
Combining the Views of Both Worlds: Science Education in Nunavut Piqusiit tamainik katisngit

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Honoring Local Community Aspirations for Science Education: Nunavut Pilot Study

- Based in three Qikiqtani communities over 5 years: Pond Inlet, Clyde River, Igloolik
- All elementary school communities desire to offer school programs that “combine the views of both worlds” in all areas including science education: science from or with reference to *Inuit Qaujimajatuqangit* (IQ)
- Communities chosen because of this desire and their cultural, language and geographical ‘proximity’
- Project in collaboration with each Local Education Authority (DEA) and Qikiqtani School Operations
- Focus on teacher & student ‘development’
- Outcomes can support other Nunavut schools & GN in their development both in terms of *resource development* and *understanding of process* influencing development



Focus of Nunavut Education

- “Culture-based education”: foundational principle for school development in Nunavut
- The activities of schools must create, preserve, promote, and enhance local culture, including arts, heritage and language
- Educational experiences provided for children should reflect, validate and promote the culture and language of Inuit
- A culture-based education program the content, skills, outcomes and objectives should be appropriate to the cultural needs of students in the communities served
- Although this might be an aspiration a variety of factors are likely to prevent this from being reality – teacher attribute and environmental – e.g., support, leadership.

Culture/Place-Based Education

- Underlying premise of culture-based education is similar to what is advocated in place-based education.
- Place-based education is rooted in place; that is, the organizing focus of the school is on the local socio-cultural, ecological setting.
- As Dewey (1907) stated:

“The great waste in schools, from a child’s perspective, is his inability to use the experience he gets outside of the school in any complete or free way within the school itself; while on the other hand he is unable to apply what he is learning in daily life. That is the isolation of the school – its isolation from life. When the child gets into the schoolroom, he has to put outside of his mind a large part of the ideas, interests and activities that predominate in his home and neighborhood”.

Stages of the Development Process

A. Diagnostic Phase (Year One):

- Nunavut Government & QSO consent.
- Initial meetings with stakeholders in each community – parents, elders and DEA, teachers (Inuit & non-Inuit), QSO administration, students.
 - Individual & group meetings & conversations, PATHing.
 - What are your aspirations for science education?
 - What do you see as the impediments and contributors for achieving these aspirations?
- Variety of risk factors mostly to do with the infancy of Nunavut or the hegemonic nature of schooling.
- Documented in CJMSTE: “Combining the Views of Both Worlds: Constraints and Contributors to Community-Based Science Education in Qikiqtani.”

School Community PATHING: Pond Inlet



“Teaching with reference to both (contemporary and traditional knowledge) just strengthens the richness of the experience provided for our students and the opportunities this provides. One without the other just reduces the richness of experience for children.” (Inuit Principal)

“Learning about our own culture is important, and I don’t want us to turn our back on that (knowledge) that is valuable for our students. It’s who they are. (At the same time) it’s really important to integrate this knowledge (with non-traditional knowledge, (Inuit Grade 1 Teacher)

Science curricula often fail to acknowledge and override local indigenous communities and their knowledge, values, and beliefs as *thoughtful and purposeful* cultures
(McKinley, 2000)

Stages of the Development Process

B. Planning for Implementation Phase (Year One):

- Identification of Inuit teacher-leaders for each community: central to the success of the project – leadership, motivation, support
 - Met in Winnipeg to substantiate preliminary findings and develop 'first order principles' and appropriate developmental goals
 - **Key Focus: Pilot Study that could support Inuit & non-Inuit teachers and Nunavut in its curriculum development and provide examples of resources and school development processes in science education consistent with local school community aspirations**
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Stages of the Development Process

c. Implementation Phase (Years 2- ...)

- Researchers in communities twice a year (late fall & late spring)
- Targeting 12 learning in science topics – e.g., weather (Sila), rocks, seasons, plants, structures
- Focus on ‘epistemology’: IQ: knowledge, values, beliefs, habits of mind
- Work with individual teachers who currently teach (Inuit & non-Inuit) these topics in Inuktitut or English
- Collaboratively develop and teach these topics with teachers using community members as required
- 2 units developed per visit along with informal classroom teaching visits
- Sources of information – ‘canonizing’ IQ through audio and video-recording of community members
- Access to IQ (elders recordings) in Igloolik (Northern Research Institute)

1. Provide **two-way learning experiences** by integrating Inuit knowledge, ways of knowing, beliefs and values and contemporary scientific knowledge, processes and attitudes.
 2. Draw upon **traditional and contemporary Inuit cultural examples** as contexts for student learning.
 3. **Include the local community** and its people in students' learning opportunities as the classroom is an extension of the school and local community
 4. Foster **language development in Inuktitut** and, where required or encouraged, English.
 5. Use locally identified, **culturally preferred teaching practices** to support student learning.
 6. Use **diagnostic and formative assessment** to inform planning and teaching and monitor student learning.
 7. **Engage** students by starting lessons by providing first-hand experiences for students or drawing upon common experience.
 8. When using **story to engage students**, use the interrupted-story-line as a vehicle to prompt first-hand investigations.
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9. Deliberately **promote scientific attitudes of mind** (curiosity, problem-solving, working to end) in students through thoughtful independent consideration of questions and challenges posed.
 10. Move from the experiential, first-hand experiences to the psychological; that is, after providing concrete experiences **assist students in making sense of experiences** by using purposeful strategies to promote understanding such as role plays, illustrations and analogies.
 11. Assist students in their **consolidation of ideas** only as an extension of the initial experiential and psychological learning experiences.
 12. Within the lesson and throughout the unit, move from concrete to more abstract ideas.
 13. Provide opportunities for **student-initiated and directed investigations**.
 14. Provide opportunity for students to make **connections among science and all other learning areas**.
 15. **Foster student independence, creativity and curiosity** by providing opportunity for students' ideas and questions and follow-up opportunities for problem-solving and investigation.
 16. Provide students the **opportunity to make connections between what they are learning and career opportunities**.
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Standard Format for Resources

- Guiding Principles of the Unit
 - Cross-Curricular Applications
 - Conceptual Framework
 - Skills Development
 - Attitudes and Beliefs Development
 - Curriculum Applications
 - Things to Consider in Preparing to Teach the Unit
 - About the Activities
 - Activities
 - Conceptual Knowledge Background
 - Inuit Qaujimajatuqangit Background
 - References
 - Appendices
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Ulus from Rock and Metal:

This is an adaptation of an interview with Therese Qillaq Ijjangiaq of Igloodik.

... I recall that ulus were also made out of rock material. These were long ago. Ulus used to be made from Uluksarnaak (for making ulu). It is in layers and very dark, sometimes even black. This was used a lot because it was easy to find in this area and it was easy to make it in flat pieces so it could be used to cut. It was not very strong but it was still good for fleshing and cutting. They would make very good scrapers against the hides to remove the flesh from the hide and make the hides softer. The sharpness did not wear out easily. I can remember making them when I was young because it was easy to take the rock and change it into ulus. It was something we liked to do. Today our grandchildren still make the little ulus from the rock.

Land Eggs and Sila: A story based on an interview with George A. Kappianaq of Igloolik.

My mother used to tell me about a certain creature that could do anything to other things that resided in the waters. It has a fluke like a whale with the upper body as a human with head. She used to mention this creature. It is said that it is a powerful creature. It can penetrate the earth and lives in the water. It is known as "TUUTALIK" [mermaid].

It is said it is much larger than a human, possibly about the same size as a beluga whale. I guess they were from sea eggs. It is said that one should not be caught as they are hatchings from sea eggs. There are sea eggs that are known as SILAAT [earth eggs]. When they hatch, some are polar bears with square flippers that are white where it is supposed to be black. The fur is very pretty with white fur. They are albinos.

Should one kill one for their skin, this will result in death to whoever caught it before his time. SILA would grieve the lost of her hatching so it was advised against hunting these particular animals. Even if one is tempted to hunt one of these animals you should leave them alone as there are others for the taking.

Resource Development

- Manuscripts developed by the researchers
 - Being used by the teachers we work with and distributed through QSO and CRYSTAL website to Qikiqtani schools
 - Curriculum Division (Brian Yanamura) for Nunavut also incorporating them into some of their preliminary resource development work for Nunavut as a whole
 - Both in English and Inuktitut (3 Qikiqtani dialects – funded by Canadian Council for Learning)
 - Teacher leaders from each school assist in the unit development and ensuring there is a local perspective for each topic.
 - Posted on CRYSTAL site:
<http://www.umanitoba.ca/outreach/crystal/nunavut%20resources/Rocks%20Grades%201-3.doc>
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Evaluation of Project

- Year 3, 4 & 5: Student development:
 - ❑ Track clusters of students in each school over the duration of the project
 - ❑ NWT (External) performance indicators: student scientific skills, integrated knowledge and scientific attitudes (Levels 1-5 and applied rubrics)
 - ❑ Portfolios of student progress: language development, “two-way” learning, + or - perceptions of the classroom.
 - ❑ Development of a further internal performance indicator: Instrument “Student Perceptions of Success”.
 - ❑ Funded by Imperial Oil Academy for the Learning of Mathematics, Science and Technology

Evaluation of Project

- Year 3-5: Changes in Teacher Personal Attribute and Environmental Factors: Consistent with System B “The Learner & Their Environment”
- 8 factors identified through the diagnostic phase being monitored through the use of a validated instrument: Science Delivery Evaluation Instrument for Inuit Settings.
- Exists in both English & Inuktitut
- Statistically monitor development from the perception of teachers
- Development of this instrument funded by SSHRC
- Example of item (#2):
 2. I am supported in my effort to teach science from the perspective of Inuit culture and values.

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School Progress A

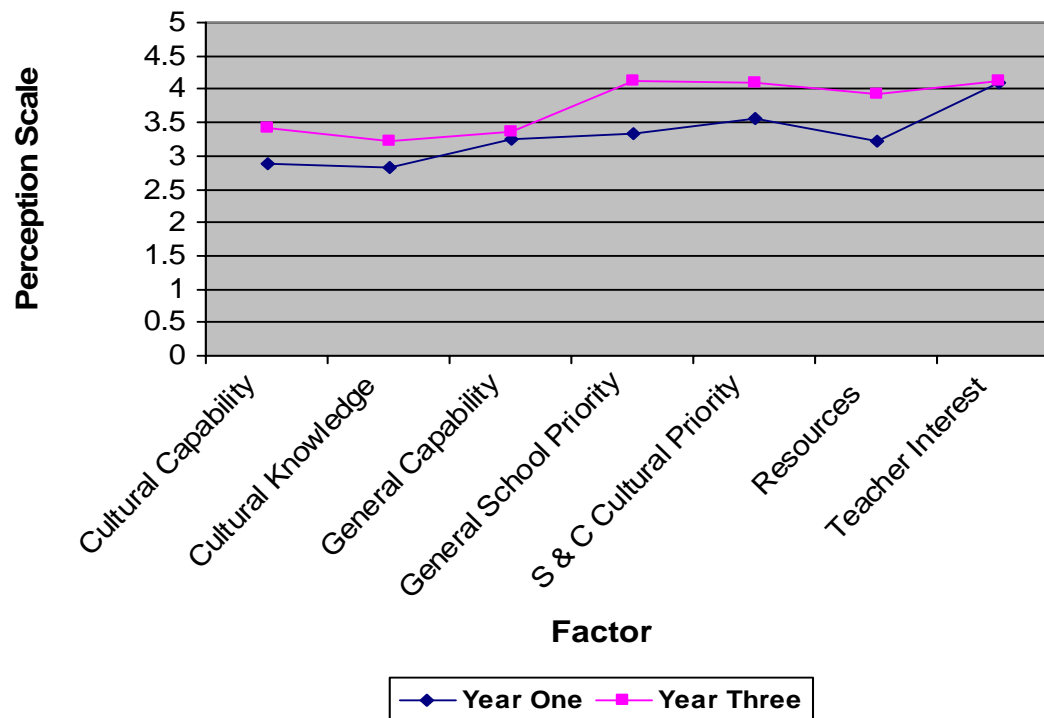


Figure 2 : SDEINS Comparison January 2005 and May 2008

School Progress B

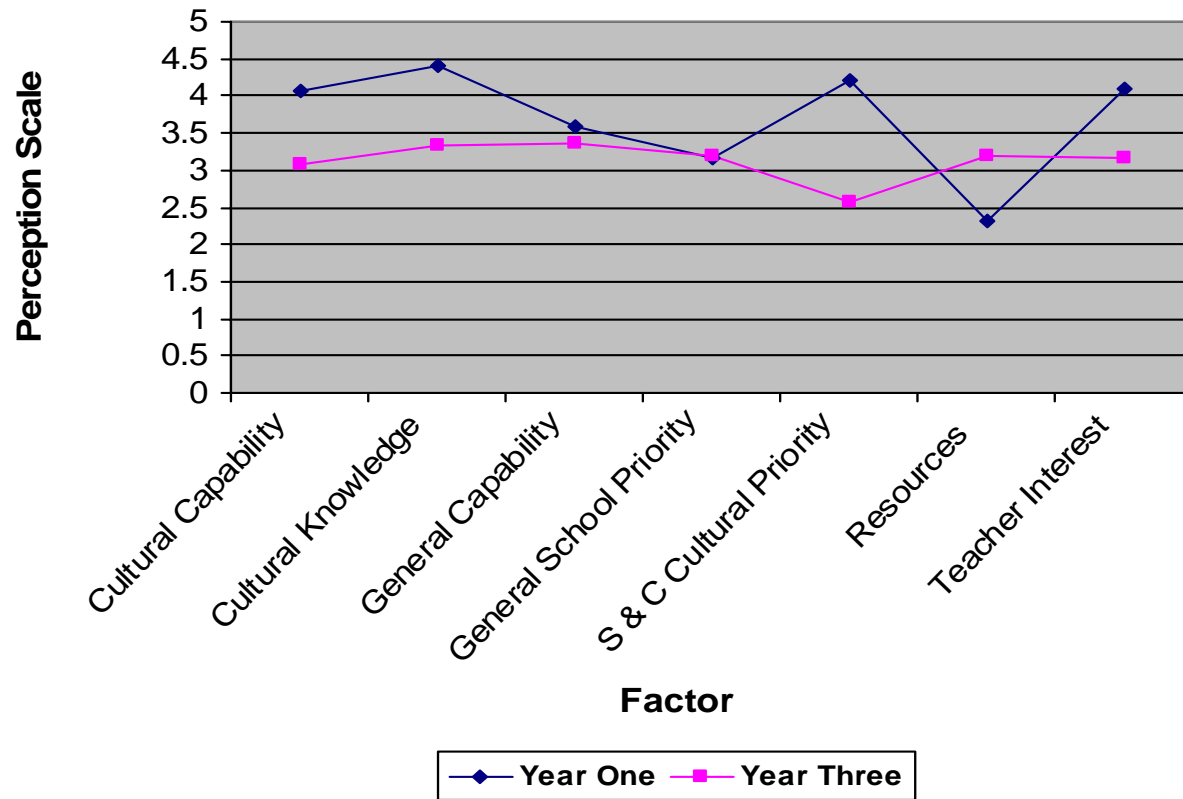


Figure 2 : SDEINS Comparison January 2005 and May 2008

Implications

- Variety of factors including school-community processes influence the achievement of aspirations.
- Development at school level is largely influenced by the role of the principal in his/her relationship with District Education Authority
- Does the DEA play an active role in determining school's orientation? Are they allowed to?
- Who does a principal serve?
- Is there an expectation that a principal will work to foster the desires of the DEA?
- Do new teaching staff know what the DEA aspiration is?
- Conflict of orientations - serving government and its structures or local community aspirations?
- This conflict is inherent within current decisions regarding Nunavut's *Education Act* – who controls education?

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