

Final Report

Information Technology Readiness North (InTeRN):
a young, northern workforce enters
the world of ICT



University College of the North

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FSC is a forward-thinking centre for research and collaboration dedicated to preparing Canadians for employment success. We believe Canadians should feel confident about the skills they have to succeed in a changing workforce. As a pan-Canadian community, we are collaborating to rigorously identify, test, measure, and share innovative approaches to assessing and developing the skills Canadians need to thrive in the days and years ahead. The Future Skills Centre was founded by a consortium whose members are Toronto Metropolitan University, Blueprint ADE, and The Conference Board of Canada

The opinions and interpretations in this publication are those of the author(s) and do not necessarily reflect those of the Future Skills Centre or the Government of Canada.



Acknowledgements

We wish to acknowledge that Indigenous peoples have continuously maintained homelands in northern Manitoba since time immemorial, and this project was conducted on the traditional territories and homelands of many Indigenous peoples, in particular the Cree, Dene, Red River Métis, and Oji-Cree.

The First Nations in the area that UCN serves entered into treaty relationships with the Crown (within our region these include signatories to treaties 4, 5, the treaty 5 adhesion, and treaty 6 lands located within the treaty 5 adhesion), and the territory has become home to other Indigenous peoples as well. We uphold the treaties and collaborate with all Indigenous peoples to share truth, reconciliation, and learning.

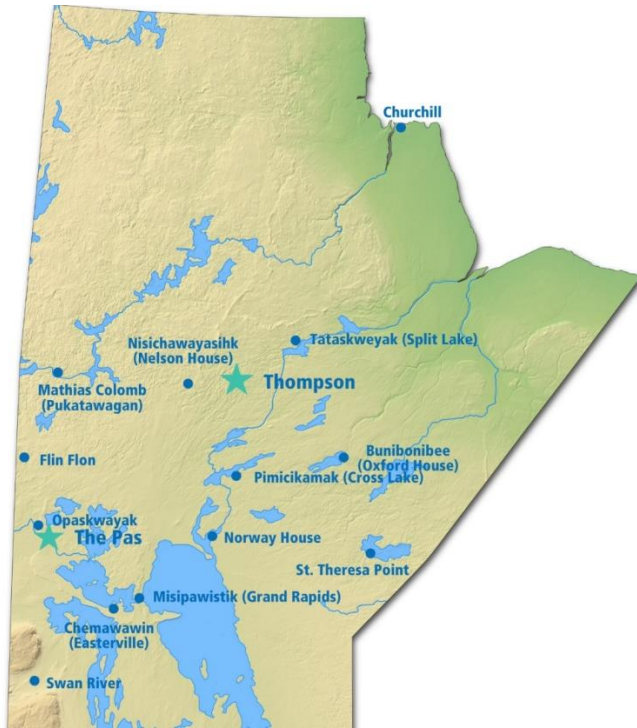
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The InTeRN team is grateful to the leadership of the Vice President Academic responsible for the portfolio which was home to the program, and to the UCN President, whose belief in InTeRN and willingness to provide space, time, and support was crucial.

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1. Preamble

The following document provides an overview of the Future Skills Centre (FSC)-funded project that University College of the North (UCN) undertook in the years 2020 to 2023. This work was conducted in a region of Canada, namely, northern Manitoba, which is sparsely populated but covers a huge geographic region. This is the catchment region for UCN, and UCN conducts its work from two main campuses (The Pas and Thompson, Manitoba) as well as a network of 12 centres that stretch from Swan River in the south to Churchill in the north of Manitoba (see figure below). UCN devotes itself to strengthening community and northern development by providing post-secondary education and training that reflects the cultural diversity and Indigenous reality of northern Manitoba (ucn.ca).



The human and physical geography of northern Manitoba dictates that numbers of students and participants will, in contrast to those witnessed in more southern urban areas of Canada, be small. As a result, the lessons learned from this project entail small sample sizes. Nonetheless, these activities should be considered exploratory work that sheds light on interesting and promising pathways towards successfully engaging marginalized groups, in our case Indigenous women and northern students, into education, training, and employment in Canada's rural and northern locations.

Most of this discussion will focus on the Information Technology Readiness North (InTeRN) program as the innovations developed as part of InTeRN had a halo effect that enlightened the thinking around the other programs and partnerships encompassed within this FSC-funded project.

2. The need for this project in northern Manitoba

Given the human and physical geographic situations outlined above, the needs for this project were multiple.

1. For northern residents, success in regular Information Technology (IT) programs delivered by post-secondary institutions in the south has, despite good intentions, been rare. Numerous reasons contribute to these poor results including (a) moving to Winnipeg or Brandon for extended periods

of time results in students losing community and family supports, including child care, (b) the high cost (both time and money) of travel making it difficult, if not impossible, for northern students to travel between home communities and urban centres, and (c) lack of prerequisite academic and essential skills necessary for success.

2. For IT businesses in Manitoba, the need for a competent workforce not only to meet current labour market needs (estimated at more than 3000 job openings; Tech Manitoba (techmanitoba.ca), pers. comm.) but to service a rapidly expanding IT infrastructure in northern Manitoba is intensifying. Graduates in southern Manitoba are difficult to recruit to the north; once recruited and employed, they are often quick to return to the south when opportunity arises.
3. For post-secondary educators in the north, engaging youth and young adults in IT training is a challenge as the industry remains largely unseen and unknown to northern residents. Further, many young women in the north are responsible not only for their own growing families but for care of elderly parents, grandparents, and, in some cases, siblings. Compound this with the male domination common to the IT industry and one soon sees the challenges of attracting young northern Indigenous women into IT training and employment – it requires focused efforts.

These issues are perhaps best summed up in the situation witnessed in much of Manitoba's north, namely, "jobs without people and people without jobs" (Miner, 2015).

3. Our proposed solution

In 2019, we proposed to create a program to train northern youth (with a particular attention on northern Indigenous females), recruited from remote northern and Indigenous communities, as front line information technology technicians to serve Manitoba-based IT industries that provide services to the North.

The program, as first envisioned, would be a 2-year network computer technology program geared to providing entry level skills but coupled with social supports (critical to success for northern students), flexible terms of study that better match family and community needs, and work-integrated-learning with industry partners. The intention was to overcome the numerous barriers that block the participation of northern individuals in the IT industries of Manitoba and produce graduates that provided a workforce, supported their families and communities, and became role models to others. The funding from FSC enabled us to do this, and more.

4. Chronology of the FSC-funded project

4.1. 2020

In the early spring of 2020, UCN was notified that it had been successful in securing funding from the Future Skills Centre for a project initially entitled, **Network Computer Technology Work-Integrated-Learning; a young, northern workforce enters the world of ICT employment**. In March of 2020, UCN signed the initial contribution agreement with FSC and development of the project commenced in full force. The project was to be completed by March 31 of 2022. It should be noted that this initial contract was signed just days after the world was plunged into the CoVid 19 pandemic.

Despite the isolation of the early days of the pandemic, a small team was assembled by the summer of 2020 and work was underway to develop a program that would entail both theoretical industry-certified information technology (IT) knowledge and work-integrated-learning (WIL)-orchestrated real world experiences. Further, the project would focus only on Indigenous women and would be geographically centred, in response to the conditions imposed by the pandemic, on the region of Opaskwayak Cree Nation / The Pas, Manitoba.

It is important to note that this project did not stem solely from the award of the FSC funding. While UCN did not have IT-related training as part of its regular menu of programming, discussions regarding the development of a northern workforce for Manitoba-based IT industries had been underway since 2012. Also, UCN, through its Community and Industry Solutions group, had just completed contract-based IT training for northern students in the winter of 2019-2020 and had witnessed less than stellar results. Discussions on how to address the need for technicians that were employment ready were on-going. These events coloured the thinking that went into the initial proposal for FSC funding and the subsequent plans in the spring and summer of 2020.

Through the summer and early autumn of 2020, the team developed, rejected, re-developed, and edited multiple programs and pathways. These were discussed with industry partners while at the same time starting to amass the equipment needed to properly train students. And, our focus continued on Indigenous women as the participants in this project. The draft program was completed by November of 2020.

4.2. 2021

Working with UCN's Department of Teaching and Learning, the Information Technology Readiness North (InTeRN) program statement of intent was submitted for approval at UCN in January, 2021. Course and program development and approvals followed.

IT related equipment began arriving in March of 2021. Renovations of a space to house the classroom and the equipment began in earnest in the spring of 2021 and continued into that summer.

Working with Kelsey Adult Learning Centre (part of the Kelsey School Division (kelseyschooldivision.ca)) located at The Pas Campus of UCN, potential students (Indigenous women learners that had not previously finished secondary school) were identified and started with the InTeRN program in July of 2021. Rather than entering a classroom-based program, they were plunged into a partnership with Community Economic Development Fund (cedf.mb.ca) and ID Fusion (idfusion.com) and immersed in practical exercises with just-in-time training. This proved more successful than we anticipated and resulted in more tinkering with the initial InTeRN program.

By autumn of 2021, UCN had re-opened its campus doors with a range of pandemic-related processes including distancing of individuals and reduced numbers on campus. InTeRN accepted five more students for a total of eight, which matched the pandemic-related load limit for the classroom space. Also, by this time, the relationship with Computers for Schools (c4smb.ca) had been developed and the classroom space was now in the initial phases of functioning as a C4S depot. This meant that the students were immediately immersed in a WIL site at the campus.

In late autumn, 2021, FSC issued another call for proposals. UCN proposed to expand on the InTeRN program but in January, was informed that our proposal had not been accepted. Our planning then focused on the InTeRN program including a second cohort for InTeRN to start in autumn, 2022, as well as additional training modules for the graduates of the first cohort.

4.3. 2022

In March of 2022, FSC notified UCN that they had reversed the initial decision and had decided to provide additional funding to UCN to continue with the proposals submitted in autumn of 2021. This decision was too late in the academic year to implement some of the plans by September (start of the autumn term of classes) but work now focused on (a) completing the first cohort of InTeRN, (b) securing a second cohort for InTeRN, (c) implementing a "train-the-trainer" program for graduates of the first

cohort, (d) expanding the programming to include a “Learning Technology Facilitators Training” program and an “Information Technology Support Technician” (ITST) certificate and (e) moving part of the programming into the geographic region of Thompson, Manitoba.

At the end of June, 2022, the first cohort of InTeRN students convoked at UCN’s commencement ceremony. All of the cohort entered employment in IT-related businesses or organizations with IT departments.

Summer of 2022 was consumed with final preparations of the ITST program as well as the Train-the-Trainer program and annual updates to the content of InTeRN.

In September of 2022, five of the first cohort returned to classes in the Train-the-Trainer program and four more joined the second cohort of InTeRN. Three students joined the pilot of the ITST program.

Through the autumn of 2022, InTeRN students continued to progress and the partnership with C4S became more robust. More and more refurbished equipment was returned to use in schools and families in northern Manitoba, and the InTeRN students were instrumental in all of this. With respect to the ITST pilot, issues arose as finding qualified and versatile instructors plagued the program and the students found the pace too aggressive. As a result, two of the three students of ITST’s initial pilot stayed into the second cohort (started in February, 2023) and were joined by five others. This group continued to June, 2023. It should be noted that one of the first students in the ITST pilot left the program early to take full-time employment at UCN’s IT Department. This transition from student to employee occurred when it came to our attention that this individual had previous IT-related training that matched a current opening within UCN’s workforce.

4.4. 2023

Concurrently, work continued during the 2022-2023 academic year for extending the IT-related training to include on-the-job training for UCN employees tasked with being Learning Technology Facilitators (LTFs) as well as extending programming into the Thompson area. With respect to the LTF training, jurisdictional issues slowed the progress of this development as LTFs are full-time employees of UCN, and the training had to meet their needs while fitting into their work schedules. The training program was developed and ready for piloting by autumn of 2023.

The expansion into the Thompson region was expedited by UCN’s partnership with North Forge Innovation of Winnipeg (northforge.ca) which had, with UCN, jointly established North Forge North

(NFN) in Thompson. Equipment and lesson content was added to the NFN offerings and by early 2023, youth in the Thompson area were engaging in IT-related training that applied to career exploration in areas such as advanced manufacturing and computer-numerically-controlled equipment. This piloting of programming proved successful and planning commenced to expand these opportunities for the school districts (three in total) with students in the Thompson area as well as outlying communities within a 1-hour radius of Thompson.

In spring of 2023, Manitoba Provincial Government announced that the pilot project of InTeRN and ITST conducted as part of this FSC-funded project would be fully funded for UCN, thereby ensuring that they continue to run at UCN Campuses after the conclusion of this project funding. Importantly, the Provincial Government also recommended that InTeRN continue to serve only Indigenous women as the Government felt this was an important attribute of the program and a direct response to the 94 Calls to Action of the Truth and Reconciliation Commission of Canada (rcaanc-cirnac.gc.ca).

To summarize, at the conclusion of the FSC-funding in autumn of 2023, UCN is now offering InTeRN, ITST, LTF Training Program, and IT-career orientation to adults and youth in northern Manitoba. None of these existed prior to this project.

5. The project-related programming

Each of the programs listed above shares some components and methods / equipment, but each are distinctly unique.

5.1. Information Technology Readiness North (InTeRN)

The most time and resources were committed to InTeRN as it was the most innovative approach undertaken (overview of the program content is attached as Appendix A). While there were many novel methods employed within the program, three in particular will be highlighted to demonstrate some of the innovations.

5.1.1. Centrality of WIL in the programming

WIL is an integral part of almost all programming at UCN and generally takes the form of a work practicum in the concluding weeks of a program of study. Employers appreciate the opportunity to get to

know the students and the students benefit from real-world experiences, but many suggest that WIL should be conducted multiple times throughout a program.

These comments from students and employers as well as our experiences working with northern students convinced us that WIL would need to be central to this program. We saw it as a way of bolstering the hands-on learning that many of our adult learners need, providing a more holistic means of making the entire program a whole rather than a collection of courses, and providing recognized benefits to the recipients of the work which, in turn, showed the value of the jobs the students were undertaking.

Based on this thinking, WIL became a daily activity for the students. By hosting the C4S depot in the classroom, we were able to immediately immerse the students into a work site with real work providing real benefits. While this was, at first, disorienting to students expecting to enter a traditional classroom for lectures, it soon connected with them and they became more comfortable with the idea. Likewise, our instructors had to be confident enough in their own knowledge and abilities to be able to work with, and around, the ebb and flow of hands-on work. Together, the students and instructors wove the technical content into the work of the depot, and also extended the learning into other employer sites.

Employing WIL on a regular basis proved to be a method that seemingly slowed learning in the initial stages as students became accustomed to the classroom / workshop environment. Once oriented, however, the students generally accelerated in their competencies as the workshop experiences gave them a framework upon which to hang the individual technical knowledge components. The result was generally more holistic rather than siloed into, for example, class-time with a lab once or twice per week.

It should be noted that having the students operate a C4S depot gave them not only practical hands-on skills related to computers, but also employability skills. The depot functioned according to all of the protocols dictated by C4S, consequently, the students gained proficiency in workplace skills such as safe work procedures, documentation and reporting, inventory control, work flow scheduling, parts management, and a range of other employment and management skills. The C4S depot was not a simulation; it was a functioning shop performing real work.

While it is difficult to draw conclusions from a small sample, the overwhelming response from those engaged in the C4S depot within the classroom was that the incorporation of theoretical training with hands-on work on a daily basis greatly aided their learning. The students expressed that “learning by doing” fit their *modus operandi* of knowledge acquisition, which is a sentiment commonly expressed by

those studying Indigenous pedagogy (see, for example, Restoule and Chaw-win-is, 2017). Further, the students completed industry recognized certification examinations (Cisco Net Academy) at the conclusion of the programming; this validated that the students had the theoretical knowledge expected of them.

5.1.2. Functioning as a Learning Community

A learning community is defined by some as a group with shared goals, motivations and values; a place to share ideas, problems and questions; a space for discussion; a collaborative environment; a source of inspiration; and a network of fellow students and experts (Burton, 2023). Comments from the instructors and students of InTeRN clearly showed that InTeRN functioned in a very different way than did most college technical programs (see McNaughton and Penner, 2023). The space of the classroom and workshop had a significantly different look and feel to it compared to other campus spaces, and the differences were palpable. Visitors to the classroom always walked away with a different feeling than they had initially anticipated. Commonly, they would ask about how to replicate this in other spaces and places.

As outlined in Section 9 of this document, process tracing indicated that simply identifying a common space did not create a learning community. Rather, a conscious effort was made to foster the security, collegiality, vulnerability, and supports to develop the community. Having a designated space was important but it also needed time in each day when the students could engage with each other, safety to share and support, challenge to discuss difficult subjects or events, creativity to problem solve, and a team that included students, instructors, administrators, counselors, and others. It required constant cultivation.

5.1.3. Indigegogy braided into the programming

Indigegogy, according to the Centre for Indigegogy at Wilfred Laurier University, *“Is a term coined by Dr. Stan Wilson, a Cree Elder and Educator. Indigegogy uses Indigenous knowledge, literature, and scholarship and is centred on land-based education. Indigegogy engages Indigenous methodology such as circle work to uplift traditional teachings, ceremonies, and practices. Indigegogy is a decolonizing practice that builds on the resurgence of Indigenous ways of knowing, teaching and learning.”* (Wilfred Laurier University). It should be noted that Dr. Wilson is from Opaskwayak Cree Nation and was Dean of Education at UCN in the mid-2000s.

Including Indigenous ways of knowing and doing is a common topic in Canada's universities and colleges. In response, many institutions across Canada have implemented mandatory Indigenous-related topical courses as a pre-requisite for graduation in certificate, diploma, and degree programs. UCN was perhaps one of the first to institute this requirement (circa 2005) and currently requires all students to attend a 1-credit course entitled *Waskawimakanwa Mecimwaci Isihtwawina* (WMI), which introduces students to Indigenous traditional teachings through the use of sharing circles, group activities and other Indigenous cultural practices and experiences while immersing the students in historical and contemporary issues related to Indigenous peoples (UCN Academic Calendar, 2022-2023).

The InTeRN students took the WMI course, as required for graduation, but InTeRN set out to make Indigegogy an integral part of the program rather than simply the addition of a course conducted over several days. A course, UC.CSC.1010 Sweetgrass (course outline attached as Appendix B), was added to the InTeRN program, but rather than it being a course taught over a single term, it became a methodology that infiltrated all activity within InTeRN. This was a calculated approach that, with the support of the Indigenous Curriculum Specialists of UCN's Teaching and Learning Department, addressed the question that was posed by many, namely, "How will you include Indigenous content into an IT program?" Our response to this question was "Rather than thinking about how to add something on, let's think about how we decolonize the world of IT!" The former questioned what the content would include. The latter envisioned Indigegogy in a learning community.

Rather than simply a course, Sweetgrass morphed into a way of addressing content, conflict, and crises. It became a space and place where the many challenges (academic, family, financial, community, etc.) that often lead to students leaving post-secondary programming could be named and addressed. It also provided a time, within the programming, where emergent topics could be discussed, external personnel with unique expertise (elders and knowledge keepers) could be engaged, and restorative activities (e.g., winter wilderness survival techniques, yoga, art, etc.) were incorporated. While these may seem incongruent to some in western-influenced academia, it makes sense within Indigenous ways that stress the importance of attending to all aspects of being (Restoule and Chaw-win-is, 2017).

5.2. InTeRN Train the Trainer

At least two challenges arose during the first cohort of InTeRN, (1) how to find instructors that were technically strong and could function within a WIL-centric Indigenous learning community situated in a

northern college campus, and (2) how to find instructors that were reflective of the students in the classroom (i.e., Indigenous women). The answer crystallized during that first cohort: grow our own.

The Train-the-Trainer program (outlined in Appendix C) was created in the summer of 2022 and part of the first cohort of InTeRN progressed into this program in autumn of 2022.

The intended outcomes of this program were numerous, and included:

- a) To produce Indigenous female IT instructors that could teach InTeRN and ITST when those programs became part of the base-funded programming of UCN in the autumn of 2023;
- b) To provide the in-training teachers with practical experiences by working with the students of cohort 2 of InTeRN and those in the ITST offerings while still within the mentorship of the original teaching team of this project;
- c) To ensure that the instructors that would continue these programs at UCN would be experienced in the practices of developing a learning community, WIL-centric methodologies, and Indigegogy; and
- d) To create a program of study that, while initially focused on IT-related programming, could be incorporated into UCN's Teaching and Learning Department's repertoire of content.

We are very pleased that, at the time of this writing, a graduate of InTeRN is now employed as the full-time instructor for InTeRN at UCN's The Pas Campus.

5.3. Information Technology Support Technician (ITST)

Demand for IT-related training was vocal when the first cohorts were restricted to Indigenous women only. To respond to these demands, ITST was created (see program outline in Appendix D). This program made use of the same industry-recognized content (Comp TIA and Cisco) and the equipment housed within the InTeRN classroom / workshop.

In addition to being open to any and all students, ITST differed from InTeRN in several critical areas:

- a) ITST was conducted, initially, over a 5 month period rather than a 10 month program. This pilot proved the 5 month period to be too short of a time for the initial group of students in the piloting of the program.
- b) ITST followed the standard operating procedure of UCN to not have a dedicated classroom and student space. This meant that the ability to 'house' a learning community environment was not present as witnessed in InTeRN.

- c) ITST was taught by existing UCN IT-related instructors with strong content knowledge but little to no experience with competency-base education or communities of learning-type approaches.

As a result, ITST bears more resemblance to many other technology-related programs at UCN than it does to InTeRN and its learning community approach.

5.4. Learning Technologies Facilitator (LTF) Training

UCN employs Learning Technology Facilitators (LTFs) to assist instructors and professors to deliver courses via distance technologies.

LTFs have a long history at UCN as this institution has, as a direct result of its unique geographic challenges, employed distance delivery of programming since the first half of the 2000s. The LTFs address connectivity and technology issues so that instructors can focus on content teaching and learning. The pandemic that impacted the world in early 2020 simply intensified the work that was already underway for distance delivery of education in northern Manitoba.

Like many employers, UCN has struggled to recruit and retain the LTF workforce. The direct impacts of this struggle are often on-boarding individuals without the complete complement of technical and workplace skills to be successful. And, instructors and students then suffer.

To address this challenge, UCN's approach was to "grow our own", but an on-boarding, training, and continuing upgrading program did not exist. Serendipitously, the content and equipment incorporated into the InTeRN program gave us the opportunity to develop the LTF training program.

While work on this program started in summer of 2022, the intensity of work-related activities for the LTF team forced developments to languish during the academic terms of autumn and winter.

Development work ramped up in the spring and summer of 2023, and the program was developed by autumn of 2023. Please see Appendix E for details on the program content.

6. Successes of the Programming

The numeric data of the above mentioned programming can be summarized as follows:

Program	Dates	No. students enrolled	No. students completing	Notes
InTeRN – cohort 1	Sept. 2021 – Jun. 2022	8	7	1 student moved to Winnipeg and continued with the program (by distance) for some time but could not complete.
InTeRN – cohort 2	Sept. 2022 – Jun. 2023	4	3	1 student exited early in the program due to sponsorship issues.
InTeRN – Train the Trainer	Sept. 2022 – Jun. 2023	5	5	
ITST – cohort 1	Sept. 2022 – Jan. 2023	3	2	1 student left early to take full-time employment in the IT field in the north of Manitoba. Remainder of cohort 1 combined with cohort 2.
ITST – cohort 2	Feb. 2023 – Jun. 2023	5	4	
LTF Training Program				Enrolment did not start by the conclusion of the project funding. Commencing in autumn, 2023.

While the numbers remain small for all the programming, it should be remembered that this is only those students enrolled in full-time programming. As documented in the quarterly reports submitted to FSC, a large number of non-registered, but nonetheless important, participants interacted with InTeRN, primarily, and in all of the career pathing opportunities that were afforded to northern participants in the areas of Opaskwayak / The Pas and Thompson. These included Indigenous youth at Thompson, in-

service teachers as well as education students at The Pas, adult learners both within and outside of UCN, and others. For short duration programming, more than 200 individuals participated over the life of this project. Through knowledge mobilization activities that offered a chance for others to learn about and experience the FSC-related programming, more than 150 individuals participated.

7. Lessons learned in the programming

For all the successes documented in this project, the team can also recount many hard-fought battles, well-earned scars, and profound learning. The following section addresses some of the critical lessons learned.

7.1. Issue of paid WIL vs student sponsorship

Work-integrated learning is a recognized and common tool for enhancing the educational experiences of post-secondary students. Many consider WIL as key to bridging the gap between theoretical knowledge and practical application by immersing the student in real-world work experiences (CEWIL Canada).

UCN has made a commitment to engaging all our students in WIL during their studies at our institution. Generally, this entails a capstone opportunity in the latter parts of an academic / technical program. The InTeRN program, however, was designed to provide WIL opportunities throughout the duration of the programming.

At the outset of this project, we envisioned that WIL opportunities would arise as our industry partners became familiar with the program and students. And, this did indeed occur; InTeRN students gained valuable practical experiences with companies and organizations such as ID Fusion, Bit Space, Kelsey School Division, UCN, and others. A major partner in our WIL efforts was an organization that we weren't particularly familiar with at the start of this project, namely, Computers for Schools (C4S; c4smb.ca).

Through serendipitous events, our instructors and students developed a relationship with C4S as both (UCN and C4S) partners envisioned the benefits that could accrue to each in this relationship. As a result, we took the C4S model and based our classroom re-design and equipping around the concept of hosting a C4S depot in the north of Manitoba in the InTeRN classroom / lab. The students then ran the C4S depot.

With the C4S partnership, the students were immersed in daily hands-on activities blended with their theoretical training. The result was a win-win-win situation in which (a) the students gained impressive shop-related technical skills along with theoretical knowledge, (b) e-waste was diverted from northern landfills (by autumn, 2023, more than 5000 kg of e-waste had been recycled), and (c) C4S was able to provide refurbished computer equipment to northern end users that, otherwise, would never have had access to this equipment.

The opportunity to perform real world work while a full-time student provided invaluable experiences and connections. We recognized, however, that our students often lacked essential skills such as money management and financial planning; much of this stemmed from the fact that many of our students were on social assistance and came from families with a history of being trapped within the 'social assistance cycle'. This was not something that we were surprised at as we went into this project knowing full well that we would need to address this issue if we were going to produce graduates that were employment ready. In anticipation of this, we had built into our budget funds to pay the students for work performed, thereby, providing them with life skills such as clocking time, submission of pay period logs, budgeting, and other financial literacy skills. To facilitate this learning in real-world situations, we made the students casual employees of UCN.

This process provided the benefits of (a) real work that aligned with the technical training, (b) making financial literacy a bedrock skill within the program, (c) documented skills and experiences to augment resumes, (d) industry contacts and networks, and (e) enhanced family income.

7.1.1. The process of paid work experience

UCN is a unionized workplace, and the students were hired as casual employees (Clerk 1, \$16.20/hour) with hours per week varying depending on the work that was available and applicable to each student. Student hours per week varied a great deal between times of the year but generally increased as the students gained more skills. For example, in autumn 2021, average number of hours per student were 6.6 hours per week (n = 26 time sheets) with a minimum of 0 hours and a maximum of 12 hours per week for some students. In autumn of 2022, when some students had progressed into their second year (Train the Trainer programming) and, correspondingly, were more skilled, the mean number of hours of paid WIL per student was 23 hours per week (n = 47 time sheets) with a minimum of 4.5 hours to a maximum of 30 hours per week for some students.

Student work hours were clocked, students were paid by UCN, and each student was issued T4 statements related to their earnings.

7.1.2. Student sponsorship

With a student population of which more than 75% self-identify as Indigenous, the majority of UCN's students are sponsored in some fashion. These sponsorships may come from their respective Indigenous First Nations, Manitoba Metis Federation, provincial workforce development funding, or others. All of the students within the InTeRN program were sponsored.

UCN works closely with sponsors, and we met with them to discuss these paid WIL opportunities. However, communications / interpretations were not always as effective as anticipated, and this resulted, unbeknownst to us, in the students having their sponsored funding and assistance reduced by the amount that they received in paid WIL. We became aware of this predicament when the students brought the situation to our attention. This is when we became acutely aware that sponsorships, while a critical component of enabling northern students to attend post-secondary training, could act as disincentives to actual work experiences. Further, the pay that the students received in some cases had the unexpected consequence of jeopardizing the subsidized childcare and housing that these students desperately needed. It must be noted that housing and childcare are in very short supply in northern Manitoba and, as a result, no one wants to lose either, even for a very short period of time.

We met with the students' sponsors in late September to November of 2021, and worked out a solution that gave these students, in our particular situation, a maximum weekly amount that they could be paid without jeopardizing their sponsorships and social assistances. This was a workable situation for our students and we adhered to it. But, it shone a light on a situation that needs to be addressed in Manitoba's north and perhaps other locations.

7.1.3. The social assistance cycle

For many northern students, social assistance while attending post-secondary training includes subsidies for housing, transportation, and childcare. Combined provincial and federal assistance and income support can, for example, provide a single parent with 2 children an income of approximately \$33,500 in Manitoba's north (Government of Manitoba. nd.).

Upon graduating and entering the workforce, many of these students must take entry-level jobs that pay the minimum wage currently in effect in Manitoba, \$15.30 / hour. Assuming that a student gets a full-

time job (40 hours per week, 52 weeks per year), this provides an annual income of \$31,800 and the loss of assistance in securing housing, transportation, and childcare. In essence, these graduates cannot afford to leave social assistance to take a job unless they are able to enter the work-force at skill levels (encompassing knowledge, technical skills, and employability skills) that enable the employer to pay them substantially above minimum wage. Without the complete package of skills, the social assistance cycle will continue for an individual because they cannot afford the risk or financial burdens of entering the workforce at entry-level wages.

7.1.4. Our recommendation

Based on discussion with our students and team, a hypothesis became clear – allowing a student to work for wages as part of WIL while in studies will result in a graduate with work-place skills that enable the employer to pay them more as they are no longer an entry-level worker. The student will transition into a position with a wage well above the living wage and make it financially viable for the graduate to pay for day care and housing.

While we did not set up a controlled experiment to test this hypothesis, we were able to observe that the training and experiences that we provided to the InTeRN students enabled some of them to enter full-time employment with substantially higher pay and benefits that permitted them to transition from student to employee without jeopardizing the security of their family situation. We observed that these sponsored students are smart and know the tipping point where social assistance, including subsidized day care and housing, is less than / greater than employment income. Thinking about this system, we recommend that the involved entities permit sponsorships to run for longer periods of time with no clawback for wages earned. This would provide the students with ample time to develop the knowledge, skills, and aptitudes to garner full-time employment at an hourly rate that an employer is willing to pay (based on their return on investment) that is financially viable to incentivize leaving the social assistance cycle. This is an area that requires further investigation.

7.2. Issue of swimming upstream within a post-secondary institution

Undertaking innovative work within an existing college setting poses several challenges stemming from institutional structures and traditional academic frameworks. It must be noted that these challenges do not rise from maliciousness nor from belligerence; rather, they often emanate from bureaucratic processes, administrative structures, established practices, funding agreements, policies, and other

components. Overcoming these challenges requires a concerted effort but it still feels a lot like ‘swimming upstream’.

Not to point fingers at any particular units within a college / university system, we offer the following observations as areas for productive discussion and consideration when attempting to undertake innovative programming such as that incorporated into the InTeRN program or attempting to replicate some of this work.

7.2.1. Competency-based-education

Competency-based education (CBE) is an approach that focuses on measurable skills and knowledge attainment rather than traditional time-based learning. Several attributes are part of most CBE systems including (a) demonstrated mastery of subjects, (b) allowing students to progress at their own pace, (c) enhanced flexibility that caters to diverse learning styles while accommodating students with varying backgrounds and experiences, and (d) alignment with industry demands and standards (Pichette and Watkins, 2018).

From the start, InTeRN was to be CBE. Given our close ties to industry and the employers within the IT sector, this simply made sense to us. Soon enough, however, we found some of the challenges inherent in CBE fitting into a ‘traditional’ academic calendar and its processes, and we list these in the following.

7.2.1.1. Registration of students:

UCN students are registered into programs that are broken down into courses with each course assigned a start and end date in an academic term. This system is dictated by both common practices in colleges / universities as well as the UCN student information management software system. For CBE, the end date does not necessarily align with the end of a term or academic year; the end date is when the student demonstrates competency. Consequently, we often could not predict the end date of a “course”.

The student information management system could be manually manipulated to accommodate a ‘sliding’ end date, but it was a difficult concept to translate into language that others could understand. For example, students were coming from years of formal education (k-12 and some post-secondary) that had pre-programmed them to a start and end date, a list of readings, assignments, and examinations to be completed, and a letter grade after anywhere from 30 to 100 hours of classroom-based instruction with perhaps a lab or two thrown in. Competency was not a word that crept into those previous

scenarios. The process of CBE was foreign to the students and, for some, unsettling until they gained a better understanding of the process.

In the same way as students and systems wanted end dates, student sponsors needed firm dates and firm costs for their paperwork and budgeting. Because they are often providing social assistance as well as tuition, the time on task is critical to sponsors. Consequently, CBE causes many problems for students sponsors not the least of which are how to properly budget for a course / program whose duration will vary.

Academic advisors and counselors within UCN are unfamiliar with CBE and, consequently, had difficulty advising students about their trajectory within the program. InTeRN did not mimic the other programs at UCN and, as a result, time had to be spent educating our advisors and counselors. What we found, however, was that some counselors immediately “got it”. Those were the ones that continued to work with the InTeRN students through the duration of the project.

UCN marketing and recruiting personnel struggled to articulate the programming to potential students because, similar to the advisors and counselors, it didn’t match the common model. Consequently, recruiting was often conducted by inviting someone into the classroom to experience the look and feel of it. That made recruiting a challenge for attracting those physically remote to The Pas Campus of UCN.

7.2.2. Functioning as part of a learning community

Similar to the peculiarity of CBE, the learning community concept had an unfamiliarity to it. As identified in the process tracing exercise that we undertook on the InTeRN project (see section 9), numerous components are critical to development of the community. Designated space(s), sharing of daily “rituals” such as morning coffee upon first arrival, meaningful and common interactions within the student – instructor - leadership team, team teaching and peer supports, and a host of other small, yet significant, processes organized and then sustained the learning community. Observations by those within and outside the learning community were enlightening. From the students, we heard comments like:

“I want to come to this place every day!”

“When are we actually going to have a class?” (This was early on in the process when the student had not yet grasped that she was already in class – it just didn’t look like any other class that she had ever attended!)

“We look after each other.”

From the instructors, we heard things like:

“I have taught for more than 30 years, and I have never had an experience like this before. This has changed me for the better.”

A university professor, not involved in this project, toured the site and commented,

“How do we do this in other programs? We need to capture this in how we could team teach our degree programs rather than have a group of profs that each teach their own courses that students use to add up credits to get a degree. It’s disjointed and non-supportive compared to this.”

Others, however, failed to grasp the concept of a learning community. The foreignness of it proved too large of a hill to climb.

“I just want to teach my stuff like I always have.” (college instructor)

Based on some of these comments, it’s easy to imagine that it takes a very special group of instructors to create and sustain a functioning learning community. We were fortunate to consistently have two instructors, for the duration of this project, that embodied the attributes of learning community facilitators: technically strong, emotionally intelligent, curious, and dynamic yet admitting to being vulnerable and always remaining humble. Finding such individuals is a challenge. Keeping them requires constant attention.

In addition to the instructors within the learning community, there were students supports provided by UCN. While these supports (e.g., counseling, academic advising, financial advising, career planning) are available to all UCN students, rather than sending our students to find these counselors and advisors on the Campus, we invited the counselors to become part of the learning community. One of those counselors, in particular, gravitated to this group and proved most effective with the students as she embodied many of the same attributes listed above for the instructors. Her time, however, was always limited by the intense workload that she carried, and her requirement to assist many students and not just this group.

In addition to UCN-related instructors and counselors, InTeRN also welcomed other supports and professionals into the community of learning. Mental health practitioners spent time with the students

both individually and collectively. Skilled practitioners, in areas as diverse as cognitive coaching to coding to winter survival techniques, were brought in as topics emerged and were incorporated into the classroom.

It must be noted that this reliance on expertise from outside the institution cost money. While we had budgeted for this in our project, these are services that cannot be reasonably inserted into regular programming with tight budgets. The FSC project funding enabled us to serve the students better.

7.2.3. Human resources management and financial management

As outlined above, the InTeRN students were hired as casual employees of UCN. This meant that the students were bound by the collective agreement under which UCN functions with its unionized employees. Numerous meetings were held with the managers within UCN's Human Resources Department to assist them to fully understand what our goals were and how best to function without causing undue stress on the HR Department. Similarly, the UCN Finance Department needed to be involved to understand the financial and legal obligations that InTeRN was incurring as it developed partnerships and agreements with industry partners.

All of these internal discussions were necessary and welcomed by the InTeRN team, but they were examples of meetings where the initial reactions to our plans were, more often than not, a noticeable shudder and skyward look from the attending managers. At this point, we need to send a big thank you to those managers as they were gracious enough to hear us out, patient enough to consider our requests, and intelligent enough to come up with workable solutions. And, we cannot blame them for their initial reactions. UCN, as a publicly funded post-secondary institution in the province of Manitoba, is funded to deliver programs. As a result, almost the entire financial management system of UCN is designed around tracking funds by programs. We were testing that system by planning for a 'process' rather than a 'program'. The process entailed taking a northern student from pre-secondary school level education into technical training coupled with intense practical experience to a level beyond simply entry level employment and doing that through a process which took into account the family and community environment and responsibilities of each individual student. Pilot project funding enabled us to do this. The funding that is received by UCN from the Provincial Government does not take that process into account.

In a similar vein, this project challenged our existing purchasing department processes. Rather than adhering to common practices for the purchase of equipment and consumables, this project was functioning as a semi-commercial operation through the running of the C4S depot. That meant that this project needed to have a point of sale system, invoicing and receiving, and self contained inventory system as well as the ability to purchase consumables and software licenses on almost a daily basis. This entailed the existing UCN purchasing department either relinquishing control of many of these daily functions or agreeing to take on a lot more daily activity than they were staffed for.

In most of these situations, we were fortunate to be able to find solutions by involving the team of UCN's Community and Industry Solutions group. This is the team that undertakes, among other things, contract and continuing education projects for UCN. Their existing solutions for short-duration hiring, contracts with external partners, revenue generation / dispersal, and project management proved to be the solutions to many of our internal problems. No doubt, continuing education departments at other institutions will be part of the planning for successful replication of this project elsewhere. But, it still takes a lot of time and communication with all those involved in the processes within a publicly funded institution.

7.2.4. Quality assurance processes

Within UCN, program quality assurance is undertaken by the Teaching and Learning group. This team has a developed process and schedule for regular reviews of all programs delivered by UCN. While there are slight differences between reviews of college vs university programming, it is, more or less, a one-size-fits-all process.

InTeRN, in particular, challenged this quality assurance (QA) approach.

Firstly, the content of InTeRN is IT-related and the world of IT changes very fast. We were reviewing program content on a 6-month basis rather than the 4-5 year schedule of UCN's QA team. As a result of this rapid review and revision process, the program would be changing sooner than the academic calendar could document it. IT programs move at the speed of industry rather than the speed of a college.

Secondly, the learning community model and CBE-related processes are not something that UCN QA are familiar with. The timing, pacing, WIL content, and emergent nature of certain topics made for stimulating, and sometimes exasperating, conversations with QA. This was a unique program in UCN's repertoire.

Thirdly, the methods of teaching required a skill set that differed from many of the standard criteria by which instructional qualifications were measured. ‘Humbleness’ and ‘vulnerability’ didn’t show up on the checklist, but these, along with all of the common technical and knowledge attributes, were essential and demonstrated by the instructors that were most successful. In short, we were fortunate to be working with master instructors, but the QA gauges couldn’t quantify that level of competence and brilliance. This is also a cautionary note – exact replication of what was accomplished in this project is highly unlikely given the unique attributes of the project team.

7.3. Doing this during a pandemic

Weeks after signing the contribution agreement with FSC in spring of 2020, UCN started implementing its response plan to the global pandemic. Like many other places, vaccinations, masking, social distancing, and work-from-home protocols were immediately in place. Distance education for all programming was the new normal.

Contrast this with our plans for this project, which entailed a close-knit group of students, from communities around the north, who were able to bring their children with them to the campus and function within a welcoming and embracing learning community, and one soon realizes the enormity of re-thinking that followed.

In the summer of 2020, UCN planned for classes to continue by distance means. Exceptions, however, could be allowed as long as the content was shown to critically involve hands-on skills. Certain trades programs at UCN went to a distance delivery format for the autumn of 2020 followed by the hands-on practical and shop classes in the winter term of the 2020-2021 academic year. Similarly, by January of 2021, our plans had adapted to where we would be able to bring a small number of students from our local communities (Opaskwayak and The Pas) onto The Pas Campus of UCN by spring of 2021. No other community or industry-related individuals were allowed on the campus. Instructors had to have permission to be on campus.

By summer of 2021, we had three students conducting work-integrated-learning as part of a pandemic-related project, funded by the Community Economic Development Fund, to support local businesses struggling to shift to on-line operations. The students were granted permission to work from the Campus as none of them had, at their homes, the internet connectivity to work via distance technology. We were making it work, but this task was clearly demonstrating the inadequacy of equipment and connectivity that plagued many of northern Manitoba’s communities during the early months of the pandemic (and,

frankly, continues to plague much of Manitoba’s north). Outside of the major urban areas of The Pas, Thompson, and Flin Flon, internet connectivity is, if it even exists, sub-standard.

Obviously, the global pandemic changed many things. It made our project much more difficult to start, but we survived. And, the students learned.

7.4. The need for support from senior administration

Despite the list that has been generated above, it must be noted that the leadership of UCN, in particular the President and Vice-President Academic and Research, deserve credit for fostering a culture of openness to change. In the section on ‘process tracing’ (section 9), ‘academic leadership’ was identified as a key component needed to create the outstanding team environment that students and faculty identified as fundamental to the success of the students within InTeRN. They were, so to speak, creating the “fish ladders” that enabled the rest of us to swim upstream.

8. Results of InTeRN vs other certificate programs

As noted in section 6 above, InTeRN cohort 1 had a completion rate of 87%. Cohort 2 had a 75% completion rate. By way of comparison, other certificate (10 months or less for comparison purposes) programs conducted by UCN in the 2021-2022 and 2022-2023 academic years demonstrated the following completion rates (data supplied by UCN Department of Institutional Research).

Faculty	2021-2022	2022-2023
Business	46%	40%
Education	58%	92%
Health	65%	71%
Skilled Trades and Technology	59%	70%

Save for ‘Education’ certificates in the 2022-2023 academic year, InTeRN surpassed the completion rates for all other faculties at UCN.

While this information is interesting, the small sample sizes render InTeRN’s completion rates of marginal use for evidence. It should be noted however, that programming in the above listed faculties is generally recruiting students that are grade 12 graduates within the Province of Manitoba. In contrast, the

students that entered InTeRN cohort 1 were, upon entry, functioning well below the grade 12 level. All, save for one, had been students in the Adult Learning Centre. At least one had a documented learning disability. Starting at this academic level adds interest to the better completion results witnessed in InTeRN. It also speaks to the concept that with small class sizes with an individualized CBE approach, one should expect better retention and completion results.

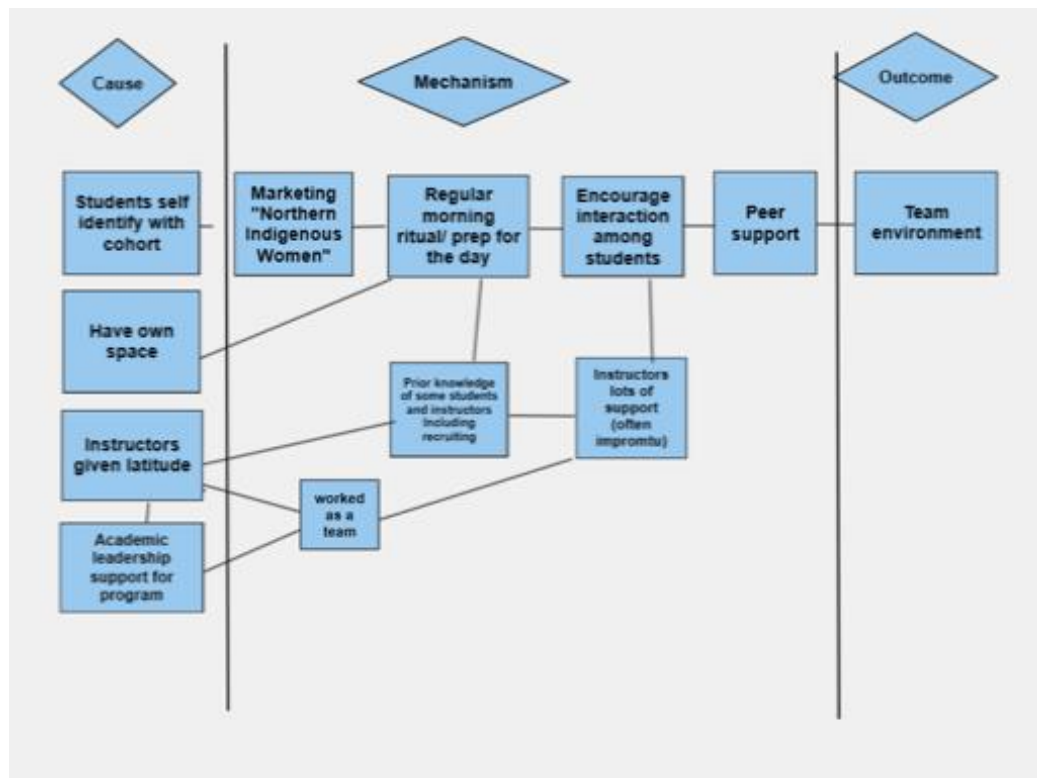
9. Process tracing evaluation of the InTeRN project

Process tracing is a qualitative research method that attempts to identify the causal mechanisms that lead to an observed outcome (Anguko, 2019). It can be used to examine an observed outcome and parse out the factors that contributed to that outcome in an attempt to find processes that can be applied to other generalized situations (Punton and Welle, 2015). Importantly, it can be applied in single cases with small sample sizes (Aston and Wadeson, 2021; Anguko, 2019) such as those encountered in the InTeRN program.

Process tracing provides a visual representation (map) of the various steps and interactions within a system. For InTeRN, we employed UCN's Department of Institutional Research to process trace this program as a means of identifying key attributes that improved the probability of success for the students. This was undertaken for two primary reasons, (a) to test whether some of the components that we, intuitively, felt were critical were substantiated by the data, and (b) to test whether the Process Tracing system was useful for further research needs within UCN's Institutional Research group (this was the first time this group had employed Process Tracing).

It should be noted that the raw data for our Process Tracing was the interviews held with students, faculty, and support personnel involved in the InTeRN program. While this renders the sample size very small, process tracing is a method that can be applied to small sample size scenarios (Anguko, 2019).

Application of process tracing techniques and plotting software produced the following 'map'.



This map identified one of the most critical outcomes as a team environment that produced improved retention and success for students in InTeRN. Through process tracing, the causes that interacted within mechanisms leading to this outcome were identified. Causes included:

- (a) students that identified themselves as part of a unique cohort,
- (b) InTeRN had its own self-created space,
- (c) faculty were given latitude and a degree of autonomy, and
- (d) leadership of the institution was supportive of these actions.

Mechanisms included:

- (a) the identity of the group remained Indigenous women,
- (b) the group very much worked as a team,
- (c) Instructors had background information and prior knowledge of the student team members,
- (d) with the prior knowledge of the students, the instructors could provide, or could get others to provide, appropriate supports,
- (e) the team encouraged interactions,

- (f) the interactions were reinforced by daily rituals such as the morning coffee time and briefing on the activities for the day, and
- (g) these rituals and atmosphere developed a team that supported one another.

Numerous daily and weekly events and interactions served to steadily foster the team environment. This does not, however, mean that all was rosy and all got along. In fact, quite the opposite happened but, rather than considering those abrading moments as something outside the realm of teaching, the team learned to name them and address them. Some of the most influential learning resulted from those times of distress and conflict.

While the method of process tracing is useful for identifying causes and mechanisms that lead to an observable outcome, it is naïve to think that simply adding the components (causes) into a random group of students and faculty members and giving the whole a thorough stirring of several semesters of training will produce the same results. In ecological systems, this is referred to as the “Humpty Dumpty effect” (Berger and Lambert, 2022) which, loosely defined, states that just because you have all the pieces (i.e., the organisms and environment in an ecological system) does not mean that you can put the system back together again (i.e., recreate a lost ecosystem). Likewise, we recognize that causes and mechanisms led to an important outcome that fostered success for the students, but the components are inherently unique including the people, the times, serendipitous events, and the sequencing, to name just a few. Humpty Dumpty is not going back together again. But, the next iteration also has the potential to be greater than the first.

10. Mentorships for InTeRN

Mentorships can play pivotal roles in shaping the educational and professional trajectory of college students. Through one-on-one interactions with mentors, students gain practical knowledge, industry perspectives, and valuable advice that supplements their academic curriculum.

From the outset of this project, mentorships for the students were implemented. At the start, the team made contact with Girls Who Game (Dell Canada), Tech Manitoba (techmanitoba.ca), New Media Manitoba (newmediamanitoba.com), and Indigenous women that were part of Natives Rising (joinnativesrising.com). One of the most influential partnerships, however, was a serendipitous

connection with the professors of the Centre for Education in Mathematics and Computing (cemc.uwaterloo.ca) at the University of Waterloo.

This partnership was fostered through a series of distant, and seemingly insignificant, connections that brought the InTeRN program to the attention of a group of professors within the CEMC of U of Waterloo. Events were held that enabled, via distance technology methods, the team of InTeRN to meet with CEMC faculty. Before long, CEMC had a growing list of faculty members that wished to assist InTeRN in some way. The eventual method entailed pairing of individual students with individual professors who went on to meet on a regular basis through distance methods.

10.1. U of Waterloo mentorship

The partnership began with a primary focus on guiding these women through the intricacies of the Information Technology Networking CISCO Certificate Program. By demystifying the tech landscape, the mentors from CEMC helped the mentees recognize their inherent potential and the possibilities that could unfold with the completion of their training.

At its core, this mentorship program aimed to unveil, to the Indigenous women, the myriad of career opportunities within the tech industry. For the women of InTeRN, this was eye-opening but also a chance to interact with mentors that were very ‘foreign’ to the women – these were professors, many of whom came from countries other than Canada, who were engaged in cutting edge research related to digital computation, and lived and worked in a large city with a reputation for being part of Canada’s ‘Silicon Valley’. For the professors, this was equally eye-opening – these were Indigenous women living in surprisingly poor conditions in Canada’s north and struggling to secure education and training that would provide futures for their families in an industry that had largely never tested this demographic within its workforce. There was a large chasm between the mentors and the mentees, but both jumped at the opportunity to learn from each other. The result was a transformative journey that began with an introduction to potential careers in technology and ended with real connections and the blossoming of friendships.

One of those friendships, in particular, served as an example of the impacts, for both mentor and mentee, of this arrangement. Dr. Mei Nagappan of the Cheriton School of Computer Science at the U of Waterloo mentored Brenda Bignell of InTeRN. Brenda related her story to FSC ([Indigenous women thrive in northern Manitoba tech training program - Future Skills Centre • Centre des Compétences futures](#))

(fsc-ccf.ca) in May of 2022. Brenda now has full time employment within an IT-related field, and she and Dr. Nagappan continue to help each other to learn.

10.2. Lessons learned from the U of Waterloo mentorship

1. **The Power of Representation:** One of the most profound lessons from this mentorship was the importance of representation in technology. Seeing experts who were willing to invest time and knowledge empowered the Indigenous women to believe in their capabilities, and to envision a future where they, too, could contribute to the field of technology.
2. **Beyond Professional Growth:** While the initial focus was on professional development, the mentorship organically evolved into a platform for cultural exchange and personal growth. The conversations naturally extended beyond technology, encompassing life experiences and mutual support, thereby truly championing the spirit of the women involved and, frankly, changing the mentors as well.
3. **Endurance of Connection:** The lasting impact of the mentorship is exemplified by the continued relationship between the women and their mentors. This enduring connection underscores the depth of the bonds formed and the mentorship's success in transcending virtual barriers.
4. **Potential for Community Impact:** The mentorship program highlighted the potential ripple effect of initiatives such as InTeRN and the connections to the world. By equipping these women with technological expertise, the program planted seeds for future educational and economic empowerment within their communities. The mentorship with U of Waterloo demonstrated the possible.

The participants of this mentorship have never met face-to-face. They hope to someday. Regardless of whether they do, this network represents hope and a model for similar initiatives. It serves as a poignant reminder that when knowledge is shared with an open heart, it can lead to profound personal and community transformation.

11. The future state of IT programming at UCN

As outlined above, four distinct programs are established at UCN at the conclusion of the FSC-funded projects. The LTF Training program is now being implemented among the LTFs employed at UCN. The Train-the-Trainer program will be implemented again as UCN grows its own instructors that are representative of the communities that we serve. And, the InTeRN and ITST programs are now fully funded and continuing at UCN in the 2023-2024 academic year and beyond.

While this is a good news story and a worthy place to conclude this report, words of warning are also required.

a) Base-funding is welcome but it changes the dynamics

The pathway to success within InTeRN, as indicated in the process tracing exercise, was based on implementing processes that do not normally appear in base-funded programming at UCN, or other colleges for that matter. Being a pilot project with external funding enabled the team to try new methods and innovate. There was an edginess to the activities. The envelope was being pushed. This does not happen, for a variety of reasons, with base-funded programming. The institution collectively knows how to conduct base-funded programming. This is what it is paid to do.

As InTeRN and ITST move into the realm of base-funded programming, they will take on more of the look and feel of all other programming at UCN. The innovation and edginess will, over time, decline. While this will make it easier to conduct these programs (refer back to section 7.2, Swimming Upstream), it will, in all probability, also dull the shine of what was accomplished during this project.

b) Secure funding takes away some of the 'hunger'

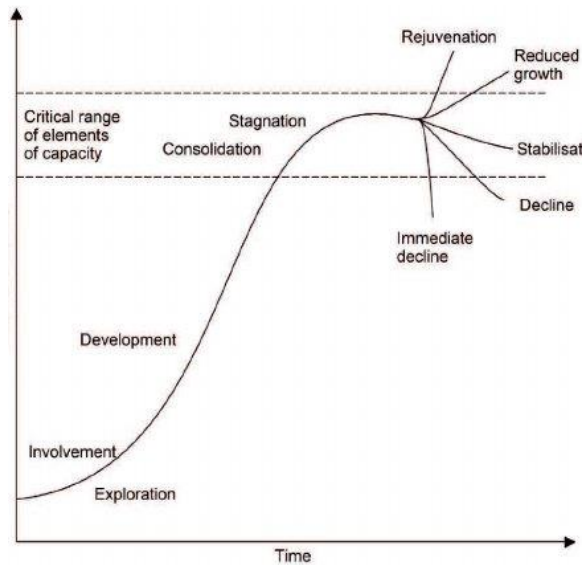
In his book, *The Ideal Team Player*, Patrick Lencioni speaks of the three virtues that effective team players exhibit as being humble, hungry, and smart. Humble and smart are self-explanatory. Hungry, on the other hand, refers to being motivated, going above and beyond, pushing and looking for the opportunity to do better (Lencioni, 2016).

Similar to team players, effective programming needs to have an element of 'hunger' that constantly pushes it to improvement and innovation. Functioning at the edges where funding and support is not always secure tends to reinforce that 'hunger'. Base-funding takes away some of the pressure, and that changes the dynamics that make a program a leader. And this leads us to the next point.

c) Decay must constantly be attended to.

As Neil Young said on his album cover in 1979, "Rust never sleeps." Likewise, in college programming, decay is never far away.

An analogy is provided within the field of tourism development and the so-called "Butler's Tourism Area Life Cycle" (Butler, 1980).



This diagram shows the excitement that is generated when a new product is brought to market. Media coverage draws attention to the development. Interest is piqued.

Gradually, the interest wains. Other ventures steal the limelight. Attention is drawn elsewhere. Stagnation creeps in. And the response from the owners of the experience must be either decline or rejuvenation.

For UCN, InTeRN was unique and “showed well”. UCN’s President loved to take politicians, innovators, funders, and other visitors into the InTeRN classroom. It demonstrated the possible. Without constant attention, however, the next exciting venture will replace it.

Butler’s diagram refers to the area of tourism development, but the analogy for college programming is not much of a stretch. While not a given in college programming, such decline and stagnation must be anticipated and acted upon. Base funding for programming tends to take the focus off the need to rejuvenate until the decline is well underway. Someone needs to be watching for the rust.

12. Extending our reach

As indicated above, much of the work of this project focused on the geographic region of Opaskwayak / The Pas. In the latter parts of this venture, FSC funding enabled us to expand into the Thompson region.

Initially, our partnership in the North Forge North (NFN) space in Thompson enabled us to extend our activities geographically but, eventually, also permitted demographic and sectoral extensions. Looking at the map in Section 1 shows that Thompson is approximately 400 km away from The Pas. Moving into the

Thompson area gave us a much wider reach for engaging new participants as Thompson is not only a larger urban area (population estimated at 13,000) than The Pas (population of 5500), but also has a number of larger Indigenous communities within a 1-hour radius of the city (e.g., Nisichiwayasik First Nation (pop. = 1500), Tataskwayak First Nation (pop. = 2200); data provided by Statistics Canada, 2021).

Secondly, our work with NFN focused more on youth (defined as middle school to young adults (i.e., <29 years)) rather than strictly post-secondary students as engaged in the activities at The Pas Campus. Much of this work was conducted with three school divisions / districts that provide educational services within Thompson and the surrounding regions (Frontier School Division (fsdnet.ca), Mystery Lake School District (mysterynet.mb.ca), and the Division Scolaire Franco-Manitobaine (dsfm.mb.ca) school in Thompson, La Voie du Nord Community School). Of the more than 200 individuals that participated in activities at our Thompson site, all were from northern communities, more than 80% were Indigenous, and about 20 were from the smaller Francophone community resident in Thompson.

With respect to industry sectors, the work at Opaskwayak / The Pas focused on IT training related to direct entry into industry. Some effort was also extended into introducing IT-related careers to youth. In contrast, the majority of the work in Thompson was related to career orientation, and the careers expanded on IT-related positions into sectors such as advanced manufacturing, digital productions (art, audio, graphic design), and digital economies. The primary purpose of much of this work was, to go back to one of the original objectives of this FSC-project, namely, to demonstrate to northern residents that careers related to technology exist in northern Manitoba and will continue to expand.

12.1. AI and mineral exploration

An excellent example of the expansion that is already happening is the “artificial intelligence” project that was spawned from this work.

Mining is a critical industry for Manitoba and a critical employer in Manitoba’s north (Mining Association of Manitoba, n.d.). Most northerners are aware of mining, yet many are not aware of the technological changes impacting mining in Manitoba and the desperate need for innovative exploration techniques to find the next mines in Manitoba.

When mineral prospectors and developers conduct exploration, one of the tools they use is the production and optical analysis of thin section samples of rock (petrographic thin sectioning; National Petrographic Services, n.d.). Rocks are taken from prospective sites and then cut to produce thin slices of no more than 30 microns in thickness. At this thickness, light can be shone through the samples to assist

in mineral identification at the microscopic level. Historically, the quality of these analyses varied depending on the experience of the assayer and their level of knowledge regarding the genesis of the rocks.

As part of the work of UCN, we created a project to examine whether artificial intelligence could take some of the human impacts and errors out of the analyses and, by so doing, create new targets for productive exploration in Manitoba's north.

In partnership with Bit Space Development (bitspacedevelopment.com) and UCN's Northern Manitoba Mining Academy, we were able to create a project to re-examine historic rock and ore samples given to the Mining Academy by HudBay Minerals (hudbayminerals.com) of Flin Flon, Manitoba. These historic samples date back almost 100 years to the initial exploration era that opened up Manitoba's north to mining and development.

The thin section samples were previously analyzed using the assaying technology of the day. With the assistance of Bit Space and their AI / machine learning capabilities, those samples are now being examined through the use of computer vision and artificial intelligence (see complete report at [https://fliphtml5.com/qciow/tojt/BSD_XR - AI-Assisted Thin Sections/](https://fliphtml5.com/qciow/tojt/BSD_XR_-_AI-Assisted_Thin_Sections/)). The results are very encouraging, and the work will continue. Of most interest to the FSC-funded project, however, is the fact that two graduates of FSC-funded programs at UCN are now employed full-time with Bit Space on this project. Both are Indigenous and from northern Manitoba. Neither knew anything about machine learning at the start of this project. Now, they are able to show what they do and explain it to others. They are living proof of the possible.

13. Concluding comments

Various attributes of the FSC-funded programming have been outlined in the document above, many of which can be replicated, in whole or in part, in other areas and scenarios. A thread that weaves through all of these activities, and must be emphasized, is the centrality and criticality of having a good team.

The team that brought this project to fruition was composed of individuals with unique aptitudes and attributes. Some of these (emotional intelligence, for example) are definable, but there are other attributes that, in the words of author Malcolm Gladwell, are less measureable but nonetheless necessary as "success... is heavily dependent on the involvement of people with a particular and rare set of social gifts" (Gladwell, 2000).

In this project, we were fortunate to have team members with complementary sets of those social gifts. Replication of such a team can be striven for but is never assured. We are dealing with humans, and humans are inherently unpredictable. That's what makes us so much fun!

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Appendix A: The InTeRN Program

Program name: **Information Technology Readiness North (InTeRN)**

Credential awarded: **Certificate**

General description of the program and its objectives:

Intended purpose

At the same time as the information technology (IT) industry of Manitoba is looking for employees with demonstrable skills, it is also seeking to make its workforce more diverse and inclusive. As a result, employers have been inquiring about the potential pathways that could engage more Indigenous women into their sector, but this is a demographic group that is historically under-represented within the IT sector of North America. This program, Information Technology Readiness North (InTeRN), is designed to address this need by engaging Indigenous women to build entry-level IT skills to confidently enter this sector.

Upon completion of this 10-month program, students will have the knowledge and skills required to install and configure end-user devices and software, connect devices to networks, perform basic cybersecurity mitigations, troubleshoot common problems to diagnose and resolve issues, and demonstrate basic knowledge of scripting, the cloud, and virtualization. Importantly, students will gain hands-on experience and be prepared to take the industry-recognized CompTIA A+ Core 1 and Core 2 certification exams (www.comptia.org/certifications/a).

Secondly, and perhaps more importantly, the InTeRN program combines IT-related skill development with culture-infused methods (Indigegogy), teachings, and story-telling to develop graduates that can become role models for other northerners considering employment within the IT-sector.

Curriculum design

Design of the curriculum aligns with industry standardized testing for entry level skills (CompTIA A+ Core 1 and Core 2 examinations). This certification continues to be recognized by IT-related industries, and we confirmed this by consulting with a variety of leading businesses in the IT-sector.

CompTIA A+ serves as the core curriculum, and the programming is designed to prepare students to successfully complete the certification examinations. Additional components were added to the core curriculum as this program will be delivered to northern Indigenous women, and our intent is that many of those students will remain in the north and be employed by northern companies. As such, it is more common for northern workers in the IT-sector to perform more 'all encompassing' work rather than specialization, and northern workers are more often involved in site preparation and wiring/cabbling than would most southern workers. Consequently, workplace safety and health components were built into the program to ensure that graduates are not only IT competent, but also safe in a wide variety of work settings.

Distinctive attributes

This program exclusively targets Indigenous women to enter the IT-sector. Through funding from the Future Skills Centre (fsc-ccf.ca), UCN has piloted this program during the 2021-2022 and 2022-2023 academic years. Not surprisingly, employers have been, and continue to be, most interested in the graduates of this program.

As a program that targets Indigenous women, it also incorporates critical Indigenous focused content and methods (Indigegogy) focused on “decolonizing the IT-industry”. While this work infuses the entirety of the program, it is most focused in the course UC.CSC.1010 “Sweetgrass – Introduction to InTeRN”.

UCN is partnering with Computers for Schools Manitoba (c4smb.ca) and this provides excellent work-integrated-learning (WIL) opportunities for InTeRN students. Coupling the theoretical- and certification-based learning with hands-on, practical (i.e., refurbishing older computers), and meaningful (refurbished computers redistributed to needy families in northern Manitoba) experiences has proven beneficial to student learning and retention. This has already been proven in the pilot projects that UCN ran with funding from Future Skills Centre for engaging Indigenous women in IT-related training (Information Technology Readiness North; <https://fsc-ccf.ca/projects/a-young-northern-workforce-enters-the-world-of-ict/>).

Intended outcomes of the program:

Academic

Other than continuing education programming, UCN has not delivered IT-related training in the north for many years. In a time when digital literacy, connectivity, the Internet of Things, cybersecurity and other topics are components of almost all careers, this is a wrong that needs to be righted for northern Manitobans. IT-related training that is industry-recognized, practical, and delivered in the north is desperately needed.

Cultural

Most IT training and development work is strongly influenced by the existing culture of the Silicon Valley, upstart IT firms, the internet, and the big IT companies. All of that, when viewed through the lens of cultural components, can be considered as adopting a largely western and white worldview. UCN has made a commitment to developing, along with our students and communities, IT-programming that challenges those worldviews and works to decolonize the IT-sector. Importantly, this program targets a demographic (Indigenous females) that is grossly under-represented within the IT-sector of North America. InTeRN seeks to address equity, diversity, and inclusivity in the IT-workplace but not by simply achieving a quota or employment diversity target; rather, InTeRN seeks to prove that IT-related businesses will benefit from having a diversity and resilience stemming from the worldviews, pragmatism, and problem-solving that Indigenous people and females bring into the worksite.

Social and economic

Supply chain challenges and local procurement are common topics among industry and provincial governments, and connectivity and information management are parts of these issues. Currently, northern Manitoba struggles with poor connectivity, low digital literacy, inadequate computer equipment in homes, and low employment rates in the IT-sector. While not rectifying all of these ailments, this program, and UCN's commitment to entering

the IT-training realm, is targeted at making improvements in this milieu. Ultimately, we want to see northern communities as part of the solution to connectivity issues rather than merely purchasers of those services from southern companies. That, in our view, is a step towards reconciliation as envisioned in the Truth and Reconciliation Calls to Action, in general, and Article 92.ii., in particular (“Ensure that Aboriginal peoples have equitable access to jobs, training, and education opportunities in the corporate sector, and that Aboriginal communities gain long-term sustainable benefits from economic development projects”).

Put simply, we want to see northern people graduating from UCN and taking important roles in the development of northern Manitoba's digital economy as it supports northern industries, businesses, communities, and education.

Program content:

Course Title	Credit Hours	Course Hours
Waskawimakanwa mecimwaci isihtwawina	1	16
Sweetgrass - Introduction to InTeRN	7	105
Applied A+ Technician Skills – Work Practicum	6	200
CompTIA A+ Certification Exams	2	55
Work Integrated Learning	6	165
IT Fundamentals	3	45
IT Essentials - Core 1	6	90
IT Essentials Core 2	6	90
Introduction to Networks	6	90
Credit Hours	43	856

Appendix B: Sweetgrass – the course

Course Name: Sweetgrass Model of Teaching for Learning

Calendar Description:

Students will explore best practices in teaching and learning with a particular focus on (a) analysis of philosophies of learning, (b) active engagement of students, (c) the importance of a safe and welcoming learning environment, (d) the creation of a learning community, and (e) application of the Indigenous perspectives on transformative education through the 'sweetgrass model' incorporating traditional teachings and oral story telling as a personal growth pedagogy.

Learning Outcomes:

At the conclusion of this course, the students will be able to

- Examine the biases and preconceived notions of teaching and learning that each brings to the course / classroom;
- Apply Indigenous perspectives on teaching and learning to the development of lessons and assessments and to the learning space;
- Create robust lesson plans and assessment tools;
- Cooperatively build a learning community; and
- Apply best practices of pedagogy / Indigegogy when teaching and learning with others.

Topical outline:

Introduction and Concept Understanding

Digital Skills Training

Soft Skills Training

Indigenous Land-Based Ways of Knowing/Storytelling

Workplace Integrated Learning

Mentorship Pathways

Assessment and Feedback

Continuous Improvement and Future Directions

Appendix C: Train-the-Trainer Program

Program Name: **InTeRN Train the Trainer (pilot project)**

Credential: Certificate

Program Description:

Qualified, competent instructors are needed for continuing the work of the Information Technology Readiness North (InTeRN) program, and this program is intended to assist UCN to 'grow its own'. This certificate program will take graduates of the InTeRN program and provide them with advanced skills in the IT sector as well as formal training in teaching. Coupled with the experiences that the graduates gleaned in the InTeRN program, the result will be IT professionals that know how to teach and know, from experience, the importance of creating a learning community where Indigenous women can enter the IT sector.

Career Opportunities:

This is a pilot project, funded by Future Skills Centre, to develop skilled instructors for IT training in the north with a particular focus on students that are Indigenous women. Employment will be at UCN or other training centres engaged in IT-related training.

Admission Requirements:

Graduate of the InTeRN program at UCN.

Program content:

Course Title	Credit Hours	Course Hours
Sweetgrass Model of Teaching for Learning – part 2	4	70
InTeRN Teaching Practicum	5	160
Cybersecurity Essentials	6	125
Security +	6	125
Introduction to Networks	6	156
Switching, Routing, and Wireless Essentials	6	125
Enterprise Networking, Security, and Automation	6	125
Totals	39	886

Appendix D: The Information Technology Support Technician Program

Program name: **IT Support Technician**

Credential awarded: **Certificate**

General description of the program and its objectives:

Intended purpose

Today's job market demands employees with demonstrable skills, and the information and activities in this Information Technology (IT) Support Technician Program will help individuals build skills to confidently perform duties in any entry-level IT support role.

Upon completion of this 5-month program, students will have the knowledge and skills required to install and configure end-user devices and software, connect devices to networks, perform basic cybersecurity mitigations, troubleshoot common problems to diagnose and resolve issues, and demonstrate basic knowledge of scripting, the cloud, and virtualization. Importantly, students will gain hands-on experience and be prepared to take the industry-recognized CompTIA A+ Core 1 and Core 2 certification exams (www.comptia.org/certifications/a).

In addition to IT-related skills, students will gain work safety-related training including WHMIS, Fall Arrest, and First Aid as many IT-workers work in a variety of settings and industries.

Curriculum design

Design of the curriculum aligns with industry standardized testing for entry level skills (Comp TIA A+ Core 1 and Core 2 examinations). This certification continues to be recognized by IT-related industries, and we confirmed this by consulting with a variety of leading businesses in the IT-sector.

CompTIA A+ serves as the core curriculum, and the programming is designed to prepare students to successfully complete the certification examinations. Additional components were added to the core curriculum as this program will largely be delivered to northern students and our intent is that many of those students will remain in the north and be employed by northern employers. As such, it is more common for northern workers in the IT-sector to perform more 'all encompassing' work rather than specialization, and northern workers are more often involved in site preparation and wiring than would most southern workers. Consequently, workplace safety and health components were built into the program to ensure that graduates are not only IT competent, but also safe in a wide variety of work settings.

Distinctive attributes

UCN is partnering with Computers for Schools Manitoba (c4smb.ca) and this provides excellent work-integrated-learning (WIL) opportunities for IT Support Tech students. Coupling the theoretical- and certification-based learning with hands-on, practical (i.e., refurbishing older computers), and meaningful (i.e., refurbished computers redistributed to needy families in northern Manitoba) experiences has proven beneficial to student learning

and retention. This has already been proven in the pilot projects that UCN ran with funding from Future Skills Centre (fsc-ccf.ca) for engaging Indigenous women in IT-related training (Information Technology Readiness North; <https://fsc-ccf.ca/projects/a-young-northern-workforce-enters-the-world-of-ict/>). Importantly, this FSC-funded project provided the capital for establishing IT-related training, such as IT Support Technician, at UCN.

Intended outcomes of the program:

Academic

Other than continuing education programming, UCN has not delivered IT-related training in the north for many years. In a time when digital literacy, connectivity, the Internet of Things, cybersecurity and other topics are components of almost all careers, this is a wrong that needs to be righted for northern Manitobans. IT-related training that is industry-recognized, practical, and delivered in the north is desperately needed.

Cultural

Most IT training and development work is strongly influenced by the existing culture of the Silicon Valley, upstart IT firms, the internet, and the big companies. All of that, when viewed through the lens of cultural components, can be considered as adopting a largely western and white worldview. UCN has made a commitment to developing, along with our students and communities, IT-programming that challenges those worldviews and works to decolonize the IT-sector. Importantly, this is also what many employers are looking for as equity, diversity, and inclusivity rise as common topics among IT employers.

Social and economic

Supply chain challenges and local procurement are common topics among industry and provincial governments, and connectivity and information management are parts of these issues. Currently, northern Manitoba struggles with poor connectivity, low digital literacy, inadequate computer equipment in homes, and low employment rates in the IT-sector. While not rectifying all of these ailments, this program, and UCN's commitment to entering the IT-training realm, is targeted at making improvements in this. Ultimately, we want to see northern communities as part of the solution to connectivity issues rather than merely purchasers of those services from southern companies. That, in our view, is a step towards reconciliation as envisioned in the Truth and Reconciliation Calls to Action, in general, and Article 92.ii., in particular (“Ensure that Aboriginal peoples have equitable access to jobs, training, and education opportunities in the corporate sector, and that Aboriginal communities gain long-term sustainable benefits from economic development projects.”)

Put simply, we want to see northern people graduating from UCN and taking important roles in the development of northern Manitoba's digital economy as it supports northern industries, businesses, communities, and education.

Program content:

Course Title	Credit Hours	Course Hours
IT Essentials A+	6	156
Introduction to Networks	6	156
IT Fundamentals	3	78

Work Integrated Learning for IT Support Technicians	3	120
Standard First Aid and CPR	0	12
WHMIS / GHS	0	4
Fall Protection	0	6
Workplace Safety (Hazard Recognition)	0	4
IT Support Technician Capstone	3	60
Waskawimakanwa mecimwaci isihtwawina	1	12
Totals	22	608

Appendix E: The Learning Technology Facilitators Training Program

Program Name: Learning Technology Facilitator

Credential: Certificate

Program Description:

This program will enable UCN to meet the facilitation needs of students and faculty engaged in distance education. It will also serve as a training ground for entry-level IT skills for other northern businesses.

Designed as an onboarding curriculum that consists of stackable modules rather than a time-delimited training program, these modules will provide the flexibility for competency-based education and individualized learning plans culminating in a certificate granted by UCN.

Career Opportunities:

This program is designed to improve the retention of UCN employees, namely, Learning Technology Facilitators.

The range of experiences and skills of high-quality LTFs and Centre Coordinators often make these individuals attractive to many employers in Northern Manitoba as this region struggles to find personnel with digital literacy and information technology (IT) skills.

Program Content: Pending

Course Title	Credit Hours	Course Hours
Waskawimakanwa mecimwadci isihtwawina	1	12
IT Fundamentals	3	78
Introduction to PC Security	1	24
Computer Concepts	2	72
MS Word	3	24
MS PowerPoint and Publisher	1.5	12
Spreadsheet & Database Management	3	24
Successful Writing at Work	1	24
Zoom Essential Training	0	24
Customer Services – MB Service Excellence	0	24
Totals	15.5	318

