

**Canadian Journal of Learning and Technology / La revue  
canadienne de l'apprentissage et de la technologie, V35(1)  
Winter / hiver, 2009**

---

**Knowledge Building in an Aboriginal Context**

*Alexander McAuley*

**Author**

Alexander McAuley is at the University of Prince Edward Island, Charlottetown PE. Correspondence regarding this article can be sent to: [amcauley@upei.ca](mailto:amcauley@upei.ca)

**Abstract**

The report on the Royal Commission on Aboriginal Peoples (1996), the Kelowna Accord announced in 2005 (five-billion dollars) followed by its demise in 2006, and the settlement in 2006 for Aboriginal survivors of residential schools (1.9 billion dollars), are but some of the recent high-profile indicators of the challenges to Canada in dealing with the 500-year history of European contact with North America's original inhabitants. While not without its challenges, the creation of Nunavut in 1999 stands apart from this history as a landmark for Inuit self-determination in Canada and a beacon of hope for other Aboriginal peoples. Building on the idea that educational change takes place within the intersecting socio-cultural contexts of the school and the larger world around it, and drawing on data from an eight-year series of design experiments in classrooms in the Baffin (now Qikiqtani) region of Nunavut, this paper explores the potential of knowledge building and knowledge-building technologies to support powerful bilingual (Inuktitut/English) and bicultural learning experiences for Aboriginal students.

**Introduction**

This paper builds on the premise that educational innovations in the classroom exist within and are influenced by the complex socio-cultural contexts within both the schools and the larger society in which schools exist. In this view, just as Aboriginal/non-Aboriginal relations in Canadian society at large are characterized by colonization, misunderstanding, and struggle, so are those of the classroom. The classroom also has the potential to become a site in which the power structures of the dominant society can be reproduced or challenged, contributing to the empowerment and academic success of Aboriginal students or to their ongoing subordination, disempowerment, and academic failure

(Cummins, 2001 (1996); Cummins, Brown, & Sayers, 2007)

Beginning in the late 1960s and culminating in the creation of the Nunavut Territory in 1999, relations between Inuit and Qallunaat (white southerners) in Canada's arctic have been increasingly shaped by the desire for Inuit self-determination. A parallel desire for local control of education emerged in the findings of the Special Committee on Education, *Learning, Tradition and Change in the Northwest Territories* (1982), and resulted in the creation of the Baffin Divisional Board of Education (BDBE) in 1985, with the Keewatin and Kitikmeot boards following soon after. With schools responsible to elected Community Education Councils, each of which has a representative on the Divisional Board, the BDBE sought to create a formal education system that would build on the strengths of Inuit language and culture while simultaneously preparing young people to take active and meaningful roles in the Canadian and global mainstream. *Piniaqtavut* (1989), a K-9 program of studies that integrated an Inuit worldview, topics of interest to Baffin children, and an interactive-experiential pedagogy (Cummins, 1986) was developed by Inuit and Qallunaat educators as an early BDBE initiative to support empowering classrooms for Inuit students. Partially because of its congruence with the culturally based pedagogy evolving within Baffin schools and partially because of its potential to extend existing uses of technology in Baffin schools, CSILE, the precursor to Knowledge Forum™ 1, was introduced in 1992. Between 1992 and 2000 a total of 55 Baffin classrooms in five schools and four communities explored the intersection of knowledge building and bilingual, bicultural education for Inuit students in what is to a large extent a reflexive dialogue between research and practice, each informing the other.

This paper provides insight into how knowledge building worked within this Northern Canadian context and discusses some of the implications. The remainder of the introduction explains the researcher's socio-cultural and technological perspective on the work presented. The first section introduces the methodology and data analysis. The second summarizes the findings in the form of an ethnographic narrative intended to provide a rich description of an Inuktitut/English knowledge building classroom. The narrative contains specific examples of how a classroom teacher integrates the intersecting complexities of a bilingual/bicultural classroom, knowledge building, and Knowledge Forum into a powerful educational environment. The narrative also points out connections to knowledge building principles. Finally, the third section discusses implications for current practice and future research.

### **Some Theory/Practice Considerations**

Educational innovations are not implemented in a vacuum, but rather within specific socio-cultural contexts with histories and power structures

that support or hinder innovations depending on the degree of congruence with them. As indicated previously, education in the Baffin was shaped by the twin goals of building on and supporting the ongoing development of Inuit language, culture, and identity and supporting young Inuit as they acquired the knowledge, skills, and attitudes necessary to survive and prosper in the contemporary Canadian and global contexts. As a locally developed, relevant, and readily available document, *Piniaqtavut* supplied specific guidance for the pursuit of those goals from its publication in 1989 onwards. Developed by Inuit and Qallunaat Baffin educators based on consultations with elders and community members across the region, *Piniaqtavut's* developmental learning framework and philosophical base had Inuit beliefs at their core. Their intersection with contemporary classroom practices was guided by the interactive experiential pedagogy (Cummins, 1986) defined by the following characteristics:

- Genuine oral and written student-teacher dialogue
- Teacher facilitation versus control
- Collaborative student-student talk
- Meaningful language use versus surface correctness
- Conscious integration of language
- Focus on higher level cognitive skills
- Task presentation for intrinsic motivation

The interactive experiential pedagogy is one part of Cummins' (2001) and Cummins et al. (2007) four-part intervention for collaborative empowerment (ICE) (see Table 1).

- <sup>1</sup> CSILE, (Computer Supported Intentional Learning Environment) the precursor to Knowledge Forum, was the networked technology introduced into Baffin classrooms in 1992 and supplanted by the more sophisticated Knowledge Forum in 1996. Except where differing functionality critically affects implementation or use, "Knowledge Forum" will be used to refer to both platforms.↑

**Table 1. Cummin's Intervention for Collaborative Empowerment Model**

<b>Additive cultural/linguistic orientation</b>	<b>An approach to second language acquisition that builds on common underlying proficiencies with the first</b>
<b>Transformative pedagogy</b>	<b>Interactive, communication-based instruction with an explicit focus on asymmetries of power and social justice</b>
<b>Community participation</b>	<b>Active and meaningful involvement of the minority community in the school.</b>
<b>Advocative assessment</b>	<b>Assessment processes emerging from and legitimating the roles of first language and culture in acquisition of the second.</b>

The four parts of this framework collectively support the identity investment and cognitive engagement necessary to maximize the potential for academic success of minority students. *Piniaqtavut* attempted to bring the experiential knowledge of Baffin educators and a well-grounded theoretical framework together to inform an intervention to support the twin goals for Inuit education outlined above.

Although Knowledge Forum was first implemented in Baffin classrooms as a means to support *Piniaqtavut* (McAuley, 2004), over the course of the Baffin initiative knowledge building evolved to encompass twelve principles characteristic of communities engaged in the systematic construction of knowledge (Scardamalia, 2002):

- Pervasive knowledge building
- Democratizing knowledge
- Symmetric knowledge advancement
- Community knowledge, collective responsibility
- Embedded, concurrent, and transformative assessment
- Constructive use of authoritative sources
- Knowledge building discourse
- Epistemic agency
- Real ideas, authentic problems
- Improvable ideas
- Idea diversity
- Rise above

The role of knowledge building in Baffin classrooms is therefore defined by the extent of the congruence between the goals for Inuit education defined by *Piniaqtavut*, the framework of the intervention for collaborative empowerment embedded in it, and the developing understanding of knowledge building as a meaningful framework for young people to acquire the knowledge, skills, and attitudes required for success in a knowledge-based society.

The eight-year experience with knowledge building in the Baffin is a series of interconnected design experiments (Brown, 1992) or formative

experiments (Newman, Goldman, Brienne, Jackson, & Magzamen, 1989). With BDBE and school administrative approval, each year interested teachers in up to four schools were offered the opportunity to participate in an initiative that would allow them to use the networked knowledge building environment to support their classroom instruction. With an eye to sustainability and expandability, participating teachers were allocated one computer for every five students. For the most part arranged in pods in each classroom, the computers were networked to a single common database over a LAN in order to promote potential collaboration across classes and grades. About halfway through the project remote access to the database became available. Participating teachers agreed to structure their schedules in such a way as to allow students approximately 30 minutes daily on the Knowledge Forum database. They were provided with initial training in the environment's operation and an orientation to the link between its conceptual underpinnings and the pedagogies promoted in Baffin classrooms.

Subsequent support included access to a long-term BDBE consultant familiar with the software's technology and pedagogy, regularly scheduled after-school meetings, scheduled release time for planning, and an end-of-year reflection and planning session. Table 2 outlines the number of teachers involved in each of the four schools over the life of the project. Shading tracks the presence of the one teacher with the greatest longevity in the project, seven years in the classroom.

**Table 2. Teacher participation (number of teachers)**

Classes/Year	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01
Atausiq	3	6	5	4	7				
Marruuk				1	2				
Pingasut			1	1	1	4	6	9	1
Tisamat		2	1	1					

As reflected in Table 2, local conditions necessitated variations to this general process of professional planning, support, and review and eliminated any chance of a simple linear year-to-year implementation-reflection-redesign cycle. The high staff turnover, common to many Aboriginal and northern communities, for example, meant that developed expertise and experience was constantly bleeding from the initiative, making it difficult to sustain momentum. Similarly, shifting administrative and school priorities affected the availability of release time for planning. Nevertheless, variations on all of the implementation support strategies accompanied each year of the initiative. In some cases participating educators raised additional funds when the support they felt was necessary could not be sustained with existing institutional funding.

Data sources included student and educator contributions to the

Knowledge Forum databases, minutes of after-school and end-of-year meetings, e-mail archives, and classroom videotapes. Quantitative measures of database engagement provided formative suggestions for successive implementations of Knowledge Forum and tentative insight into what was happening in the classroom.

The next section of this paper integrates a qualitative interpretation of the data into a composite portrait of “a day in the life” of a Baffin knowledge building educator. While this portrait is fictional in the sense that it describes a succession of events that never happened in a single 24 hour span, it summarizes and integrates data gathered from the third to the sixth years of the initiative. In so doing it provides insight into the range of classroom practices that supported knowledge building in classrooms that balanced the knowledge and skills of a Qallunaat teacher with the strengths and needs of Inuit students. This should be of interest to teachers desiring to create educational experiences that move beyond dichotomous Aboriginal/non-Aboriginal power structures. From a more theoretical perspective, it highlights where and how the classroom practices intersect with Knowledge-Building principles and where those principles intersect with the intervention for collaborative empowerment. The intersection of classroom practices, Knowledge-Building principles and the intervention for collaborative empowerment is explored more fully in the final section of the paper.

#### ***A Day in the Life of a Baffin Knowledge-Building Classroom***

As Liz raises her hand and calls out, “Give me five!” to get her class’s attention, she cannot help but be reminded of the challenges she and her students confront in Iqaluit, a town of about 5,000 on Baffin Island in Canada’s eastern Arctic. The 23 Inuit students that make up her Grade 6 class speak Inuktitut as their first language and though most are conversationally fluent in English, their fluency belies the difficulty they have in using English as the primary medium for academic schoolwork. A substantial portion has only the most basic literacy skills in either Inuktitut or English, which is understandable, given the immensity of the struggle facing them in school, the breakneck pace of social and cultural change, and the often difficult conditions facing them in the larger community. Due to these factors they are also, at risk of dropping out, becoming teenage parents, succumbing to the lure of drugs and alcohol, or committing suicide, the rates in the eastern arctic for all of these being among the highest in Canada.

Once she has the students’ attention, Liz reviews their progress on the current theme of study: Indigenous Peoples. Taken from the *Piniaqtavut* program of studies developed by a committee of Inuit and non-Inuit educators, the Indigenous Peoples theme integrates subject areas around a topic of local relevance in a manner more reflective of an Inuit worldview. As Liz finishes talking, the students move off individually or in small groups. One group gathers around a map on the wall to determine

where the groups of indigenous people they have chosen to study actually live. A second group picks up resources from a small classroom library and continues their research on their particular peoples. The final group moves to a network of five Macintosh computers scattered around the perimeter of the classroom where they log into the Knowledge Forum environment that facilitates recording, sharing, and collaborating on their investigations.

As the students settle into their work, Liz moves among them, helping them pursue their theories and questions. Liz is not the only source of information, nor is she the focus of attention. In fact, as she explains how to do something with Knowledge Forum to a student on one computer, a student on the neighbouring computer leans over and says, "See! Told you!" Many ideas and forms of support exist independently of the teacher in this class.

Two additional things might strike a "fly-on-the-wall" observer of this classroom scene, particularly if they are more used to classrooms in which the teacher talks and students listen and take notes or do seatwork. The first is a buzz of student talk and movement around the classroom. Superficially this may seem both distracting and aimless, but a closer examination reveals that for the most part it is directly related to investigation of the Indigenous People theme. The second is Liz's apparent comfort with this environment and her almost uncanny ability to focus effectively and unobtrusively on students who seem off topic or in need of assistance. Despite her own predisposition towards classrooms based on small group work and her years of experience as a northern educator, Liz is quick to note that neither condition has come without struggle.

For one thing, if we can accept as accurate what the students related when they entered her class in September, their conception of learning in school centered on "fill in the blanks" type work. They expressed little if any conception of language as a tool they could use to advance their own learning. Their use of computers had been similarly skewed towards the trivial: they reported that in the previous year their computer use was restricted to weekly or biweekly sessions in the school computer lab with at least some of that limited time spent on games and none of it leaving any lasting impression of relevance to anything they considered important. As a result, Liz spent the first two months of the school year acquainting the students with a classroom routine intended to familiarize them with working in small groups on mini-rotations to various learning activities. One of those mini-rotations was a daily 30 minute spot at a computer where they used the Mavis Beacon Teaches Typing software package to learn keyboarding, and KidWorks and ClarisWorks to learn the fundamentals of graphics and word processing.

By the time of their first exposure to Knowledge Forum in November, the students were comfortable in a classroom with multiple simultaneous

activities in which they could begin to take more responsibility for working without constant teacher supervision. They were also comfortable enough with some of the more subtle features of the computer that they were ready to use it as a tool to work with ideas, as noted by Liz reflecting on students' first couple of days with Knowledge Forum. Whereas in previous years she had had to put assignments and checklists on sheets attached to each computer, this year the students' mastery of multiple windows enabled them to flip back and forth between the introductory note in the database with which their work began, contributions from their classmates, and their own contributions.

Knowledge Forum's shift from the emphasis on the individual acquisition of knowledge that characterizes many classrooms to an emphasis on individuals' contributions to furthering the communal understanding of a problem or topic has required that Liz revise how she tracks and assesses student progress. Although each theme of study will result in a piece of student work to be submitted for formal evaluation, students have a choice about whether to work individually or in small groups, and small groups progress at different rates. Keeping track of individual and group progress is a challenge, so to assist in this process Liz keeps a portfolio for each student. The portfolio includes a checklist that summarizes what they have completed, what they are currently working on, and what they will be doing next. If ever a student seems at a loss about how to proceed, Liz can refer to their portfolio to help them get back on track.

While the student checklists and portfolios are modifications of authentic assessment techniques used in many regular classrooms, Knowledge Forum provides Liz with an Analytic Toolkit to help her monitor the progress of students in an expanding database. On a student-by-student basis the Analytic Toolkit enables Liz to determine such things as the number of notes contributed, their length, and the number of revisions. Should she desire, she can also explore the kinds of relationships between students' notes—build-ons and references, for example, which are indications of knowledge-building processes and the extent to which students are contributing to each other's ideas. While she has found that printed summaries of students' contributions can be useful to motivate continuing involvement, Liz has also found that the Analytic Toolkit helps her foster the knowledge-building behaviours. For example, when students first began contributing to the database Liz read almost everything and commented extensively to demonstrate that she was an active and caring member of the group and to model appropriate interactions. As the database grew and students contributed more and longer notes this became too time-consuming. Use of the Analytic Toolkit streamlines her participation by helping her to identify areas of activity that might benefit from her direct involvement, something she believes is important. Here her experience deviates to some extent from other of her knowledge-building colleagues and highlights some critical questions: to what extent should she participate in a student database?



How can she structure her participation as the “first among equals” in a knowledge-building community as opposed to a dominating authority? Some of her colleagues feel they can address this dilemma by maintaining a minimal presence in the database. In contrast, Liz feels that her students’ lack of experience with English as a tool for learning in a literate environment requires that she participate directly in order to provide them with a model of how they might begin to do so as well.

This belief is emphasized that evening as Liz logs into Knowledge Forum to monitor student progress from home over the Internet. Although she regularly uses Knowledge Forum’s search function to browse the database by author, topic or contributions since a certain date, tonight she uses the Analytic Toolkit to generate a quick overview of student activity on the Indigenous Peoples topic. She focuses on the latest contributions of each student, adding comments or questions where she feels it is appropriate. She notes with satisfaction the students’ growing competence in giving their notes titles that accurately convey their contents to facilitate retrieval, but also notes that their use of scaffolds to identify their notes’ roles in the progress of the ongoing investigation is erratic. It isn’t something she’s particularly concerned about at this point as her students’ are still only part way through their first year with the program, but she will keep it in mind as something to broach to them soon.

Often she introduces a new Knowledge Forum feature such as Scaffolds by doing a mini-lesson with four or five students who seem ready and letting them teach their peers. Tonight, though, she notices that students are beginning to read database contributions from other groups researching different indigenous peoples. They are also beginning to independently identify sources of information other than those available in the classroom. One student, for example, offers a story his mother told him about meeting Mohawk Indians to a student researching the Mohawks. Another adds information from a television documentary about the Cherokee. Still another draws upon direct communication with Maori contacted over the Internet to help with her research; the stage is being set for more substantial engagement with other communities. Note that the students are engaging other communities with their own ideas, to be connected with and further refined through interactions with an extended community, while they contribute ideas of their own. They are not operating in the more traditional computer-mediated mode of “ask-the-expert”, with students as the ones with questions, experts with the answer. Liz’s goal, in contrast, is to engage students in the production of ideas.

Even more exciting, however, is the evidence of higher order thinking implicit in the students’ growing tendency to make direct comparisons between different contributions or to rise above the current level of discussion. One student, for example, notes the similarity in shape among the bushmen’s hut, a wigwam, and an igloo. Another explores

the relationship between the Cree and Inuktitut syllabic orthographies. A third student initiates a discussion proposing that interested students contribute specific comparisons between aspects of life of the various indigenous peoples being studied. Liz realizes that the class is making steps towards becoming a real knowledge-building community.

Although she does not always do so, Liz takes the time this evening to identify and retrieve recent contributions other than those on Indigenous Peoples, the current focus of classroom study. A quick survey of the database draws her attention to a unit on customs around the world officially finished two months ago to which a couple of interested students continue to contribute. Because the Knowledge Forum database allows units of study to remain accessible for any length of time participants choose, it provides for student engagement and enrichment as long as they wish to sustain their efforts at idea improvement. Liz remembers a “throwaway” Knowledge Forum discussion that she put together to give students something to do in the database for a week or two between units: it evolved into a six-month exploration of racism. The communal database allows students to make connections between themes that would otherwise be relegated to separate sections of a notebook or forgotten.

Perhaps more importantly however, it provides all Liz’s ESL students with more extensive exposure to the language relevant to their investigations, and because they have contributed notes themselves, more appropriate to their current level of competence. From her ten years in northern education and her reading on what is known about bilingual education, Liz knows that comprehensible input is essential to acquisition of a second language. She also knows that academic proficiency in a second language generally lags behind conversational proficiency by as much as five to seven years. As an experienced ESL teacher, she strives to create an environment that supports extensive and appropriate language use in the topics of study relevant to students. By providing an environment that helps students build connections between context-embedded, conversational use of language and the context-free, cognitively demanding academic use of language, Knowledge Forum has facilitated that process to such an extent that sometimes she thinks she could no longer teach without it.

Relying on students for input to the database ensures that the language is accessible to most of their peers and allows for such things as interviews with elders to supplement scanty resources, but Liz sometimes worries that it does not provide them with sufficiently challenging models to aspire to and emulate. To some extent, that challenge had been addressed in her previous school where a network of Knowledge Forum classrooms had been set up to share a common database. In conjunction with common units of study undertaken across classes at a given grade level, this arrangement allowed interactions between English first-language and second-language students in which

the contributions of English first-language students served as models of language use for the second-language students. Cross-grade interactions in the database also allowed the contributions of older and more proficient English second-language students to serve as models for their younger peers.

The only teacher using Knowledge Forum in her present school, Liz initially found she could no longer rely on this type of cross-grade, cross-class collaboration to ensure that the language of the database was both appropriate and challenging to her students. Instead, she deliberately structured alternative approaches to foster these types of interactions. At one point she used students from her class at her previous school to act as "learning buddies" or peer mentors to help her current students become familiar with both the use of the Knowledge Forum software and how to undertake collaborative research. Now that her current students are comfortable with Knowledge Forum, she has set them up with partners in the classes that are just beginning to use it. This has had two additional advantages. First, because Liz's students speak Inuktitut as well as English, they are able to work with the Inuktitut-speaking students in the younger grades and notes written in Inuktitut's syllabic orthography are now starting to appear in the database. Second, because the students are often more comfortable with the Knowledge Forum software than the teachers of their buddy classes, they sometimes find themselves mentoring the teachers as well.

To provide further exposure to the more advanced language use appropriate to an area of study Liz encourages the participation of external resource people in Knowledge Forum. Guest contributors have included the school principal, parents, and other occasional classroom visitors. Visiting scientists and representatives of the Nunavut Research Institute have volunteered their time and expertise to contribute to various units of study. A quick search of the database reveals comments made by parents at parent-teacher interviews urging their children to continue their efforts in school. A contribution from the Deputy Minister of Education poses a question for the Indigenous Peoples topic. Classroom visitor Peter Gzowski, the Peabody award winning journalist known for his work in promoting literacy, has posted a note expressing his wish to be remembered as "a really cool guy who types fast" (P. Gzowski, CSILE database, Note #869, April 25, 1997). Gzowski's note has elicited a comment from a student to correct his spelling.

Only a couple of years ago resource people had to be physically present in the classroom in order to contribute to the database. Now, however, the Internet connection Liz uses to access Knowledge Forum from home has opened up a wealth of new opportunities. She is particularly pleased that it has allowed her to continue her ongoing collaboration with the colleague primarily responsible for the original implementation of Knowledge Forum in the Baffin region. After 17 years in the arctic, this colleague, Sandy, moved to Prince Edward Island, over 2,000

kilometres away, and so is unable to provide the direct support that he has in years past. Instead, he now logs into the Knowledge Forum database over the Internet just as Liz does from home.

Under way for several years, this tele-mentoring relationship evolved out of necessity, beginning when Liz took over sole responsibility for the Knowledge Forum local-area network for the first time. With no local support person, she relied upon Sandy to answer her questions about keeping the computers and network operating reliably. As the number of Liz's technical questions diminished Sandy found himself drawn as an educator to consider issues pertaining to subject matter and pedagogy. A Knowledge Forum view, the "Classroom Research Journal," created by Liz to record her reflections about implementing Knowledge Forum gradually became the nexus for their collaboration. Liz's classroom observations and questions often led Sandy to offer his own perspective on what was taking place in the database. At other times Liz would propose ways to introduce a new theme of study or to structure a special class to incorporate a guest visitor for Sandy's feedback. Although invisible to the students, the Classroom Research Journal was an integral part of the same database in which they were working, so it was a simple matter to move between educators' discussion and the relevant student work. It also permitted Sandy to work directly with the students if the circumstances allowed. For example, when students were using Knowledge Forum to work on Science Fair investigations Sandy contributed suggestions to one student about how to build a pinhole camera and to another about how to construct a papermaking frame, information not available locally to the students.

Tele-mentoring, wide-area access to Knowledge Forum databases, and use of the database to promote knowledge building for educators as well as for students has evolved significantly since Liz's and Sandy's first efforts. Last year, for example, both Sandy and Liz collaborated with teachers implementing Knowledge Forum in Hay River, a community in the Northwest Territories over 2,000 kilometres to the west. Over the course of the year participants at both sites contributed to the development of a shared database on Space to see whether the kinds of relationships that had existed within a building could be established between Iqaluit ESL students and Hay River English-first-language students. The teacher in Hay River extended the tele-mentoring concept to include an astrophysicist who happened to be resident in Hay River and was willing to share her expertise by participating in the database. For their part, the Iqaluit students were able to contribute from their online experiences with programs from the Canadian Space Agency and Inuit myths and legends about the stars they had collected from local elders.

Liz has continued to draw on Sandy's support as she uses the Iqaluit database to build a collaborative approach to extend the use of Knowledge Forum to other classrooms within the school. The Classroom

Research Journal now includes views on collaborative theme development, technical questions, assessment, and observations. Although these views are intended for teachers, they are accessible to students and a student will occasionally comment on or ask a question about the issues raised there.

Tonight, however, as Liz finishes reading and commenting on the students' notes she restricts herself to one last contribution to direct Sandy's attention to the notes which she thinks demonstrate higher order thinking and logs out. The next morning, thousands of kilometres and a time zone away, Sandy logs in to check the database, something he does a couple of times a week. Searching for notes contributed since his last login, he finds Liz's contribution, opens it, then searches by author to retrieve the notes she has pointed out. He notes with delight the evidence of the students' growing ownership of the investigation, offers a couple of comments, and poses a question to a student about the extinction of Newfoundland's Beothuk people. Then he logs out himself.

#### ***Discussion: Rising Above a Day in the Life***

Drawn from data from an eight-year exploration of the potential of knowledge building and knowledge-building technologies in Baffin classrooms, the preceding "day in the life" passage illustrates how the knowledge building space becomes one in which the relationships between teacher and students can be negotiated across differences of language, culture, and power. The data provide evidence that students in the knowledge building classrooms participating in the study acquired the skills and motivation to select, plan, and conduct investigations in Inuktitut and English. In the process of facilitating this, their teacher became a knowledge builder herself, using the Knowledge Forum environment to reflect on and assess her pedagogy. Together the teacher, students, and others who participated in the Baffin initiative demonstrated that they could construct their own version of a viable knowledge-building community in a minority language context.

Because the "day in the life" format condenses the data highly in order to generate a coherent picture, it tends to obscure the challenges that had to be overcome. It also blurs the distinction between the kinds of knowledge-building practices that characterized the initiative in its first few years and those that were developed later in the project: collapsing the eight-year initiative into a snapshot of a single imaginary day, while true to the practices described, says little about the knowledge-building trajectory that Liz traveled as she developed them. Table 3 provides a framework from which to explore this distinction.

#### **Table 3. A teacher's knowledge-building trajectory**

		Early indications	Later indications
Community	Pervasive knowledge building	<ul style="list-style-type: none"> <li>teacher made deliberate effort to make knowledge building integral to all themes</li> <li>knowledge building applied within individual classrooms</li> </ul>	<ul style="list-style-type: none"> <li>cross-grade, interschool mentoring and collaboration</li> <li>teacher practices subject to investigation</li> <li>connections made across investigations</li> <li>contributions to an investigation extend beyond time allotted</li> </ul>
	Democratizing knowledge	<ul style="list-style-type: none"> <li>teacher participates as “first among equals”</li> <li>all students are expected to contribute in some capacity to idea sharing, critique, and refinement</li> </ul>	<ul style="list-style-type: none"> <li>cross-grade, interschool mentoring and collaboration</li> <li>all students contribute in some capacity to idea sharing, critique, and refinement</li> </ul>
	Symmetric knowledge advancement		<ul style="list-style-type: none"> <li>cross-grade, interschool mentoring and collaboration</li> <li>school-researcher collaboration</li> </ul>
	Community knowledge, collective responsibility	<ul style="list-style-type: none"> <li>casual peer help as supplement to teacher help</li> <li>teacher as participant</li> </ul>	<ul style="list-style-type: none"> <li>cross-grade, interschool mentoring and collaboration</li> <li>school-researcher collaboration</li> </ul>
Agency	Embedded, concurrent, and transformative assessment	<ul style="list-style-type: none"> <li>tracking portfolios maintained by teacher</li> </ul>	<ul style="list-style-type: none"> <li>Analytic Tool Kit; vocabulary growth, build-on clusters, printed student summaries</li> <li>student-maintained knowledge-building portfolios</li> </ul>
	Constructive use of authoritative sources	<ul style="list-style-type: none"> <li>classroom library</li> <li>teacher an authoritative source</li> </ul>	<ul style="list-style-type: none"> <li>students identify and select authoritative sources including themselves, local community members, &amp; Internet contacts</li> </ul>
	Knowledge building discourse	<ul style="list-style-type: none"> <li>teacher models written discourse in database</li> </ul>	Structured use of: <ul style="list-style-type: none"> <li>scaffolds</li> <li>substantive build-ons</li> <li>references</li> <li>revisions to incorporate feedback and new knowledge</li> </ul>
	Epistemic agency	<ul style="list-style-type: none"> <li>student choice of indigenous group to study</li> <li>casual peer help</li> <li>choice of groups and group size</li> </ul>	<ul style="list-style-type: none"> <li>student interests/questions drive selection, process, and duration of investigation (e.g. racism unit, world customs)</li> <li>increasing use of Inuktitut in database</li> </ul>
	Real ideas, authentic problems	<ul style="list-style-type: none"> <li>investigations selected from <i>Piniagtavut</i> program of studies</li> </ul>	<ul style="list-style-type: none"> <li>investigations selected from problems identified by students</li> </ul>
	Improvable ideas		<ul style="list-style-type: none"> <li>revisions incorporate feedback and new knowledge</li> </ul>

The first two columns categorize and list Knowledge-Building principles. The third column, Early Indications, lists the practices supporting knowledge building that characterized Liz's classrooms during the first couple of years of the study. Many of those practices could be seen as characteristic of "good teaching" in general as opposed to a deliberate attempt to nurture a knowledge-building classroom in particular. These practices include such things as peer helpers, teacher-maintained tracking portfolios, a classroom library of diverse resources, student choice, and teacher questioning techniques. What distinguishes this particular "good teaching" from good teaching in general is the conscious effort to build on to these practices to create a classroom focused on the collaborative construction of knowledge. Good teaching itself thus becomes an improvable idea.

The fourth column in Table 3, Later Indications, summarizes the kinds of classroom practices that characterize the later years of the study. Salient in such practices are engagement with a community beyond that of the classroom, growing student agency in selection and conduct of the investigations, and increased sophistication in dealing with ideas. A conscious focus on the role of Inuktitut and traditional Inuit knowledge permeated these practices, something most evident in the process of interviewing elders as an example of constructive use of authoritative sources.

While the knowledge-building practices outlined in the fourth column are both more numerous and more sophisticated than those in the third, they were neither ubiquitous nor the sine qua non of classroom knowledge building. For example, while students would suggest questions or issues to be explored and while their input did shape the overall progress of an investigation, to a large extent the issues were determined by the teacher based on those suggested by the *Piniqtaqvut* program of studies. Topics such as the investigation of racism mentioned earlier, which took on a life of their own as a result of progressively refined student and teacher interest, were the exception rather than the rule, particularly when new teachers were drawn in as part of cross-grade collaborations. What the practices in the fourth column do illustrate, however, is the progress of one particular teacher along a trajectory towards an ever more sophisticated knowledge-building environment. This is an endless journey, partly because ongoing research constantly refines what is understood about knowledge building and how it may be implemented in K-12 classrooms and partly because the teacher herself was continually re-evaluating and reformulating her own understanding and practices. One of the defining characteristics of expertise (Bereiter & Scardamalia, 1993), the willingness to live on the edge of what is known, constantly seeking to improve knowledge and understanding, is not a state of being with which all educators are comfortable. Nor is it something with which a system increasingly preoccupied with uniform standards and basic skills will be comfortable.

Educators striving to establish knowledge-building classrooms must recognize and respond to the socio-cultural contexts within which the knowledge building will take place. In this study in the Baffin region, responding to the context was facilitated by drawing upon prior work towards bilingual education that demonstrated a fundamental congruence with Knowledge-Building principles. It also built upon the trusting working relationship and similar deeply felt pedagogical beliefs of the researcher and collaborating educator. Finally, it took time, hard work, and a lot of false starts. Although the issues of politics and power outlined in this paper may seem peripheral to creating knowledge-building classrooms, they are critical in minority or Aboriginal contexts which are characterized by curricula and educators from a dominant majority culture. Without the critical consciousness of the importance of Inuit language and culture in the knowledge-building context and the deliberate effort to integrate them into the Knowledge Forum investigations, the initiative might have devolved into another technologically based educational initiative that undermined the very goals it purported to address. Accepting and coming to terms with this issue is a significant challenge to many non-Aboriginal educators.

Other significant challenges also stand in the way of expanding to other Aboriginal contexts what was done with strong researcher support in a few Baffin classrooms. These barriers include the high teacher turnover rate mentioned earlier and the concurrent continuous loss of key personnel that characterize education in many isolated Aboriginal schools, particularly those with a lack of indigenous educators. Congruent with one administrator's view that the intervention was too complex for the "average" teacher is the notion that knowledge building fundamentally challenges much conventional wisdom about what constitutes curriculum and how it should be delivered and assessed.

A final barrier, and one which reaches beyond the Aboriginal context of this study, is determining how to move beyond the well-demonstrated success of a productive research/practitioner collaboration to other means of propagating innovation. For knowledge building to become widespread in schools two sorts of imbalance—in purpose and in number—between university communities and school communities need to be addressed. Universities generate knowledge on the leading edge and induct students into becoming knowledgeable about both the established canon and new knowledge. Universities have a large capacity to generate, assess, and organize knowledge. Schools have a much smaller capacity to do that, and are primarily concerned with having students become knowledgeable about carefully selected bodies of knowledge organized in ways designed to promote learning. Second, the number of researchers who could engage with teachers in the sort of work described in this paper is very small relative to the number of teachers in schools. Thus what is needed is both a shift in purpose of schools and new forms of professional partnership. Such partnerships would need to be emergent in their method, adapting how they work to



whatever circumstances arise, just as in the eight years of work of the author reported herein. The “day in the life” presentation of the author’s experience in Baffin region demonstrates empirically that knowledge building is congruent with and can complement and extend a framework specifically designed to support the academic success of minority language students. It could thus serve as guidance for those educators who choose to collaborate in doing similar work in other schools.

### **References**

Baffin Divisional Board of Education. (1989). *Piniaqtavut*. Iqaluit, NU: Author.

Bereiter, C., & Scardamalia, M. (1993). *Surpassing ourselves*. Chicago and LaSalle, IL: Open Court.

Brown, A. (1992). Design experiments: Theoretical and methodological challenges in creating complex interventions in classroom settings. *The Journal of the Learning Sciences*, 2(2), 141-178.

Cummins, J. (1986). Empowering minority students: A framework for intervention. *Harvard Education Review* 56(1), 18-36.

Cummins, J. (2001 (1996)). *Negotiating identities: Education for empowerment in a diverse society* (2nd ed.). Los Angeles: California Association for Bilingual Education.

Cummins, J., Brown, K., & Sayers, D. (2007). *Literacy, technology, and diversity*. Boston, MA: Pearson Education.

Government of the Northwest Territories. (1982). *Learning, tradition and change in the Northwest Territories*. Yellowknife, NT: Author.

McAuley, A. (2004). *Illiniqatigiit*. Unpublished doctoral dissertation. Toronto, ON: University of Toronto.

Newman, D., Goldman, S. V., Brienne, D., Jackson, I., & Magzamen, S. (1989). Computer mediation of collaborative science investigations. *Journal of Educational Computing Research*, 5(2), 151-166.

Scardamalia, M. (2002). Collective cognitive responsibility for the advancement of knowledge. In B. Smith (Ed.), *Liberal education in a knowledge society* (pp. 67-96). Chicago and LaSalle, IL: Open Court.