Northern Alberta Institute of Technology (NAIT)

Creating an innovative, immersive education delivery system for rural, remote, and northern communities: A practical example using environmental service skills training in Indigenous communities to address immediate regional labour shortages

Project Key Learnings

Prepared for Future Skills Centre

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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 project “Creating an innovative, immersive education delivery system for rural, remote, and northern communities: A practical example using environmental service skills training in Indigenous communities to address immediate regional labour shortages” is funded by the Future Skills Centre (FSC) and NAIT’s Digital Transformation Fund. With FSC’s support, the project team has developed two pilot courses that include immersive 360° content and a software application that allows instructors to easily create 360° scenes for their courses. The two pilot courses are focused in the areas of plant identification, seed collection and seed extraction.

Over the course of the project period (March 5, 2021 – March 31, 2023), the project team has undertaken the following key activities:

- Create two revegetation courses targeting students who may not have a high school education. Ensure that courses are culturally appropriate and inclusive.
- Create 360° immersive experience for two revegetation courses that can be delivered remotely. Ensure that experience is as inclusive as possible.
- Develop 360° immersive toolkit with training guide for instructors.

The original project plan had anticipated a pilot to take place in the Summer of 2022, however, the project team experienced delays in course development process due to personnel changes and illness, therefore, piloting the course content has been delayed until Spring/Summer 2023. NAIT and the partner communities remain committed to this project and will continue with the pilot process after the project end date. As the pilot testing of the courses have been delayed, the evaluation and delivery of project results to partners, reclamation-involved industries, training communities and public have also been subsequently delayed.

With the completion of the two pilot courses and version 1.0 of the 360° toolkit application, we are looking forward to the pilot tests with communities, especially as we were able to provide a sample via a beta test in June 2022, which received positive feedback.

Beta Test of Course Components

While we were unable to complete a full-scale pilot of the developed revegetation courses as planned in the summer of 2022, we were able to introduce and beta test components of the courses, including a 360° activity created using the immersive toolkit with Aski Reclamation Ltd.

General feedback received from the community members were positive as the sample 360° activity left them wanting more and generated excitement for the full version of the course. They found this content to be interesting and different from other training products. Additional feedback from the community also included notes that building knowledge slowly and adding repetition within the course and associated activities would be most helpful. Throughout the beta test, a handful of technical issues such as the time it took for images to buffer and load were noted and a recommendation was made to use 4k video files rather 8k video files as the large file sizes will require higher computing power to work smoothly.

Learnings from the beta testing session included that there are many ways to collect feedback from participants rather than only using a formal survey and it is important to build in different feedback mechanisms. For instance, we used pre/post surveys, group discussions and sticky note questions.

Throughout the beta-testing, we built in small debriefing sessions after activities with different feedback mechanisms and found verbal feedback was the preferred method of communicating. By creating the space for the debriefing session, we were able to adapt our processes to meet the communication needs of the participants. The debriefing and group discussion sessions provided greater opportunity for participants to expand on their comments and for the project team to ask probing questions as needed, which allowed us to collect more robust feedback compared to a survey with Likert scales and/or closed ended questions. This experience with the beta-testers has provided valuable insight on how we can continue to refine the feedback process when the courses are piloted in 2023.

Project Next Steps

The goal to address the need for training in reforestation and revegetation skills within indigenous communities remains and NAIT is committed to continue to develop immersive training in this area. The project team has received funding to create additional reforestation and revegetation courses that incorporate immersive project content. The deliverables from this project provide a foundation to continue to leverage NAIT expertise in reforestation, revegetation, and innovative media to create immersive training environments.

Project Learnings

Throughout this project, there were several key lessons that we would highlight as guidance for other organizations that are embarking on a similar project.

Project Planning and Design

Taking the time to design and develop a plan for the project was crucial for success from the content and software development perspectives. Recognizing that there is a limited time frame to execute a project, there is an instinct to immediately move to the implementation phase of a project. It may feel counter-intuitive to spend a significant amount of time planning and designing aspects of the project, when in many situations, starting the process, failing fast and making iterative changes would appear to be the best way to gain momentum and continue pushing a project forward.

For our project team, the time spent planning and designing mock-ups of content and software elements allowed us to keep the overarching project goals in mind, while working on individual features. In a software development process, there is a heavy emphasis on planning and working in 2–4-week sprints to remain agile. However, for this project, by planning from a holistic point of view, it helped prevent situations where the teams plan a feature, create the feature, and when they arrive to the next feature, they need to re-implement and configure swaths of code from the first feature. The step-by-step implementation details of future features do not need to be known but having an idea of the upcoming features can mitigate the need to re-implement old code as new features are added. From the content development process, the curriculum mapping sessions with stakeholders were a key planning component as it outlined the objectives, skills, and outcomes that industry partners are looking for to fill their training skills gap. While we have offered ad hoc training based on industry requests, the mapping sessions identified concrete areas of focus and a path forward for the content, including multi-media items, that needed to be created or collected.

Continuous Feedback and Evaluation

Building on the project planning and design process, continuous feedback and evaluation of project tasks were very helpful through the course of our project. When working with a software development project, it is possible to become singularly focused on a feature, especially when encountering issues. For instance, there was a quarter where the software development team spent a significant amount of time trying to find workarounds around a platform limitation, so that the 360° toolkit could be available as a desktop application and a website via a WebGL setting. The Unity platform that the toolkit is built in is limited in its capability to covert the toolkit into a WebGL version that maintained key features (e.g., uploading videos into the scene). As part of the evaluation of the project needs and tasks, it was determined that it would be rare for instructors to want to build their 360° content using a web browser as most would be using a desktop or laptop to complete the work, therefore, it was unnecessary to continue down the path of seeking alternative solutions. Without a continuous evaluation and feedback process, it is easy for project teams to focus on project enhancements versus core deliverables.

We would also suggest that project teams build in collaborative testing sessions between content and software development teams where they are working through the new software updates together. The collaborative testing sessions would allow for instant feedback between the two teams and for the software developers to see how the content experts are using the toolkit and to see any bug or errors that occur live. These sessions would also facilitate enhanced communication and understanding of how each team thinks the features should be working and why they want or need it to function in a specific manner.

Open Communication

When bringing a project team together, it is imperative to develop an open and transparent communication model, so that feedback is consistently provided, and everyone is communicating on the same wavelength to meet the project goals. Our project team consisted of several people who had not worked together before, and we thought it was important to meet on a consistent basis so that each team member was aware of what was happening in the project and issues could be discussed. The standing meetings provided an opportunity for areas to provide updates and discuss the various content and features being developed. There was open communication between the content and software development teams, which was essential to ensure that the software development team was building an application that met the needs from a training perspective.

An issue we did discover was that we missed identifying a common language when several different areas are collaborating on a project. There are certain terms that are used by the various team members that have different meanings based on their respective expertise, so there have been moments where it appears everyone is speaking a common language, but the context is not the same. This can lead to miscommunication resulting in additional meetings to clarify intent to ensure everyone is on the same page. We would recommend that other project teams start their projects by defining key terms that they commonly use to ensure that there is an understanding of what they mean when they say something.

Project Dissemination with Others

We would recommend that that project teams share their project work with other potential internal and external stakeholders throughout the lifecycle of the project. There can be a reluctance to share early versions of a project as it may not be as polished as a final product, but we have found that by offering

demonstrations of the project at its early stages can lead to feedback from other stakeholders that can impact the direction of the project. For example, in discussions with an internal team at NAIT, we noted that we had plans to integrate the 360° content and toolkit into our current learning management system (LMS) but were experiencing issues connecting to the system. A result of the discussion was that we learned that NAIT is changing their LMS and even if we did connect to the current LMS, it would be obsolete soon. As such, we were able to shift the LMS connection out of the project scope and focus on different areas.

We have provided multiple demonstrations of the 360° toolkit at various stages of development and these demonstrations have provided the foundation in building a potential pool of instructors and academic programs that would be interested in using the toolkit in their own courses. These demonstrations have laid the groundwork in ensuring the project deliverables can and will used by others beyond the current project team. The content we have developed has also been shared with internal and external stakeholders and have also led to interest in creating additional courses in the reforestation and revegetation space.

Project dissemination should be occurring at all stages of the project and not just at the end of the project. Formalizing a plan to consistently share project progress with others will pay dividends in sustaining the project beyond its original scope.

Project Resources and Timelines

Many project teams, in particular small teams, will experience constraints on resourcing, which can lead to single points of failure in terms of staffing. This was an issue for our project as some key personnel experienced position changes and illness, which led to delays on certain aspects of the project. Within the institution, there was no availability for replacing the expertise of these staff members without substantial on-boarding and training. While we were able to catch up on this work at a later date, it did impact other milestones in the project plan. In particular, our ability to pilot the course content with partners in rural and remote areas. Our advice for other project teams would be to try build in cross-training in early stages of the project where possible. While a key resource may not be fully replaced, cross-training may alleviate complete stoppage of certain deliverables and help keep the project on track.

Beyond building redundancy with expertise on the project team, it would be helpful to also build in additional time to allow for unforeseen project delays. Our project focused on piloting course content in rural and remote communities, which could only be completed during specific times, therefore, missing that single window of opportunity led to an inability to meet our project goals within the planned project timelines. We would recommend that project teams identify these key time frames and ensure that there is a contingency plan or a project timeline that offers more than one opportunity to complete the task.

Resourcing and timelines will vary across projects, however, our project had up to 12 team members (approximately 7 full time equivalent positions) working on it over the course of two years. If we were to complete a project of similar size and scope in the future, we would keep the project team at a similar size, but over a longer period (3 years) to allow for more opportunities to go out to rural and remote communities to deliver and pilot our completed course content.