from the building of local capacity (Smith 1999). Finally, non-Aboriginal researchers become participants in the process and are immersed in Aboriginal ways of knowing, collaboration, and research.

FINDINGS

When reporting on a multiphase convergent mixed method study, the findings are often presented first according to method, then as separate analyses, and then as integrative analyses that show supportive and contradictive elements of the findings. The purpose of integrative analyses is to explore intricacies in the findings obtained from separate analyses, as well as identify meaningful contradictions in the dataset. For this study, separate analyses of data from the administrators and ATCs are presented in Tables 1-3, while the integrative analyses are presented in text.

Quantitative and Qualitative Analyses

The purpose of the following discussion is to point out supportive and contradictory elements among the findings pertaining to the effectiveness of courses delivered to ATCs at a distance using a CMS. Table 1 provides a summary of descriptive findings based on the administrators’ and ATCs’ responses in the quantitative survey. Table 2 provides highlights from the narrative comments made by ATCs during the Talking Circle, while Table 3 summarizes narrative comments made by administrators on the quantitative survey.

DISCUSSION

The supportive elements in the findings demonstrate that the distance-based delivery of the courses was effective for the ATCs and their professors or instructors in that they could consistently connect through the Internet and participate in an educational experience that reflected the learning needs of the ATC cohort (e.g., synchronous, face-to-face interactions). Both the administrators and ATCs indicated that the CMS was difficult to learn but became easier to use as time went on.

The capacity of the CMS to provide a variety of synchronous communication functions (e.g., synchronous, face-to-face interactions, break-out group opportunities) with Aboriginal visual content created a culturally responsive environment for learners and instructors.

Despite the positive functions of the CMS, the analysis revealed that the system should not be used in isolation to support learning. In other words, additional teaching strategies and scaffolding were required to ensure that the ATCs were learning course content. While the CMS was a useful tool for facilitating synchronous communication between instructors and students, it became clear that other



features provided by an additional CMS are required to enable effective learning for the students. For example, while the CMS allowed learners to interact in real time with each other and with the instructor through video, audio, whiteboard, and simultaneous chat, this system was not able to deliver updates to learners outside of class time or provide access to external course materials (e.g., additional documents or readings). This was a recurring theme expressed by the ATCs taking the courses (Table 2). Unexpected barriers evolved over time that created more work for administrators and course instructors. For example, learners had problems with logins and passwords as well as downloading and saving additional documents or readings provided by the professors or instructors as the courses progressed. The need for administrators who had strong experience with the CMS emerged as an important message.

Table 1. Quantitative Findings from Surveys Completed by Administrators and ATCs

	Administrators	Aboriginal Teacher Candidates (ATC)
Data Analysis Methods Findings	<ul style="list-style-type: none"> - SPSS software was used to run descriptive statistics in order to examine frequencies - the majority familiarized themselves with the CMS program via a combination of learning on their own and attending training (50%); they reported that they used 1-2 sessions in order to feel confident navigating the program (66%) and that their tasks evolved over time (66%) - those whose tasks evolved over time on the project worked more weeks ($M = 10.25$) to complete tasks than those whose tasks did not evolve ($M = 4.25$) - those who had prior knowledge of the CMS program worked more weeks on the pilot project ($M = 22.2$) than those who had no prior knowledge ($M = 14.2$) - on average, administrators spent 5.63 hours on tasks weekly. - based on salary information, calculated using the median dollar amount specified by salary range and a 35 hour work week, the total cost of completed tasks was \$2,843.16. In order to have these administrators as employees on salary during the project cost a total of \$211,713.95. 	<ul style="list-style-type: none"> - the majority preferred more than one communication method for learning (50%); most preferred was group discussion (75%), followed by viewing PowerPoint, texting on message board in real time, and seeing instructor and other students (50%) - fewer problems were experienced with the video cameras in comparison to the microphones (87% 'sometimes'; 12.5% 'always'); the majority indicated that these problems discouraged their participation in the course (50%) - few indicated that they viewed class recordings of the classes they missed (25%) - most did not have problems getting the CMS software up and running on an ongoing basis - in general, the distance delivery personnel support provided outside of class time seemed less helpful for ATCs, with the exception of the moderator's assistance - the majority of the ATCs indicated that they always used the laptop provided by the consortium representing local First Nations communities in the north (62.5%). - they rarely shared a computer during a course session (75%) and if they did so, it was due to technical problems



Table 2. Talking Circle Themes Based on Comments Made by ATCs

Select Statements Used to Construct Themes	Researchers' Summary of Themes
<i>Course Connectivity and Delivery</i>	
<p>"We were just taken to a point where we were getting frustrated with [names CMS and we didn't like it and you had to change your password often. They should have an alternative email account to remind you when to change your password or ten days before"</p> <p>"For me it was okay. It was something new and I like it. But it's just when something breaks you can't just fix it just like that, you have to wait and wait for the parts, even for the headphone there's hardly anything in the store you have to order it and it takes time, maybe a week of two."</p> <p>"Like for example today [speaking while visiting the south] we checked to see if we could get new modems for our home they don't sell it in stores we had to go to [names stores] they say they don't carry those no more you have to get it from your internet provider they said, we don't have anything extra on hand back home..."</p> <p>"I didn't have too many problems. I wasn't connected to the community Internet. We don't have a community internet system. We have our own satellite dishes that we use so it was easier for me to get online and get the course material, but those other people they were having a rough time even getting online, not to mention getting the course materials"</p> <p>"We only had computer problems mostly because of bandwidth and our connection got cut off--- I don't know what happened, I think it was a tree fell on the wire. We couldn't log in and I tried to log on and it just booted me off or just, our computers, our laptops are getting out of date, I guess, I can say because we receive all of our assignments on there and we're almost done the three years of assignments and it is all in there".</p>	<p>- the need for an additional CMS created unexpected barriers (e.g., knowledge of and the updating of logins and passwords) and frustration in general</p> <p>- problems with router, bandwidth, access to satellite versus community internet system; out-of-date computers limiting saving and downloading, access to new technology; ATC principals, other uncontrollable events created barriers for course connectivity, delivery and learning; relationships were found between these issues and social realities</p>
<i>Iconography</i>	
<p>I: So I guess what I am hearing is that you really respond to the visual.</p> <ul style="list-style-type: none"> o "Yes, because they [instructors] referred to--- I think they referred to every theme that came up and how we connect with [it] so I thought it was good" o "When we are teaching kids we have to have something visual all the time so even with adult learners it reinforces whatever the teachers trying to do, to have something around... it reinforces your sense of identity, you know, it gives you a sense of pride, something to connect to..." o "It helped...everything represents something" [that is, everything has a spiritual meaning] o "I really enjoyed those [images], inspirational mostly; they have on there and the meaning. It makes sense." 	<p>- positive reactions: helped navigate through course content, connect spiritually to non-Indigenous content</p> <p>- a negative reaction occurred when a non-Indigenous instructor incorporated an image without consulting the First Nations graphic designer; this image has different meanings in various Aboriginal cultures causing some learners discomfort</p>



Table 3. Administrators' Narrative Comments on the Quantitative Survey

Researchers' Summary of Themes	Examples of Administrator Narratives
<i>Positive Factors [Personnel support; frequent communication and documentation]</i>	
- the most prominent positive factors influencing the project process included personnel support and communication among administrators; administrators spoke often of the importance of each team's support in aiding the other.	"As there was ample tech support, my lack of knowledge was not a significant impediment to teaching the course. The instructional assistant made sure that everything was in working order and handled the various technical issues that arose. Additional support from [teaching and learning department] and the [technology department] were also critical. Assistance in advance meant that I was given good advice as to how to adapt to this mode of delivery."
<i>Negative Factors: Problems in the North</i>	
- most frequent complaint was the lack of technology support for ATCs in the north, followed by being able to communicate with ATCs, obtaining community information specific to delivery, bandwidth and connectivity problems.	"The absence of many learners for many sessions was also a recurring problem, which hindered the success of the Pilot. The technical problems and absenteeism are in some ways related, but not entirely. The lack of participants at orientation sessions meant that not all teacher candidates had an opportunity to learn how to function in online environments; thus the agendas of the training sessions that I had developed did not work."
- administrators suggested ATCs were uncomfortable with the online program functions.	"There was issues with the technical support available to students on their end...The bad internet at the students end...The fact that there was no real support available on their end...The lack of support mid-week for the students (only sessions once per week) with no support networking put into place until the last 2 sessions."
<i>Problems in the South</i>	
- several comments regarding the failures of the administrative support model due to lack of communication and established understandings of job descriptions	"Clear lines of communication and reporting need to be established from the start. The role of each unit [(teaching and learning, technology, Education department or Aboriginal centre, etc.)) needs to be clearly defined, and schedules need to be established. However, since many units need to collaborate in order to get another project off the ground and in order to maintain distance activities, it is essential that a project manager be clearly identified; this person's role is to coordinate activities and ensure that things are done on time."
<i>Distributed Leadership</i>	
- the integration of a plethora of individuals in four different departments working in two epistemic traditions and management models presented unrealized challenges	"I feel that a great part of what worked and what created challenges is the 'distributed leadership' model in the [Aboriginal Centre]. Since tasks were shared almost equally among members and since most of the [Aboriginal Centre] members participated in training sessions, Steering Committee meetings, program development and course design meetings, responsibility was shared also."



Through the integrative analysis of the various phases in this study (see Figure 1), the main contradictory finding was that decisions made by administrators in the south did not always apply or reflect the realities of those living in northern communities. This occurred when certain assumptions were made by administrators in the south and the consortium of agencies representing local First Nation communities in the north about the realities of life for the ATCs in the north. A number of these assumptions inhibited the ability of ATCs and their instructors to consistently connect through the Internet and participate in the planned educational experiences. These assumptions were as follows: (a) connectivity would not be a problem, (b) principals would allow the ATCs to attend class during school hours, (c) fixing technical issues is easy for learners (e.g., if a computer microphone breaks, the learner can go out and buy another one right away). All of these assumptions influenced ATC absences.

The administrator data illustrated frustration about contacting students and student absences. Absences by the ATCs challenged administrators' assumptions about life in the north. As an example, administrators assumed that course connectivity would not be a problem for the ATCs. While both parties confirmed that bandwidth capacity issues and absences due to H1N1 (a flu pandemic that affected the families of many ATCs during their enrolment in the program) were barriers to course engagement, they differed on other points. The administrator data demonstrated that course engagement was negatively affected by bandwidth capability, the computer skills of the ATCs, H1N1, and the lack of direct CMS support for the ATCs. In contrast, the ATC data indicated that course engagement was affected by bandwidth issues, a lack of accountability between instructors and the ATCs, the time of day the courses were held, and H1N1.

Prior to the CMS launch, administrators assumed that the bandwidth capacity in the north would be sufficient to host the classes. Yet, ATC data revealed that satellite Internet connectivity was not available in some of the ATC locations and that the CMS would not run properly with a dial-up connection. Data obtained from the ATCs did not support administrators' claims that connectivity problems were due to the ATCs' lack of computer skills and level of support for the course management system for ATCs. Instead, the ATCs suggested that, despite the barriers and challenges they faced with course connectivity, they were resilient. They employed group and individual problem solving strategies to navigate unfamiliar territory and sought alternative connections. In addition, the data suggested that no amount of extra CMS support in the north would have alleviated the problem of an absence of satellite and high-speed cable access.

Another assumption made by southern administrators was that the ATCs would be able to attend their classes. The ATCs were often unable to login to class because their principals would not provide relief for them to leave their classrooms during school hours. The southern administrators did not identify this possibility. Without permission from the ATCs' principals, the ATCs could not attend a class scheduled during regular school hours. While principals were a barrier to the ATCs' engagement in the course, holding class during school hours was also a barrier to engagement. The data collected from the administrators illustrated their frustration with the ATCs' lack of attendance. The inability to communicate with the ATCs on a regular basis due to absences was identified as a frustrating occurrence. A relationship between course connectivity, social realities, and absences was evident.



The last assumption made was that fixing technological problems in the north would be possible. In the north, the lack of access to retail outlets was a barrier to replacing even the most mundane of periphery hardware: the ATCs could not just run out to Best Buy or some other retail store to replace a defective set of headphones. Exacerbating this was that the ATCs seemed reluctant to convey their problems. This reluctance is attributed to the ATCs' learning needs that included issues in the classroom and external to the classroom. This again illustrates that southern assumptions do not often reflect the realities of the north.

Overall, the administrators' assumptions created barriers to ATC learning via the CMS. Often, the ATCs' inability to overcome barriers was interpreted as academic disengagement by the administrators; however, based on the ATC narratives, this was not the case. Through the integrative analysis of data collected from the ATCs and administrators, it became apparent that the clashing of administrative assumptions with northern realities created barriers to engagement. For future initiatives, the ATCs offered the following suggestions as ways of mitigating some of the challenges they experienced: 1) ensure that satellite connections are provided for all areas where ATCs are living, 2) offer alternative class times (e.g., evenings or weekends), and 3) create a mentoring system between cohorts so that more experienced ATCs might share their knowledge of the CMS with ATCs who are just starting the program.

Reflecting on the link between the supportive and contradictory elements within the findings, the significance of relationships in issues of course connectivity and delivery of course content emerges. Aboriginal epistemology is centred within complex expressions of "relationship." Relationships between individuals are often established over time, through multiple interactions and personal observations. One particular example illustrates this epistemic value quite clearly. At points the administrators were frustrated with not being able to connect with students; one administrator, however, did share that their tasks evolved significantly in contrast with what was initially outlined. That evolution was motivated by the fact that she/he was the most consistent person for the students to contact regarding course delivery. This individual would assist students with technical issues, carry out conversions of PowerPoint lectures for students to access, liaise with staff when students brought forward issues that needed to be addressed in order to meet their needs, and helped them navigate the CMS. Why did this person become the 'go-to guide' for the ATCs? The researchers attribute this phenomenon to the significance of relationships in Aboriginal education. This particular individual connected with the students on day one and was consistently present via the synchronous CMS during each class of each course. This administrator was not physically present in the north but in the south at a distance from the students; however, this individual consistently connected face-to-face online with the ATCs during each class and other course-related interactions.

Relatedly, the ATCs discussed instructor qualities that enabled them to excel in their courses. Candidates used the following words and phrases to describe a good instructor: (a) 'tough love' (b) flexible (c) offers support. 'Tough love' refers to relationships in which the participants are held accountable and accountability is enforced. The ATCs discussed that instructors were often reluctant to remind them of their responsibilities in the course (e.g., logging on, submitting assignments, and conducting presentations) when, in fact, the ATCs welcomed such attention to their own accountability. These



examples speak to the significance of building relationships between administrators and ATCs for future distance programs for which a CMS is utilized.

Limitations

Data was gathered via researcher-developed surveys. No validity process was conducted when developing survey questions; instead survey questions were based on the literature. In addition, the statistical analyses conducted in this study do not allow for generalizability. Descriptive statistics were used to quantify the frequencies of participant responses for the purpose of providing descriptive results.

Aboriginal research methods, response rates, and sample sizes often appear insignificant when compared to similar research in the dominant mainstream society. By nature, community-based Aboriginal research generally involves smaller populations that seldom generate a response rate or sample size that is considered statistically meaningful by the dominant mainstream society. For this reason, findings are often dismissed. This could be true for this study. These circumstances are not limitations but rather the realities of Aboriginal research. The findings of Aboriginal research when it is conducted well are legitimate representations of Aboriginal realities.

FUTURE CONSIDERATIONS

The main 'lessons learned' derived from this study include the importance of building relationships among the administrators, principals, and ATCs, the positive perceptions of iconography on ATCs' learning, and the need to be mindful of absenteeism by the ATCs who were working in remote northern settings. First, if the objective of a distance education program is to serve Aboriginal learners in northern and remote settings, our findings emphasize the need to establish and maintain relationships through multiple interactions between learners and administrators. In future studies, a relational approach is recommended as the most effective way to recruit participants. As noted throughout this paper, Aboriginal epistemology is centred on relationships between individuals which are often established over time through multiple interactions and personal observations. Second, being mindful of iconography is an important consideration in relation to Aboriginal distance program development. Being able to connect individual courses with themes that are associated with traditional teachings and related visuals encouraged the ATCs to connect culturally to the learning, and resulted in a deeper understanding of these teachings and their relevance in contemporary contexts that would be undoubtedly be replicated in their practice. Non-Aboriginal educators who demonstrated an understanding of such teachings built strong relationships with the ATCs that enhanced learning and minimized the physical distance between ATC and educator. Due to the positive impact of iconography observed in this study on ATC learning, further research into the use of iconography in course content is recommended.



Finally, if the objective of future CMS-supported courses is to connect and deliver education to Aboriginal learners effectively, the findings suggest that administrators need to conceptualize and approach absenteeism in a more culturally sensitive manner. In this sense, administrators need to understand the complexities of northern life, course connectivity, delivery, and content from a perspective other than one often used in the dominant mainstream society. Findings show that ATC absenteeism was not an indication of student disengagement from online learning but rather evidence of a lack of a relational approach by some administrators and a lack of understanding about culturally-relevant realities in the north (e.g., class scheduling, satellite connections and bandwidth capabilities, unforeseen weather conditions, access to retail outlets, employment and community obligations, and the capabilities of the ATCs personal computers).

CONCLUSION

For over a decade, online education has been touted as the unrealized panacea of higher education in Ontario offering greater choices to learners and financial benefits to post-secondary institutions. Today, what permeates much of the online education environment tends to be text heavy and limits the face-to-face interaction between professors and learners and between learners and learners, which is so fundamental to an Aboriginal pedagogy. A recent report, (Rushowy, 2012) authored by the Ontario Ministry of Training, Colleges and Universities calls for undergraduates to be allowed to “take three of every five credits online” (pp. A1-A 16). In that report, there is very little about the real cost of developing effective online learning environments that are inclusive of the learning needs of Aboriginal learners. From an Aboriginal pedagogical perspective, “learning needs” are not limited to issues that arise in the classroom. They include other factors outside of the classroom as well, for example, a lack of bandwidth and supportive principals shaped the learning environment and, by extension, the ATCs in this study (Annand, 1999).

In this study, a technological platform that reflects an Anishinabe aligned classroom where learners can see the professor and the professor can see the learners was selected. In this environment, all could see, hear, and verbally interact in real time; they did not need to rely on text-based lessons or texting as the primary mode of communication.

The financial realities associated with this study reflect the real cost of person hours (\$211,713.95) to accomplish just that. The financial costs adjusted for inflation align with those reported in earlier studies. In the edited book *Dollars, Distance and Online Education*, Boettcher (2000) concludes the following:

A complete web course with all course material and interaction on-line would cost \$184,000 to develop. This includes 360 hours of staff time in a course team consisting of a project manager, academic experts, instructional designers, technical support people, graphical designers, editors and clerical staff (as cited in Taylor, 2002, p. A12).



Rarely do government agencies and industry reports address the real costs and the expertise required from both a pedagogical and technological perspective to achieve effective online education. One is left to conclude that it is unrealistic to expect institutions of higher learning to shoulder this burden in the current economic climate.

Both provincial and federal educational policy shifts propose to increase the level of academic success of an ever increasing number of Aboriginal children entering publicly funded schools (see Ontario Ministry of Education, 2007; Aboriginal Affairs and Northern Development, 2013). Key to achieving that goal is increasing the number of Aboriginal educators that meet the regulatory criteria of the province and have the capacity to be culturally responsive relational educators. In many instances, those potential educators are limited in their ability to attend conventional teacher education programs because they live in remote areas, have familial responsibilities, and/or employment limitations. To increase the availability and effectiveness of online education for Aboriginal people requires a strategic and sustained investment designed to overcome the many factors that limit access to Aboriginal teacher education.



Appendix A: Administrator Survey

1. In order to accurately inform future initiatives using [names software], you are asked to identify your employment position during the pilot project. Please select only ONE organizational title that best describes your employment position while you were involved in the [names software] implementation. (Circle one) [Lists employment positions]

2. Please identify only ONE unit or department title that best reflects your employment position while you were involved in the [names software] pilot project. (Circle one) [Lists units or departments]

3. Between [month] and [month] [year], please indicate the months when you were actively involved in the [names software] pilot project: [Lists months] Number of weeks per month:

Comments:

Learning to use [names CMS]

4. Before being asked to participate in the pilot project at [names university], did you have previous knowledge of or experience with the [names software] course management system? (Circle one) (Yes or No). If yes, please explain where or from whom you gained this knowledge or experience with [names software]:

5. How did your previous experience with, OR your lack of knowledge about [names software] affect your involvement in the pilot project? Please explain in detail:

6. How did you familiarize yourself with (i.e. learn to use) [names software]? (Circle one) (On your own, through trial and error; through training or demonstration sessions; a combination of learning on your own and attending training; or other (please specify))

7. Did you participate in a training or demonstration session provided by your [names university] employer? (Circle one) (Yes or No). If you answered No, skip to question #11.

8. How many [names software] training or demonstration sessions provided by your [names university] employer did you attend? Please indicate the number of sessions:

9. How many training or demonstration sessions did it take for you to feel confident that you could: participate in an activity on [names software]? Number of sessions: ____; moderate or teach on [names software]? Number of sessions: ____; provide technical support to others in an [names software] activity: Number of sessions: ____; other (please specify): ____ Number of sessions: ____.

Please add comments on your experiences in learning to use [names software]: 10. Do you feel the training or demonstration sessions were effective in teaching you how to use the course management system? (Circle one) Yes. Please explain why you feel they were effective: _____. No. Please explain why they were not effective: _____.

11. How could the training or demonstration sessions be improved? Please explain _____



Involvement in Activities in Pilot Project

12. How many meetings of the [names software] steering committee did you attend during the period between [names month and year] and [names month and year]? (Please refer to the dates indicated in your individual email message to trigger your memory about some of these)

Number of steering committee meetings: _____ Comments: _____

13. How many program development meetings did you participate in during the period between [names month and year] and [names month and year]? Number of program development meetings: _____ Comments: _____

14. How many course design meetings did you participate in during the period between [names month and year] and [names month and year]? Number of course design meetings: _____ Comments: _____

15. How many meetings or sessions related to instructional techniques did you participate in during the period between [names month and year] and [names month and year]?

Number of instructional strategy sessions: _____ Comments: _____

16. How many meetings within your specific unit (i.e. names units) did you participate in during the pilot project period? Number of internal unit meetings: _____ Comments: _____

17. How many meetings related to administrative or logistical issues did you participate in during the period between [names month and year] and [names month and year] (not including steering committee meetings and internal meetings)? Number of meetings: _____ Comments: _____

18. How many class sessions did you participate in through [names software]? Number of class sessions: _____. Please specify if you attended the entire class session or part of it: _____ Comments: _____

19. a) Approximately how many emails per week would you say pertained to the [names software] pilot project? Number of weeks when you were communicating through email about the [names software] pilot project: _____ Number of emails per week: _____

b) Approximately how much time per week in total did you spend on email communications related to the [names software] pilot project? Number of weeks when you were communicating through email about the [names software]: _____ Approximate time per week spent on email communications concerning the pilot project: _____ Comments: _____

20. Approximately how much time per week did you spend on phone conversations related to the [names software] pilot project? Number of weeks when you were communicating by phone about [names software] pilot project: _____ Approximate time per week spent on phone communications concerning the pilot project: _____ Comments: _____

21. Did you participate in other activities related to the [names software] pilot project not noted above? If so, please describe: _____ Please indicate approximately how much time was involved in these other activities related to the [names software] pilot project: _____



22. Overall, during the period when you were involved in the pilot project, approximately how many hours per week on average did you spend on activities related to the project? (tasks, meetings, training, class sessions, communication, etc.)? _____

Tasks

23. What were your tasks during the pilot project? Please list the tasks and add comments: _____

24. Did your tasks evolve other time? (Circle one) (Yes or No). If your tasks evolved, how did they change? Please describe: _____

25. What factors during the pilot project helped you accomplish these tasks? _____

26. What factors during the pilot project hindered or posed challenges to your accomplishment of your tasks? _____

27. Do you think the tasks would be the same if there were future initiatives in distance education through [names software]? Please explain: _____

Costs

28. One of the purposes of this study is to obtain data that would help investigators arrive at the approximate cost of human resources involved in the launch of [names software] at [university] and its use in delivering distance courses to teacher candidates north of [names place]. In order to do so, it would be helpful to the investigators to have an idea of the salary range of individuals who have participated in the pilot project. Please enter 'x' next to the category that represents your salary range. In analyzing data, investigators will select the median salary number for each category to make calculations. (Categories ranged from 'Less than \$10,000' to 'Greater than \$150,000'; ranges were increments of \$10,000)



Appendix B: Aboriginal Teacher Candidate Survey

1. Did you have problems getting the [names software] up and running? (Circle one) (Not at all = 1; Yes, at first = 2; Most of the time = 3; Always = 4)
2. Did you have problems logging into an [names software] session? (Circle one) (Not at all = 1; Yes, at first = 2; No problems once the link was posted on [names added course management system] = 3; Most of the time = 4; Always = 5)
3. Did you have trouble using any of the functions in [names software]? (Circle one) (Never = 1; Yes, at first = 2; Most of the time = 3; Always = 4)
4. Do you use the laptop provided by [names organization] when participating in an [names software] session? (Circle one) (Never = 1; Sometimes = 2; Most of the time = 3; Always = 4)
5. Did you have any audio problems when using [names software]? (Circle one) (Never = 1; Sometimes = 2; Most of the time = 3; Always = 4)
6. Did you have any video or camera problems when using [names software]? (Circle one) (Never = 1; Sometimes = 2; Most of the time = 3; Always = 4)
7. Did you ever share a computer during a course session? (Circle one) (Never = 1; Once = 2; A few times = 3; Most of the time = 4; Always = 5)
8. What was the reason for sharing? (Circle one) (Technical problems = 1; Wanted to work with others in same room = 2; Does not apply = 3)
9. Would you have preferred to use your own computer instead of the [names organization] laptop for [names software] sessions? (Circle one) (Yes or No)
10. Why would you prefer you own computer? (Circle one) (I'm used to it = 1; Easier to use internet on it = 2; I use the [names organization] laptop = 3; Other reasons = 4)
11. Which method of communication in [names software] do you prefer for learning? (Circle one) (Audio, i.e. talking and hearing others = 1; Seeing instructor and other students = 2; Group discussion = 3; Box functions = 4; Seeing PowerPoint or writing on whiteboard = 5)
12. If you had problems using the audio or video functions of [names software], did this discourage your participation in the course in any way? (Circle one) (No = 1; Yes = 2; I did not have any audio or video problems = 3)
13. Did you view the recordings of the [names software] sessions you missed? (Circle one) (Never = 1; Sometimes = 2; Most of the time = 3; Always = 4)
14. How often did you communicate with [names administrator] about distance delivery problems? (Circle one) (Never = 1; Once = 2; A few times = 3; Most of the time = 4; All the time = 5)
15. What type of support provided by [names administrator] was most helpful for you distance courses: (Circle one) (Emotional support = 1; Technical support = 2; Logistic support = 3; Support for learning = 4; Other = 5)



16. Did you need [names administrator] assistance during [names software] sessions? (Circle one)
(Never = 1; Once = 2; A few times = 3; Most of the time = 4; All the time = 5)

17. Did you need [names administrator] assistance during sessions? (Circle one) (Never = 1; Once = 2; A few times = 3; Most of the time = 4; All the time = 5)

18. Did you use the 1-800-number to call the Helpdesk line at [names university]? (Circle one) (Never = 1; Once = 2; A few times = 3; Often = 4)

19. If you did not call the HelpDesk number, what was the main reason? (Circle one) (I didn't need their help = 1; I didn't know them = 2; I didn't know how to explain my problems = 3; I got help from someone else = 4; I thought I needed to pay long-distance fees = 5; This question does not apply to me = 6)



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