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Teaching and Learning Research Exchange

How does a Teacher Incorporate Place-Based First Nations Way of Living in Nature in a Classroom to Teach High School Science in a Northern Reserve School?

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Why is this approach of incorporating First Nations way of living to teach high school science important?

Abstract

This paper discourses the possibilities and advantages of incorporating Indigenous knowledge in to high school science to teach in a northern Canadian high school. The educational and job achievements in science-based fields are lower in Indigenous populations compared to Caucasian or immigrant identities. This is associated with numerous reasons, including lack of resources, lack of science teachers, lack of motivation to enter the job market, and dissimilar worldviews. Indigenous knowledge framework is a noble instrument to inspire students liking science and promote choosing job categories in the essential job and demanding science-related occupations in northern Canada.

I further discuss the stewardship worldview of Indigenous people in terms of their sustainable lifestyle in the nature and how it can guide to create responsible citizens to the future world. I conclude my topic with potential implications and the importance of encouraging concepts like two-eyed seeing or multiple truths in the education process. It is important to think beyond the classroom with the help of the community to face present realities of environmental changes.

Key words: Indigenous, Place-Based, Holistic, Community, Curriculum, Reflection

What was the Process Followed/ Research Activities?

The research activities were planned based on the principals of a participatory action research. Research plan included three cycles but with different groups of students who identified themselves having Indigenous descent. Students are originally from northern reserves. The research was planned and initiated at Canoe Lake Miksew School in northern Saskatchewan. Due to changes in researcher's career, the research was finalized at Transition Place Education Centre in Meadow Lake, Saskatchewan. COVID-19 restrictions have altered the initial plans, but it was a learning to respond to the changing dynamics in the environment and challenges in the world.

Literature review, curriculum study, implications, data collections, reflections/feedback, and continuing the cycle were the key steps in the methodology. The researcher has identified specific topics to incorporate Indigenous knowledge in Grade 10 to 12 science subjects of Saskatchewan curriculum, with a special attention to Science 10, Environmental Science 20, Physical Science 20, Health Science 20 and Biology 30. Qualitative data were gathered after every interaction from students in the form of feedback and reflections, attendance, attention, and engagement. We organized museum visits, land-based learning, nature walks, medicine and berry picking, Elders and Knowledge Keepers in the classroom, having more presentations and discussions about Indigenous knowledge and some questions related to Indigenous knowledge for assessments in science classes. The students were encouraged to do self-reflections of how they feel after each activity of bringing in traditional knowledge in science classroom/science laboratory. Taking feedback of students was an integral portion of the daily routine. Students were given incentives like painting the roof tiles, cooking together, and playing at the beach by the lake for meeting the requirements. Painting and cooking were connected with Indigenous nature/ perspectives/themes/recipes followed by thoughtful discussions. In addition, students were interviewed with specific questions by the administration to observe how they actually feel about learning science.

The questions include:

1. How do you like the teaching and learning in the science classroom?

2. What do you have to say about today's activities?

3. How did you feel about learning this topic?

4. How do you feel when the science teacher discusses about your culture?

5. Are you satisfied about the way you learn science?

6. What else can the teacher work on to be more connected?

7. How did science classes help to navigate your future goals?

The science classroom was rearranged with Indigenous paintings/posters done by students, dream catchers and a hydroponic garden tower to feel like nature. Books of Indigenous role models and activists were used in projects for career explorations in science curriculums. Special attention was taken to show students books about Indigenous medicines and foods available in the north. Special field trips were arranged for medicine picking to demonstrate the importance, protocols of picking, and threats to boreal forests. Students were encouraged to speak about their prior learning, experience, and generational learning from grandparents.

Problems and Limitations

COVID-19 restrictions limited our activities like bringing guests to the school, organizing outdoor camps as we planned and meetings. It takes some time to get connected with any community to find and build the trust with Elders and Knowledge Keepers. Most of the science and math teachers come to reserves and small villages or towns from far places. In this case, the researcher was an immigrant teacher to the reserve school. It was time-consuming and challenging to go through all protocols and restrictions in a First Nation environment.

Summary of the Data

The feedback received from students after every implication of strategies was straightforward and positive. Attendance and engagement were improved. They were amused by the connections of their own ancestral knowledge to western science. One of the best examples is construction of an igloo to the topic of heat transfer in Physical Science 20. Students felt welcoming to science laboratory. It was not a strange place anymore to majority of students. Although teacher was a new immigrant/foreigner/outsider from the other side of the world, students treated the teacher like someone from their community. Following statements were taken from student feedback, self-assessments and interviews. There were mostly positive feedbacks but negative or neutral feedbacks as well.

"I feel proud."

"I feel proud and excited."

"I wish to be out doing more land based."

"She relates to our culture to connect with culture."

"This sounds different."

"I like Elders coming to science classroom."

"I want to take more science classes and go to university one day."

"I want to learn more about Indigenous biology."

"There is definitely things I do not know and I hope I learn about it in the future."

"Very satisfied about science class"

"Interesting."

"I get confused."

"Feel proud that someone from so far away wants to learn our culture."

"Not afraid to learn about new culture."

"Teacher finds ways to teach."

"Bring in more Elders to share stories and knowledge about the land."

"More land based, Elders and Knowledge Keepers."

"I never really had anyone teach me about that sort of stuff. So learning about that was very interesting."

"I'd do it again."

"I really like how teach us about our medicine and it was interesting learning about it."

"I really enjoyed the Elder that came. It was very educational and I learned a lot about plants and different medicines."

"I like what Elders had to say about everything."

"This was really interesting."

"Seeing the actual plants in the land is really interesting."

"The class was enjoyable."

"I would really enjoy more about our way."

"Enjoyed learning about traditional and non-traditional medicines."

"Why do we learn these things in science?"

"Elders never need weather forecast by someone else."

"I loved everything, I've seen at museums."

"I want to take my siblings and cousins to see museums."

"It was an amazing experience."

"I learn my culture in physical science."

"I like that healing garden because it showed me real sweetgrass."

Statement of Research Conclusions

Students were enthusiastic and engaged in learning science. They felt included and respected for who they are and where they are from. Teaching and learning of science became an enjoyable experience to both teacher and students day by day as it was culturally responsive, inclusive, and innovative to find and overcome challenges of walking in two worlds. Researcher's self-assessment was confident, constructive, and leads to continuous learning of First Nations way of learning in nature for years.

In conclusion, by incorporating Indigenous knowledge in teaching science, the holistic view of First Nations' cultural teachings was honoured and appreciated with facilitating students to walk between two worlds of knowledge.

Recommendations from the Results

Planning ahead is important. However, plans may not turn to real as we want in reality. Concept of time is different in First Nations from western. Teachers struggle with achieving the academic goals in curriculum and have to think out of the box to manage activities with limited time.

Incorporating Indigenous knowledge has no complete meaning unless teachers use that in assessments. Students weigh the importance of instructional content as they appear in tests. Incentives are beneficial in both building relationships and as indicators of the curriculum outcomes if they are planned with a conscious mind.

Areas for Further Research

How does the knowledge of First Nations way of living help to face present global challenges in education?

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