Future Skills Centre (FSC) Pilot Overview & Impact Summary

Learning together with & for Indigenous Youth in STEM and Innovation

MindFuel's Canada Tech Futures Initiative
April 1, 2021 - June 30, 2023
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This report was produced as part of a project funded by the Future Skills Centre (FSC), with financial support from the Government of Canada's Future Skills Program.

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

Overview

- Thank you
- Pilot Intent & Goals
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- Pilot Journey
- Pilot Impacts
- Beyond the Pilot

Thank you

To our Indigenous Collaboration Partners - the Students, Teachers & Communities:

Thank you for welcoming us into your schools & communities, learning together, and teaching us more about our programs and ourselves than we could have even imagined at the beginning of this journey.

We are grateful, humbled & we look forward to our continued learning together.

Thank you, and with appreciation.

We acknowledge that we are on the traditional territories of many Indigenous peoples, Metis & Inuit whose footsteps have marked these lands for centuries.

Our working together & learnings happened on the lands of Northern BC, Treaty 6, Treaty 7, Treaty 8, and Yukon.

All things start with and come from the land,
it is the essence of who we are and our inspiration.

Acknowledgements -- With Appreciation

To our FSC advisors & supporters, consultants, partners and funders:

With each conversation, email, insights, wisdom & understanding that you shared, we learned more, and our Pilot evolved, our journey became clearer, and without a doubt, grew beyond our initial expectations and ideas.

Thank you

Transformer Funding Partner

Future Skills Centre

Supporting Funders

- Anonymous
- Government of Canada (CanCode)
- Schulich School of Engineering, University of Calgary
- NSERC PromoScience
- RBC Foundation (Future Launch)
- Syncrude (operated by Suncor)
- TC Energy

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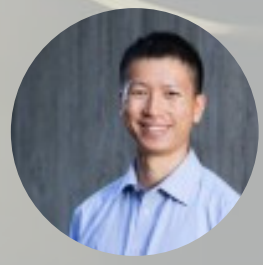

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Collaborators & Partners

- AC Robotics
- Alberta Native Friendship Centres Association
- EiAmplified
- Tutoring Education Centre
- Firecracker Strategies
- IndigeSTEAM
- Northland School Division
- Yukonstruct

Pilot Intent & Goals

Inspired by MindFuel's first all-Indigenous Tech Futures Challenge (TFC) team and their innovative student project, MindFuel's FSC pilot's mission focused on increasing STEM innovation learning opportunities for Indigenous youth in AB, BC & YT rural & remote communities.

Pilot vision: To create learning opportunities that will spark creativity, strengthen prior knowledge in STEM, support ideas and build interest in future studies and work in STEM.

Pilot approach: focus on student project-based hands-on learning, knowledge sharing, mentoring, and interweaving Indigenous ways-of-doing & Western science.

Ultimate outcome: To create a framework that supports long-term economic opportunities for Indigenous youth.

Students & team advisors of the Siksika Nation High School Robotics Team

Key Pilot Goals

- **Students develop, complete & share their own STEM project**
- **Support 70 Indigenous students from rural/remote communities**
- **Collaborate with 3 Indigenous collaboration partners: 1 in each: AB, BC & YT**
- **75% student completion rate in Pilot activities**
- **65% students indicate increased access to computers & tech resources**
- **70% students indicate improved innovation mindset & skills**
- **65% students indicate increased interest in high school/ post-secondary STEM courses**
- **Knowledge share learnings with communities & forward**

Key Milestones for Developing & Delivering Pilot's Goals:

- Objective 1: Engagement through Understanding Community Needs.. Conduct two-part needs assessment in developing STEM skills & resilience to capture Indigenous students' perspectives & needs, to achieve Equity Diversity Inclusion (EDI).
- Objective 2: Program Accessibility. Increase access to innovation skills development & quality STEM education.
- Objective 3: Technology Access. Increase access to technology to locations that lack access and connect key partners that provide tech/WiFi or offline support, to achieve EDI.
- Objective 4: Knowledge Mobilization. Share project learnings and outcomes re: how to support Indigenous youth in developing an innovation mindset and resiliency.

Key Learnings & Pivots

Throughout the pilot, adapting initial timelines & ideas for co-planning, co-development & co-delivery greatly supported our collaborations & strengthened our pilot.

- Objective 1: Engagement through Understanding Community Needs. Through informal conversations, relationship building, co-planning meetings, and actively scheduling next meetings & workshops, while keeping flexible timelines, the project team was able to learn & understand community needs. The formal needs assessment surveys & interviews, initially developed in Year 1, was not introduced during during the Engagement phase, as the timing did not align with the genuine relationship building process.
- Objective 2: Program Accessibility. Based on insights from Engagement, we committed to Program Adaptations, which included program activities & content, incorporating more community context, cultural ways of learning, and having a more flexible delivery model. These adaptations increased program accessibility and interest in the STEM innovation activities. In Year 2, based on insights gathered in Year 1, MindFuel assessed the right approach to be: focus on building teacher/community capacities & skills training; create a STEAM student project with more scaffolded skills development; and incorporate more accessible real-world scenarios, cultural elements, art and humour.
- Objective 3: Technology Access. Through Year 1 learnings, improved WIFI access was needed in community, but was beyond the project scope. In order to ensure Technology Access, critical to project participation, tangible technology was distributed; the benefit being an easier entry point, multiple uses across multiple grades and an affordable economic price point. To further ensure these tech resources were effective & meaningful, MindFuel increased ongoing training & support for the teachers.
- Objective 4: Knowledge Mobilization. Students' knowledge sharing with their classmates, friends, school, and family is the most valuable type of knowledge mobilization to support Indigenous student's developing their innovation mindset. In Year 2, we prioritized students' sharing in the form of an Innovation Showcase and/or learning circles before we shared with the broader education community.
- Other insights: Required Support & Expertise. MindFuel adapted the initial plan to hire one full-time Indigenous team member to developing a Community Champions model, with the hope of having one Community Champion in each community to ensure continuity. Through learnings and insights from the two Community Champions in Year 1, we validated the important of having this continuity, but also realized that the Pilot would require more time in order to develop the necessary Community Champion relationships in each community. Therefore, in Year 2, the model shifted to working with expert consultants, which had a very positive impact on the Pilot development, implementation and resources. It is our hope to incorporate Community Champions into the program model in the future.
- Two valuable additional FSC offerings that greatly supported and enhanced the overall learnings and Pilot work were the FSC Accelerator and the Evaluation by Johnston Research Inc. in Year 2.

Pilot Journey & Evolution

Through our key learnings & pivots, we regularly visited the initial Pilot work plan, which was a linear & structured process, to update & adapt it. This led to evolving the Pilot work into a more flexible model that better supported students, teachers & communities, and our Pilot goals & vision.

Community Outreach → Needs Assessment & Planning → STEM program with technology provided → Reflection & Evaluation → Reporting → Knowledge Mobilization

After initial pilot work in Year 1 and the unprecedented global pandemic, the work plan became more flexible with longer timeframes; our program development became more adaptive; and the program design & delivery had a more organic, diverse & flexible approach.

In addition, as our work expanded from working with 2 initial communities to six communities in AB, BC & YT within one year, there was a deepening of understanding of the following interwoven practices that we incorporated throughout the whole project:

Trained in & Integrated cultural safety

- First Nations principles of OCAP
- TRC commitments
- Indigenous pedagogy & ways of doing, 2-eyed seeing
- Protocols & practices
- Sharing circles
- Land acknowledgement
- Holistic approaches

Understood community needs & challenges

- Student attendance
- Teacher burnout & high turnover
- COVID pandemic & isolation
- Community loss
- Unstable connectivity
- Floods & fire
- Mistrust

Planned, Designed Implemented & Reflected

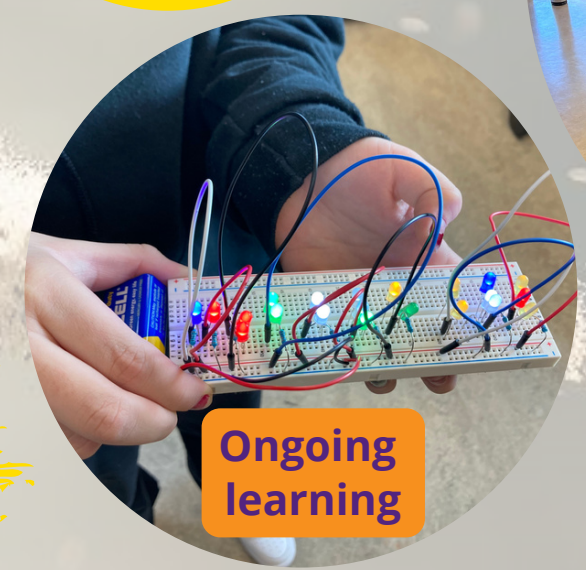
- Encouraged student voice & action
- Learned & used the Medicine Wheel
- Integrated understanding of communities unique history, culture, language, strengths & needs
- Used diverse learning & teaching methods
- Explored students' intrinsic motivation & why to learn
- Learned & used Waawiyeyaa storytelling tool

Developed Knowledge Mobilization

- Focused on knowledge sharing to support student sharing to their school & community
- Students shared their projects, in Showcases & videos
- Had sharing circles, celebrations &/or awards ceremonies
- Created resources, videos & posters of students' projects

Our Flexible Approach & Practices

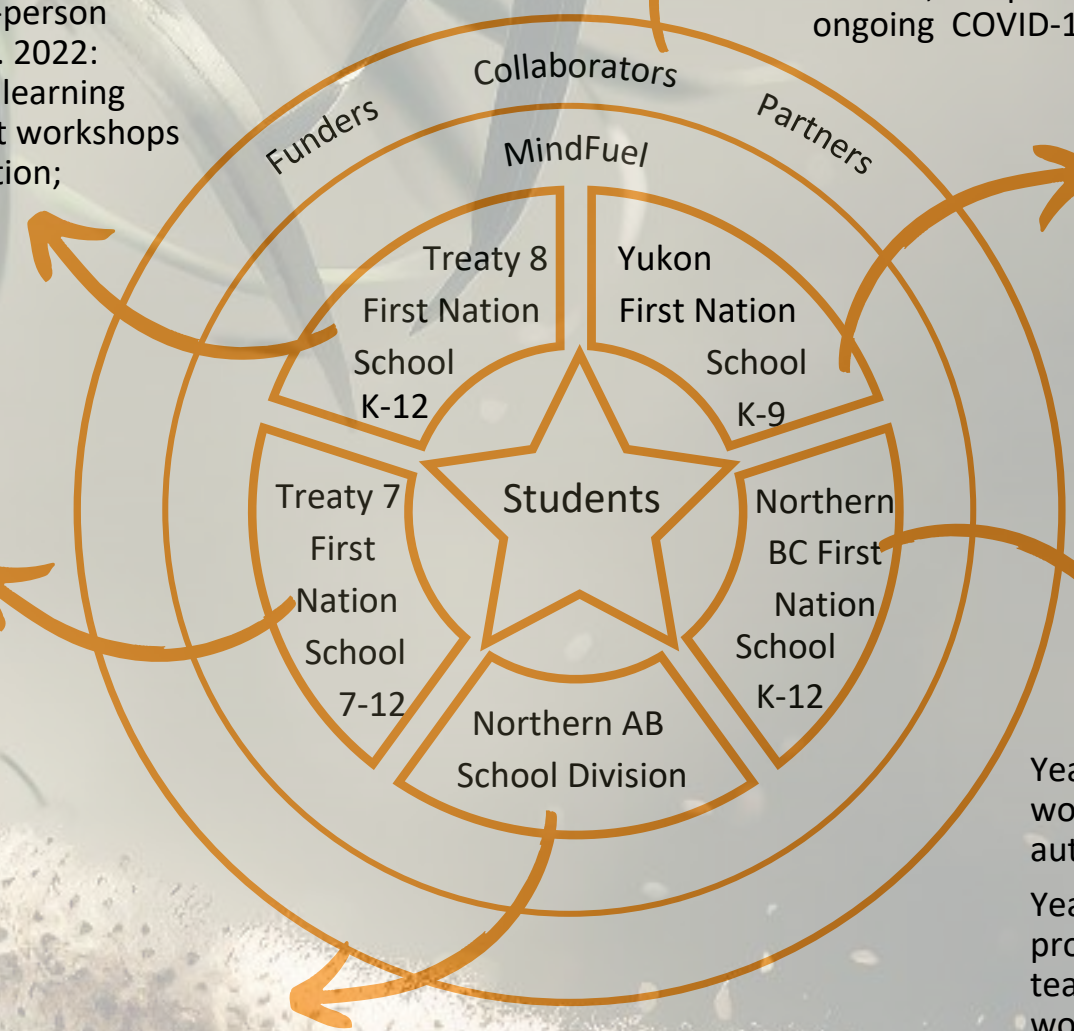
To support increasing opportunities for Indigenous youth in STEM and innovation within each community, we practiced and prioritized:



Collaboration, trusted relationships, time, flexibility, commitment... the key ingredients for successful programming.

Collaborations & Outcomes

Each of the six Pilot communities has unique, rich histories, learning needs, and community & educational interests; and our work together with each community grew to different levels of collaboration depending on our developing relationships, community needs, & global challenges, in particular the pandemic. Here is a brief overview of each collaboration:



Year 1: 2 digital training workshops for youth educators from eight communities on coding & automation; activities paused due COVID-19

Year 2: remained in contact with ANFCA contact; no specific activity together due to ongoing COVID-19 challenges

Year 1: 2 digital teacher workshops on coding & automation

Year 2: week-long in-person programming in Nov. 2022: teacher professional learning workshops & student workshops on coding & automation; tech deliverables

Year 1: 3 digital teacher workshops on coding & automation; activities paused due to admin change

Year 2: 1-day visit in Nov. 2022 doing a tech & fur activity; 2 digital student workshops; 1 week-long in-person program in May 2023 on coding & robotics

Year 1: 2 digital teacher workshops on coding & automation; 6 digital & 4 in-person student workshops on coding & automation, 1 student team participation in TFC 2022; tech deliverables

Year 2: 6 in-person & 4 digital student workshops on coding & automation; 1 full-day teacher professional learning workshop on Project-Based Learning; tech deliverables;
1 student work week for 5 grade 12 graduates at MindFuel

Year 1: 2 digital teacher workshops on coding & automation

Year 2: 1 week-long in-person programming in Oct. 2022: teacher professional learning workshops & student workshops on coding & automation; tech deliverables

Year 1: 2 digital teacher workshops on coding and automation; tech deliverables

Year 2: 10 teacher digital workshops; 7 digital mentorship sessions during class time; 1 virtual student Showcase in April 2023; Tech deliverables

MindFuel team was readily available to troubleshoot & support via digital platforms throughout the entirety of the program.

Pilot Impact

With each community Pilot partner, building relationships was prioritized first, which led to skills building workshops with teachers and/or community educators, and then working directly with the students. Foundational with each workshop was working with a STEM technology new to the teachers & students, and project-based learning.

283 Indigenous students from 17 rural/remote schools

All students worked on smart circuit models, guided with scaffolded Pilot activities.

Workshops

46 student sessions
31 teacher workshops

5 week-long in-person community visits

Collaborated with 6 Indigenous collaboration partners

4 in AB, 1 in BC & 1 in YT

1 student team created an algae bioreactor with team advisors for the 2022 Tech Futures Challenge, Jan - May 2022.

2 student real-world community-based group projects during in-person week-long session, Oct - Nov. 2023.

15 students created their own STEAM projects for school district Showcase, April 2023.

Tech

512 kits, 13 laptops & 145 tech incentives distributed

Resources

7 videos,
27 activities &
1 showcase event developed & delivered

Direct impact from in-class & live digital student activity sessions & teacher workshops:

- Student attendance improved. One school shared they had students who previously had not yet attended school that school year, and they participated n the full week of activities.
- Student participation in STEM activities increased, as well as sustained interest and focus.
- Student motivation increased to continue learning & doing, as well as exceeding activity outcomes.
- Teacher supports for learning a new tech and incorporating it into their classroom strengthened.
- Teacher knowledge, skills & confidence in new tech & innovation mindset development increased.
- Project-based learning and the design thinking process works and aligns with Indigenous ways of learning and doing.
- Student understandings of STEM fields & careers heightened.

Pilot Impact

The students’ and teachers' reflections, sharings and insights tell even more of the story.

80% of students stated, “I kept working with the sensors, breadboard and coding even when parts of it didn't work.”

88% of students stated, “I found using new technology fun.”

“I wanted to keep working because I wanted to make it work.” (student)

73% of students stated “I have more interest in enrolling in STEM classes at high school/post-secondary school.”

88% of teachers/educators agreed that, “The learnings from this workshop will help me to support youth in building STEM skills relevant to the real-world.”

100% of teachers/educators agreed that, “Students who have accessed Coding & Automation activities show an increased interest in pursuing a job/work/career in a STEM field.”

"It is so exciting to teach ‘real life’ lessons to young people!” (teacher)

"This is the first time I've seen them with their cameras on." (online school teacher)

- *“It made me curious on why it wasn't [working] and then figuring out why it wasn't working and fixing the problem.” (student)*
- *“It was challenging and exciting at the same time.” (student)*
- *“Something indecipherable became more easy to understand.” (student)*
- *“My students were successful. It helped the students problem solve and think analytically.” (teacher)*
- *“It helped me to learn the knowledge and skills to facilitate coding and digital skills. I’ve gained more confidence in teaching and facilitating students and improving their skills.” (teacher)*
- *“Why do you have to leave?” (student) / “When are you coming back?” (teacher)*
- *“Thank you for coming back when it gets hard.” (teacher)*

Pilot Impact for MindFuel & Team

With all the positive, fun and amazing student and teacher learnings and ‘a-ha’ moments, there has also been many breakthrough-learnings for the MindFuel team. This FSC Pilot has been a very meaningful professional and personal journey.

12 team members, current & past, from all departments collectively contributing 11,200+ hours

“We are all students & teachers.”

All team members participated in professional development

Teams' reflections & insights

- Team members reflected the Pilot positively impacted their professional learning & personal growth.
- Programs team's confidence in working with Indigenous communities and understanding of Indigenous communities unique needs significantly increased.
- Programs team' comfort with an adaptive work plan with many unknowns increased & the experiences therewith supported their own strengthening of resiliency.
- The evolution of this project delivery model is positively supporting MindFuel's other program delivery models and overall approach to program planning & delivery, collaborations, and knowledge sharing.
- Programs team's understanding of and adapting of all programs to start and happen "in a good way".
- MindFuel's commitment to long-term relationships with Indigenous communities & organizations deepened, and increased our focus on working with funders to develop long-term funding opportunities.

Through learnings & experiences together, we evolved our main knowledge mobilization to share forward....

How to more meaningfully support Indigenous youth in developing an innovation mindset

Connect with Community & the Land

Practice cultural safety

Understand community Expectations & Challenges

Hands-on learning with tech

Humour &/ Stories

Flexible Project -based

Student centered "Doing first"

Applicable community & cultural connections

Food

STEM mentors, Indigenous & non-Indigenous

Traditional language vocabulary

Support community capacity building

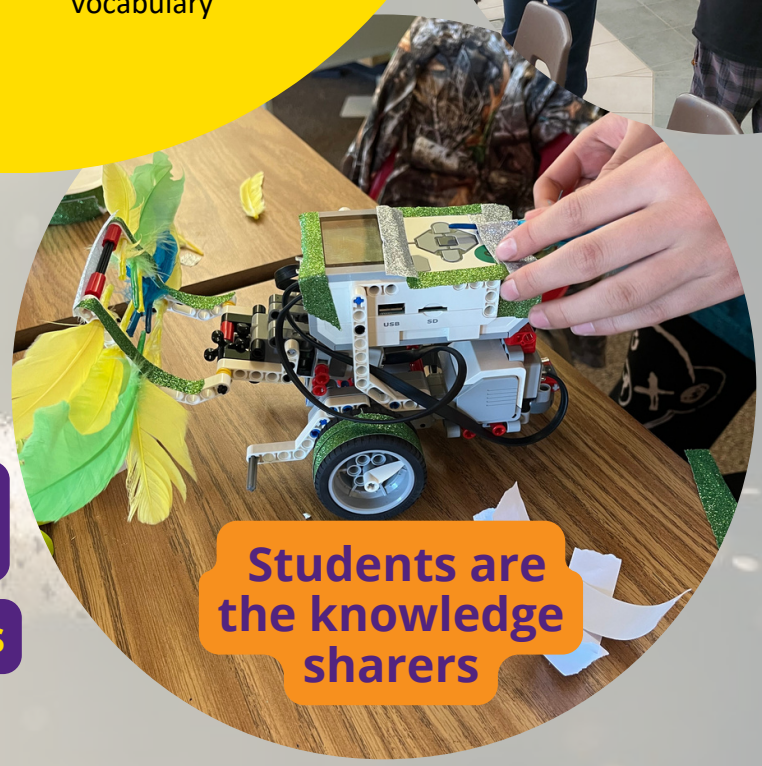
Teacher professional learning

Collaborative working group

Community Champion

Listen, Learn & Adapt - ongoing

Provide accessible tech & scaffolded activities with examples & models



Students are the knowledge sharers

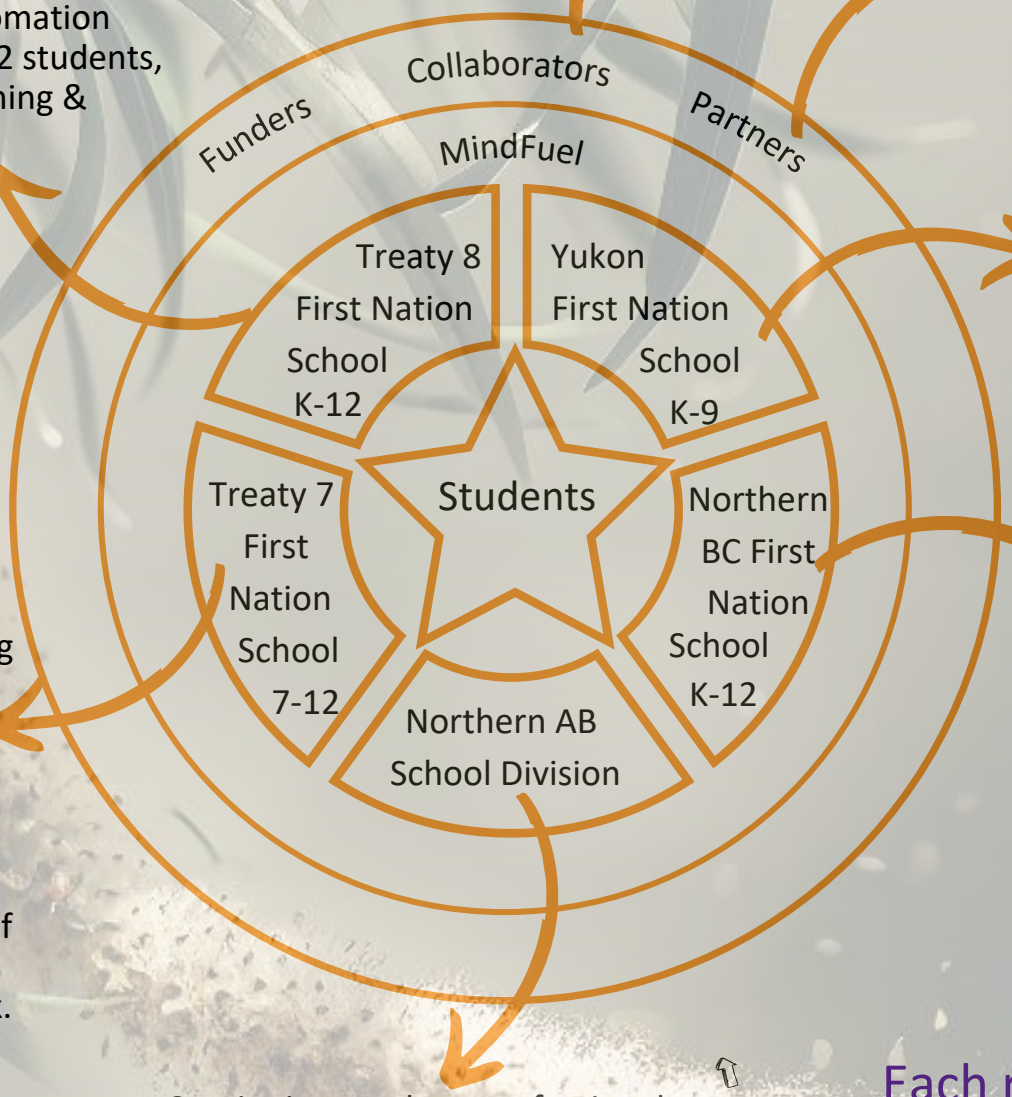
Collaboration

Trusted relationships

Long-term commitment

Collaborating Together - Continuing Beyond Pilot

We are excited that there are plans &/or intent to continue working and learning together with each community.



Reconnection with ANFCA. Meeting in September to share organization plans and explore collaboration opportunities.

New in Year 2: Developed a formal partnership with IndigeSTEAM. Continuing to support each others events, and plan to co-apply for grants.

Return community visit planned for November 2023 for weeklong in-class robotics and coding classes for grades K-9 students.
Regular yearlong support for new robotics club to be confirmed in September.

Return community visit planned for October 2023 for weeklong in-class coding & automation classes for grades 3-12 students, and professional learning & support or teachers.

Continuing yearlong professional learning & support for grade 5-12 teachers with 3 workshops per year, including training for new teachers.
District Showcase of students' projects planned for April 2024.

Continued professional learning for teachers to be confirmed in September 2023.
Additional student work proposed to the grade 12 graduate students of the June 2023 Student Work Week.

Return community visit planned for September 2023 for weeklong in-class coding & automation classes for grades 3-12 students, and professional learning & support for teachers.

Each relationship continues to be unique with plans for a different level of collaboration with continued co-planning and co-delivery.

Vision for the Near Future

Through our learnings and experiences during this two year project, to truly meet students, teachers, and communities needs and interests in STEM and innovation, more than a two year collaboration with community is needed.

All of these collaborations are at a strong next steps point, rather than a project conclusion. With thanks to all the students, teachers, collaborators & partners that we have worked with, there is excitement and inspiration to envision more, including to...

- Co-create & implement a 5-7 year program plan that leads to community self-sustainability of the learning program.
- Co-apply & co-implement grants, with funders supporting with multi-year dynamic funding that has a flexible, yet accountable time line, supports cultural components including food & additional wraparound supports, and professional learning for teachers, communities & MindFuel team.
- Develop more paid Student Work Weeks to evolve into full Summer Work Programs
- Commercialization of Indigenous student projects addressing real-world challenges that create more Indigenous-led businesses, and support community job creation & economic growth.

And beyond... what we are yet to envision ...

In keeping with the MindFuel mission, we are committed to long-term relationships to support increasing Indigenous youth STEM innovation learning experiences and project development, and welcome partners, volunteers, and interested communities to participate in this mission.

MindFuel™

Future Skills Centre

Learning together with & for Indigenous Youth in STEM and Innovation

"There's so much more technology available...that I didn't even know existed before the start of what we've done here...that's just completely changed the direction of how I've used technology. Now it's a tool to help them grow within themselves and show how they know things.
It let's them have more of an outlet in different ways."
-teacher

(awareness and insight gained from using the Johnston Research Inc. Waawiyeyaa evaluation tool)

The MindFuel Foundation

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